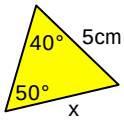
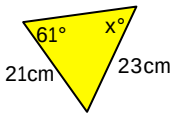
NATIONAL 5 HOMEWORK EXERCISE PACK B

CONTENTS

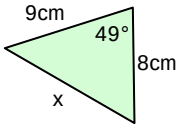
Exercise 1

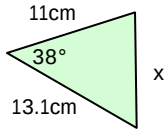
1. Use the sine rule to find x

a. 

b. 

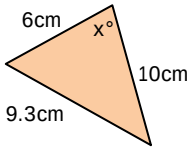
2. Use the cosine rule to side x

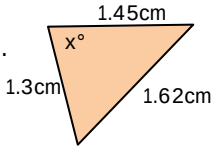
a. 

b. 

3. Calculate the area of the triangles in question 2.

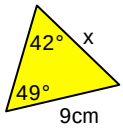
4. Use the cosine rule to find angle x

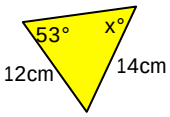
a. 

b. 

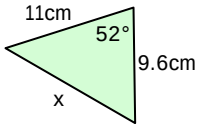
Exercise 2

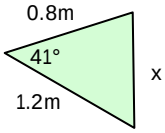
1. Use the sine rule to find x

a. 

b. 

2. Use the cosine rule to side x

a. 

b. 

3. Calculate the area of the triangles in question 2.

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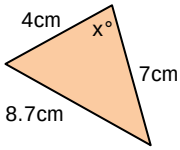
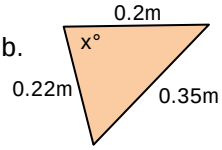
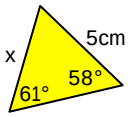
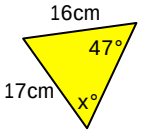
a. 

b. 

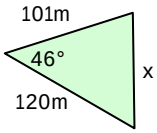
Exercise 3

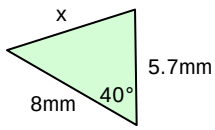
1. Use the sine rule to find x

a. 

b. 

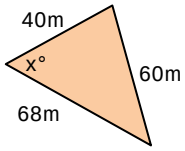
2. Use the cosine rule to side x

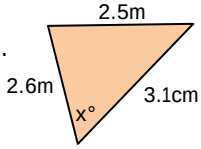
a. 

b. 

3. Calculate the area of the triangles in question 2.

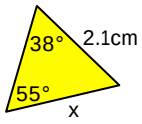
4. Use the cosine rule to find angle x

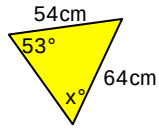
a. 

b. 

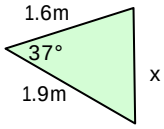
Exercise 4

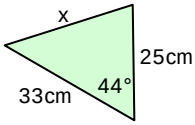
1. Use the sine rule to find x

a. 

b. 

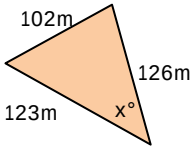
2. Use the cosine rule to side x

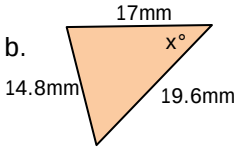
a. 

b. 

3. Calculate the area of the triangles in question 2.

4. Use the cosine rule to find angle x

a. 

b. 

Applications	Triangle Trigonometry

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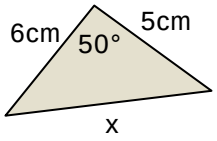
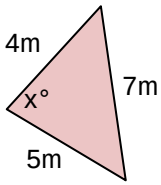
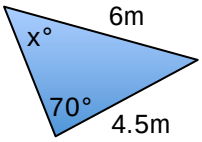
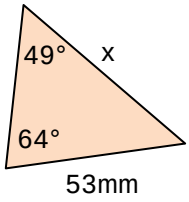
Exercise 1

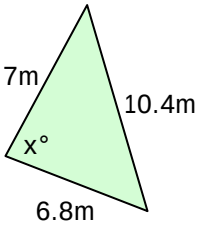
1. Use the sine rule or cosine rule to find x

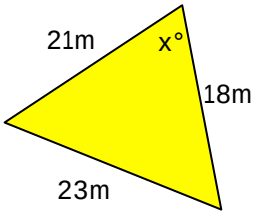
a. 

b. 

c. 

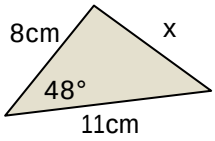
d. 

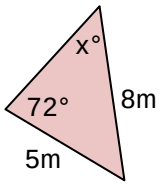
e. 

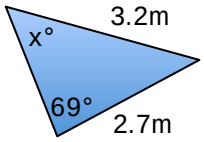
f. 

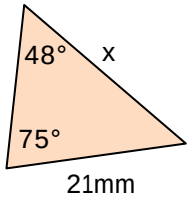
Exercise 2

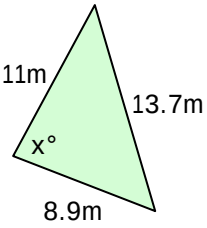
1. Use the sine rule or cosine rule to find x

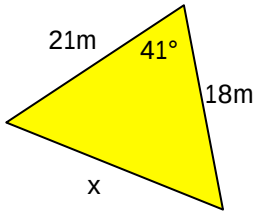
b. 

b. 

c. 

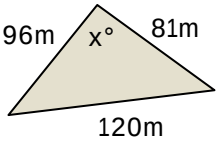
d. 

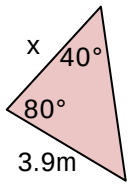
e. 

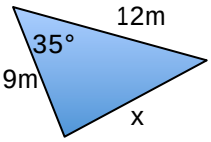
f. 

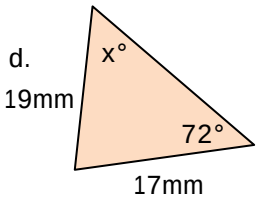
Exercise 3

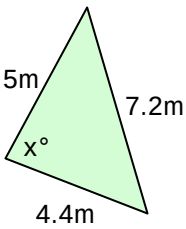
1. Use the sine rule or cosine rule to find x

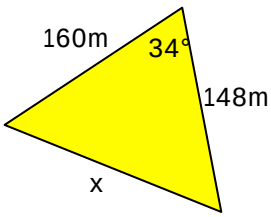
c. 

b. 

c. 

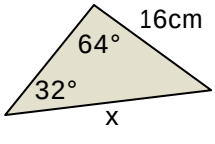
d. 

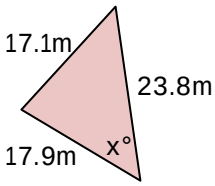
e. 

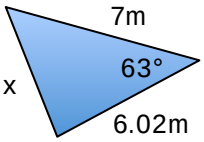
f. 

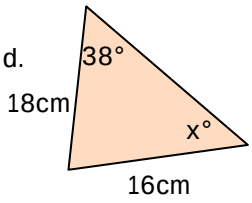
Exercise 4

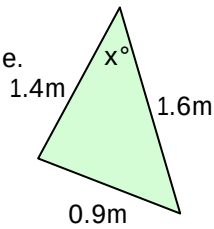
1. Use the sine rule or cosine rule to find x

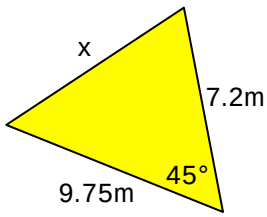
d. 

b. 

c. 

d. 

e. 

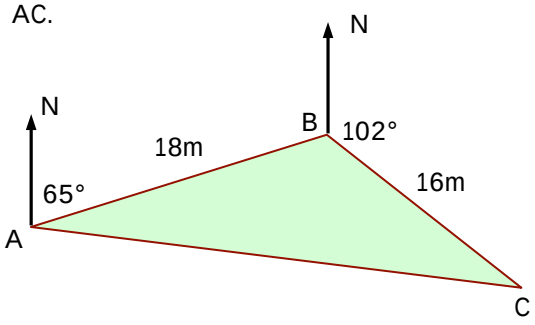
f. 

Applications	Triangle Trigonometry

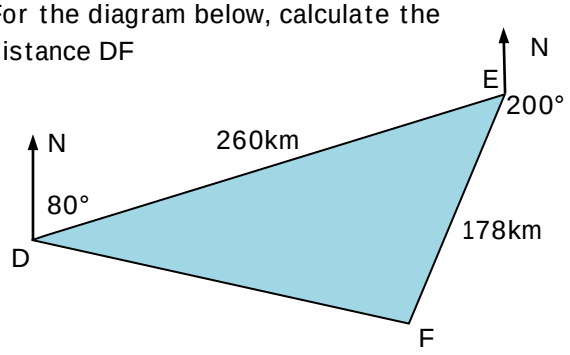
National 5 Homework Booklet

Exercise 1

1. For the diagram below, calculate the distance AC.

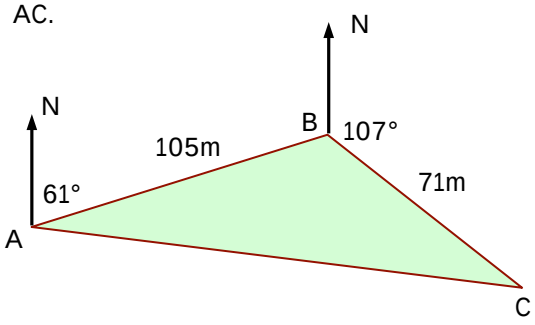


2. For the diagram below, calculate the distance DF

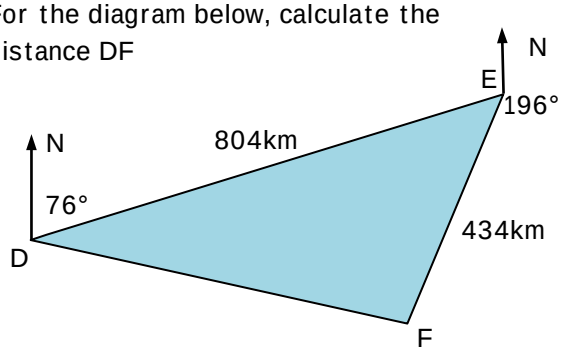


Exercise 2

1. For the diagram below, calculate the distance AC.

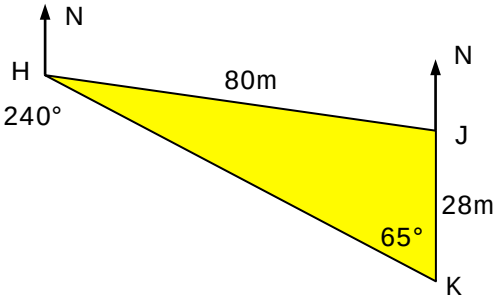


2. For the diagram below, calculate the distance DF

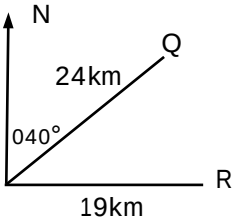


Exercise 3

1. For the diagram below, calculate the distance HK.

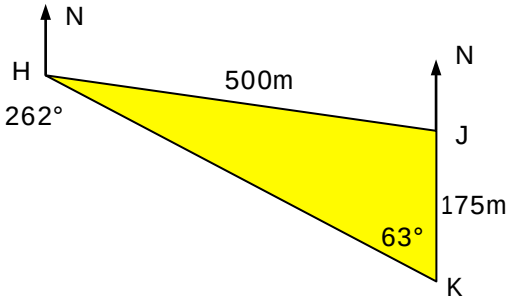


2. For the diagram below, calculate the distance between Q and R

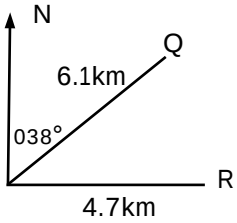


Exercise 4

1. For the diagram below, calculate the distance HK.

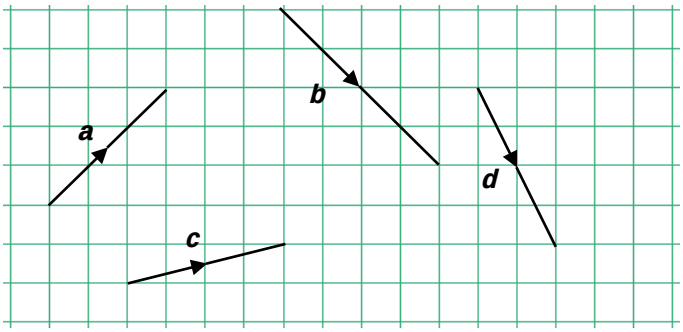


2. For the diagram below, calculate the distance between Q and R



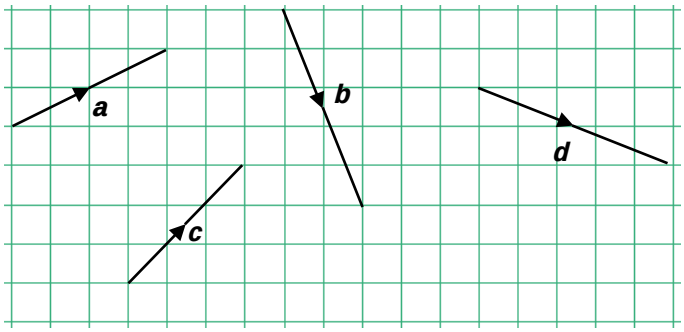
Applications	Trigonometry – Bearings Problems

Exercise 1



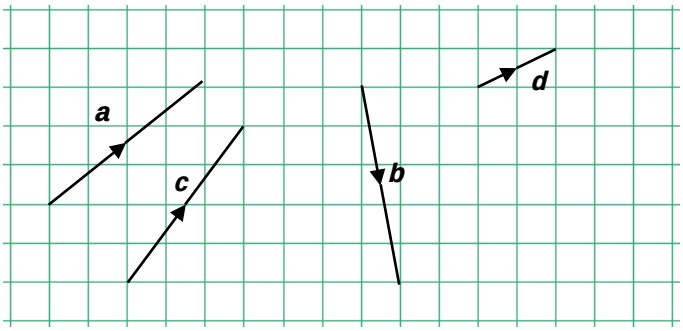
1. Draw a diagram representing:
   (a) ***a + b*** (b) ***b – c*** (c) ***c – d***
2. Write each of the vectors above in component form
3. Using the component form above, find
   (a) ***b + d*** (b) ***c – a*** (c) ***d – b***
   (d) ***2a + c*** (e) ***3b – 3d*** (f) ***4d + 2a***

Exercise 2



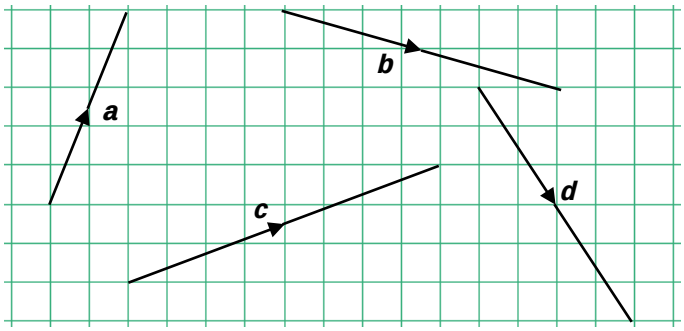
1. Draw a diagram representing:
   (a) ***a + b*** (b) ***c + b*** (c) ***d – c***
2. Write each of the vectors above in component form
3. Using the component form above, find
   (a) ***a + d*** (b) ***b – c*** (c) ***c + b***
   (d) ***2b + d*** (e) ***3d – 3a*** (f) ***4a - 2c***

Exercise 3



1. Draw a diagram representing:
   (a) ***a + b*** (b) ***b + c*** (c) ***c – d***
2. Write each of the vectors above in component form
3. Using the component form above, find
   (a) ***b + d*** (b) ***c – a*** (c) ***d – b***
   (d) ***2a + c*** (e) ***3b – 3d*** (f) ***4d + 2a***

Exercise 4



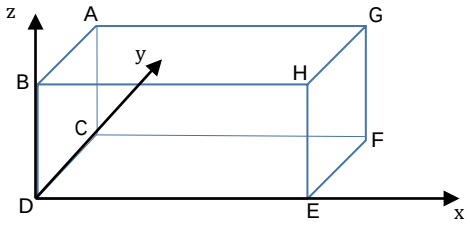
1. Draw a diagram representing:
   (a) ***a + b*** (b) ***c + b*** (c) ***d – b***
2. Write each of the vectors above in component form
3. Using the component form above, find
   (a) ***a + d*** (b) ***b – c*** (c) ***c + b***
   (d) ***3a + 2d*** (e) ***2c – 3d*** (f) ***4b - 5c***

Applications	Vectors

National 5 Homework Booklet

Exercise 1

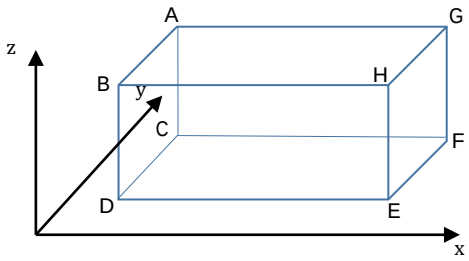
In the cuboid below, G is the point (8, 5, 6)



1. Find the position vectors for:
   (a) H (b) C (c) A
2. Write the following vectors in component form:
   (a) $\overrightarrow{DE}$ (b) $\overrightarrow{EF}$ (c) $\overrightarrow{DG}$
3. Calculate the magnitude of DG, giving your answer to 1 decimal place.

Exercise 2

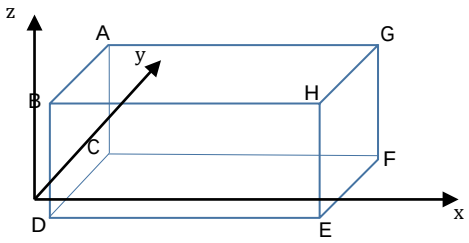
In the cuboid below, D is the point (2, 2, 0) and G is (6, 3, 2)



1. Find the position vectors for:
   (a) H (b) C (c) A
2. Write the following vectors in component form:
   (a) $\overrightarrow{DE}$ (b) $\overrightarrow{FE}$ (c) $\overrightarrow{DG}$
3. Calculate the magnitude of DG, giving your answer to 1 decimal place.

Exercise 3

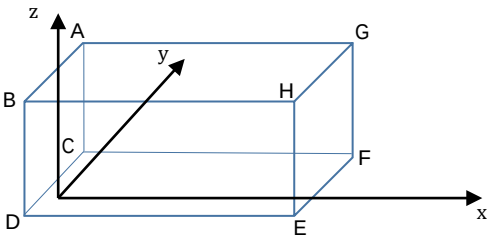
In the cuboid below, D is the point (1, -1, 0) and G is (5, 2, 4)



1. Find the position vectors for:
   (a) H (b) C (c) A
2. Write the following vectors in component form:
   (a) $\overrightarrow{DE}$ (b) $\overrightarrow{EF}$ (c) $\overrightarrow{DG}$
3. Calculate the magnitude of DG, giving your answer to 1 decimal place.

Exercise 4

In the cuboid below, D is the point (-2, -2, 0) and G is (8, 6, 6)



1. Find the position vectors for:
   (a) H (b) C (c) A
2. Write the following vectors in component form:
   (a) $\overrightarrow{DE}$ (b) $\overrightarrow{FE}$ (c) $\overrightarrow{GD}$
3. Calculate the magnitude of DG, giving your answer to 1 decimal place.

Applications	Vectors

Exercise 1

1. Steve bought a car for £16,500 and sold it two years later for £12,000. Calculate the percentage depreciation to 1 decimal place.
2. A yacht increased in value from £220,000 to £260,000. Calculate this increase as a percentage to 1 decimal place.
3. A suit was reduced in the sale by 15% to £80.75. Calculate the original price of the suit.
4. A house increased in value by 20% to £240,000. Calculate the original value of the house before the rise.
5. A bottle manufacture reduced the volume of their bottles by 24% to 228ml. Calculate the original volume of the bottles.
6. Trainers are reduced by 30% to £42 in a sale. Calculate their original price.

Exercise 2

1. Zainab bought an X-box for £500 and sold it two years later for £180. Calculate the percentage depreciation.
2. A house increased in value from £120,000 to £166,000. Calculate this increase as a percentage to 1 decimal place.
3. A scarf was reduced in the sale by 18% to £6.56. Calculate the original price of the scarf.
4. A motorbike depreciated by 40% to £7560. Calculate the original value of the motorbike.
5. A crisp manufacture reduced the weight of their crisp packets by 4% to 38g. Calculate the original weight to 1 decimal place
6. A phone contract is reduced by 12% to £12 per month. Calculate its original price.

Exercise 3

1. Susan bought a car for £20,900 and sold it two years later for £14,000. Calculate the percentage depreciation to 1 decimal place.
2. Jamal's coin collection increased in value from £320 to £450. Calculate this increase as a percentage to 1 decimal place.
3. A dress was reduced in the sale by 60% to £33. Calculate the original price of the dress.
4. A house increased in value by 23% to £147,600. Calculate the original value of the house before the rise.
5. A bottle manufacture increased the volume of their bottles by 8% to 216ml. Calculate the original volume of the bottles.
6. Trainers are reduced by 45% to £35.75 in a sale. Calculate their original price.

Exercise 4

1. Calum bought a PS3 for £400 and sold it three years later for £80. Calculate the percentage depreciation.
2. An antique increased in value from £500 to £700. Calculate this increase as a percentage.
3. A necklace was reduced in the sale by 32% to £61.20. Calculate the original price of the necklace.
4. A motorbike depreciated by 92% to £1120. Calculate the original value of the motorbike.
5. A crisp manufacture reduced the weight of their crisp packets by 6% to 47g. Calculate the original weight.
6. A phone contract is reduced by 18% to £13.12 per month. Calculate its original price.

Applications	Percentages – Increase/Decrease, Percentages in Reverse

Exercise 1

1. Zach leaves £2300 in his bank for 3 years. The rate of interest is paid at 4% per annum. Calculate how much interest Zach is due after 3 years.

2. A boat was purchased for £36,000. The value fell by 2% after the first year and then by 5% for the next two years. How much is the boat worth after 3 years?

3. The population of bees in a farm is rising by 2.3% per annum. If the original population was 240,000, calculate the population after 5 years.

4. A car was purchased for £24,000. The value of the car depreciated by 6.7% for 4 years. Find the value of the car after 4 years.

Exercise 2

1. Lauren leaves £4500 in her bank for 2 years. The rate of interest is paid at 3% per annum. Calculate how much interest Lauren is due after 2 years.

2. A boat was purchased for £48,000. The value fell by 6% after the first year and then by 11% for the next two years. How much is the boat worth after 3 years?

3. The population of bees in a farm is rising by 1.8% per annum. If the original population was 360,000, calculate the population after 4 years.

4. A car was purchased for £22,000. The value of the car depreciated by 12.3% for 5 years. Find the value of the car after 5 years.

Exercise 3

1. Ryan leaves £26400 in his bank for 3 years. The rate of interest is paid at 3.7% per annum. Calculate how much interest Ryan is due after 3 years.

2. A caravan was purchased for £32500. The value fell by 7% after the first year and then by 4.3% for the next two years. How much is the caravan worth after 3 years?

3. The population of bees in a farm is rising by 10.1% per annum. If the original population was 3,070,000, calculate the population after 4 years.

4. A car was purchased for £47000. The value of the car depreciated by 12.3% for 4 years. Find the value of the car after 4 years.

Exercise 4

1. Tony leaves £54000 in his bank for 3 years. The rate of interest is paid at 2.09% per annum. Calculate how much interest Tony is due after 3 years.

2. A caravan was purchased for £42600. The value fell by 9% after the first year and then by 14% for the next two years. How much is the caravan worth after 3 years?

3. The population of bees in a farm is rising by 14.03% per annum. If the original population was 2,800,000, calculate the population after 3 years.

4. A car was purchased for £64000. The value of the car depreciated by 12.8% for 5 years. Find the value of the car after 5 years.

Applications	Percentages – Compound Interest

Exercise 1

1. Calculate the compound interest on these bank accounts:
   a. £3000 invested at 4% p.a, 2 years
   b. £22000 invested at 2.03% p.a, 4 years
   c. £560 invested at 1.2% p.a, 3 years
   d. $4000 invested 10.04% p.a, 5 years
2. A suit was reduced in the sale by 15% to £216.75. Calculate the original price of the suit.
3. A house increased in value by 20% to £264,000. Calculate the original value of the house before the rise.
4. An aerosol manufacture reduced the volume of their tin cans by 14% to 314ml. Calculate the original volume to 4 significant figures.

Exercise 2

1. Calculate the compound interest on these bank accounts:
   a. £7000 invested at 5% p.a, 3 years
   b. £31000 invested at 4.09% p.a, 2 years
   c. £217 invested at 0.98% p.a, 4 years
   d. $3000 invested 9.003% p.a, 3 years
2. A suit was reduced in the sale by 12% to £340. Calculate the original price of the suit.
3. A house increased in value by 17% to £125,000. Calculate the original value of the house before the rise.
4. An aerosol manufacture reduced the volume of their tin cans by 10% to 305ml. Calculate the original volume to 4 significant figures.

Exercise 3

1. Calculate the compound interest on these bank accounts:
   a. £2000 invested at 6% p.a, 2 years
   b. £18000 invested at 1.07% p.a, 4 years
   c. £830 invested at 2.8% p.a, 5 years
   d. $6200 invested 7.002% p.a, 3 years
2. A suit was reduced in the sale by 23% to £406. Calculate the original price of the suit.
3. A house increased in value by 16% to £374,200. Calculate the original value of the house before the rise.
4. An aerosol manufacture reduced the volume of their tin cans by 9% to 308ml. Calculate the original volume to 4 significant figures.

Exercise 4

1. Calculate the compound interest on these bank accounts:
   a. £5000 invested at 2% p.a, 3 years
   b. £45000 invested at 3.08% p.a, 2 years
   c. £720 invested at 0.6% p.a, 3 years
   d. $12000 invested 8.105% p.a, 4 years
2. A suit was reduced in the sale by 25% to £250. Calculate the original price of the suit.
3. A house increased in value by 42% to £132,000. Calculate the original value of the house before the rise.
4. An aerosol manufacture reduced the volume of their tin cans by 6% to 288ml. Calculate the original volume to 4 significant figures.

Applications	Percentages – Compound Interest, Percentages in Reverse

Exercise 1

1. Add or subtract the following fractions:

a. $\frac{1}{5}+\frac{2}{5}$ **b.** $\frac{1}{2}+\frac{1}{3}$ **c.** $2\frac{1}{3}+3\frac{2}{5}$

d. $8\frac{7}{8}-5\frac{1}{4}$ **e.** $6\frac{1}{5}-2\frac{2}{3}$ **f.** $\frac{13}{4}+5\frac{1}{3}$

2. A bodybuilder weighed $14\frac{3}{4}$ stones. After training, his weight increased by $2\frac{1}{3}$ stones. Find his new weight.

3. The length of a pipe was $6\frac{4}{5}$ metres long. $1\frac{1}{2}$ metres was cut from the length. Find the new length of the pipe.

Exercise 2

1. Add or subtract the following fractions:

a. $\frac{2}{7}+\frac{3}{7}$ **b.** $\frac{2}{3}+\frac{1}{8}$ **c.** $7\frac{1}{6}+4\frac{1}{5}$

d. $4\frac{8}{9}-1\frac{1}{2}$ **e.** $9\frac{1}{4}-2\frac{5}{6}$ **f.** $\frac{12}{5}+2\frac{1}{4}$

2. A bodybuilder weighed $16\frac{1}{3}$ stones. After training, his weight increased by $2\frac{1}{4}$ stones. Find his new weight.

3. The length of a pipe was $5\frac{6}{7}$ metres long. $1\frac{1}{2}$ metres was cut from the length. Find the new length of the pipe.

Exercise 3

1. Add or subtract the following fractions:

a. $\frac{2}{9}+\frac{3}{9}$ **b.** $\frac{1}{7}+\frac{1}{8}$ **c.** $3\frac{1}{2}+5\frac{2}{5}$

d. $5\frac{7}{12}-2\frac{1}{4}$ **e.** $7\frac{1}{2}-3\frac{3}{5}$ **f.** $\frac{10}{3}+4\frac{1}{4}$

2. A bodybuilder weighed $15\frac{2}{5}$ stones. After training, his weight increased by $1\frac{1}{3}$ stones. Find his new weight.

3. The length of a pipe was $6\frac{4}{5}$ metres long. $1\frac{1}{2}$ metres was cut from the length. Find the new length of the pipe.

Exercise 4

1. Add or subtract the following fractions:

a. $\frac{3}{11}+\frac{6}{11}$ **b.** $\frac{1}{7}+\frac{1}{2}$ **c.** $5\frac{1}{2}+6\frac{2}{9}$

d. $5\frac{6}{7}-2\frac{3}{14}$ **e.** $8\frac{1}{3}-3\frac{4}{5}$ **f.** $\frac{11}{2}+2\frac{3}{4}$

2. A bodybuilder weighed $16\frac{1}{4}$ stones. After training, his weight increased by $1\frac{3}{8}$ stones. Find his new weight.

3. The length of a pipe was $8\frac{5}{12}$ metres long. $3\frac{1}{4}$ metres was cut from the length. Find the new length of the pipe.

Applications	Fractions – Adding and Subtracting

Exercise 1

1. Multiply or divide the following fractions and simplify:

a. $\frac{1}{5}\times\frac{2}{3}$ **b.** $\frac{5}{7}\times\frac{14}{25}$ **c.** $\frac{11}{3}\times 2\frac{1}{4}$

d. $3\frac{1}{2}\times 2\frac{1}{6}$ **e.** $\frac{1}{5}\div\frac{1}{3}$ **f.** $\frac{5}{9}\div\frac{2}{3}$

g. $4\frac{1}{2}\div 1\frac{3}{4}$ h. $5\frac{2}{5}\div 3\frac{1}{4}$

2. A rectangle is $5\frac{1}{3}$ metres long by $3\frac{1}{2}$ metres wide. Calculate the area.

3. Calculate the perimeter of the rectangle in question 2.

Exercise 2

1. Multiply or divide the following fractions and simplify:

a. $\frac{1}{4}\times\frac{3}{8}$ **b.** $\frac{3}{8}\times\frac{12}{27}$ **c.** $\frac{9}{2}\times 3\frac{1}{5}$

d. $7\frac{1}{3}\times 3\frac{5}{6}$ **e.** $\frac{1}{7}\div\frac{1}{9}$ **f.** $\frac{6}{7}\div\frac{1}{4}$

g. $2\frac{1}{3}\div 1\frac{1}{5}$ h. $6\frac{3}{8}\div 2\frac{2}{3}$

2. A rectangle is $6\frac{1}{4}$ metres long by $2\frac{1}{3}$ metres wide. Calculate the area.

3. Calculate the perimeter of the rectangle in question 2.

Exercise 3

1. Multiply or divide the following fractions and simplify:

a. $\frac{1}{7}\times\frac{2}{9}$ **b.** $\frac{6}{25}\times\frac{10}{21}$ **c.** $\frac{5}{2}\times 4\frac{1}{3}$

d. $5\frac{1}{4}\times 3\frac{1}{2}$ **e.** $\frac{1}{3}\div\frac{1}{7}$ **f.** $\frac{7}{8}\div\frac{3}{4}$

g. $5\frac{1}{5}\div 2\frac{2}{3}$ h. $3\frac{2}{5}\div 2\frac{1}{2}$

2. A rectangle is $10\frac{1}{2}$ metres long by $6\frac{1}{5}$ metres wide. Calculate the area.

3. Calculate the perimeter of the rectangle in question 2.

Exercise 4

1. Multiply or divide the following fractions and simplify:

a. $\frac{1}{8}\times\frac{3}{7}$ **b.** $\frac{10}{21}\times\frac{14}{30}$ **c.** $\frac{8}{5}\times 3\frac{1}{4}$

d. $2\frac{1}{7}\times 3\frac{1}{4}$ **e.** $\frac{2}{3}\div\frac{1}{10}$ **f.** $\frac{6}{7}\div\frac{12}{13}$

g. $4\frac{1}{2}\div 1\frac{3}{4}$ h. $5\frac{2}{5}\div 3\frac{1}{4}$

2. A rectangle is $5\frac{1}{3}$ metres long by $1\frac{1}{2}$ metres wide. Calculate the area.

3. Calculate the perimeter of the rectangle in question 2.

Applications	Fractions – Multiplying and Dividing

Exercise 1

1. For each of the number sets, find the quartiles and semi-interquartile range:

   a. 2, 4, 6, 9, 10, 12, 18, 24

   b. 6, 3, 7, 2, 12, 8, 5, 9, 11

   c. 20, 24, 18, 36, 29, 31, 22

2. Calculate the mean and standard deviation for the following sets of numbers:

   a. 5, 6, 8, 9

   b. 2, 4, 3, 8, 5, 8

3. Construct a boxplot for the numbers below:

   a. 5, 12, 18, 24, 28, 30

Exercise 2

1. For each of the number sets, find the quartiles and semi-interquartile range:

   a. 6, 9, 10, 11, 15, 18, 19, 20, 23, 26

   b. 10, 1, 5, 6, 7, 9, 4

   c. 104, 97, 83, 86, 81, 100, 94, 90

2. Calculate the mean and standard deviation for the following sets of numbers:

   a. 2, 6, 13, 15

   b. 8, 3, 4, 9, 10, 8

3. Construct a boxplot for the numbers below:

   a. 7, 10, 12, 16, 18, 20, 24, 26

Exercise 3

1. For each of the number sets, find the quartiles and semi-interquartile range:

   a. 1, 3, 6, 10, 15, 17, 19, 22

   b. 20, 25, 18, 22, 29

   c. 6, 3, 8, 15, 6, 20, 14, 7, 18, 8, 11

2. Calculate the mean and standard deviation for the following sets of numbers:

   a. 7, 8, 11, 16

   b. 8, 3, 12, 5, 7

3. Construct a boxplot for the numbers below:

   a. 2, 4, 8, 10, 16, 20, 22

Exercise 4

1. For each of the number sets, find the quartiles and semi-interquartile range:

   a. 10, 14, 18, 20, 28, 30, 35, 42, 44, 46

   b. 20, 18, 15, 22, 26, 14

   c. 0.4, 2.1, 0.9, 1.7, 0.8, 1.1, 0.6, 1.3

2. Calculate the mean and standard deviation for the following sets of numbers:

   a. 2, 8, 10, 16

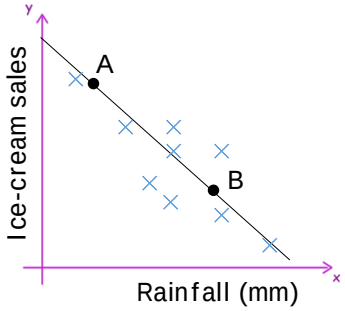
   b. 10, 4, 13, 5, 7, 9

3. Construct a boxplot for the numbers below:

   a. 50, 54, 60, 72, 88, 96, 98

Exercise 1

Below is a scattergraph with a line of best fit, representing rainfall and ice-cream sales on certain days



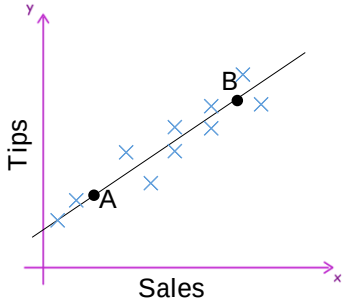
1. Describe the relationship between the two categories

2. Point A is (5, 200) and B is (20, 50), find the equation of the line of best fit

3. Use your equation to calculate how many ice-cream sales there would be if there were 25mm of rainfall

Exercise 2

Below is a scattergraph with a line of best fit, representing a waiter's pay and sales on certain days in a restaurant



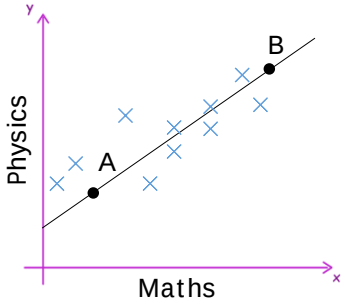
1. Describe the relationship between the two categories

2. Point A is (10, 60) and B is (40, 120), find the equation of the line of best fit

3. Use your equation to calculate how the waiter would earn if they were to make 55 sales

Exercise 3

Below is a scattergraph with a line of best fit, representing maths and physics class test results



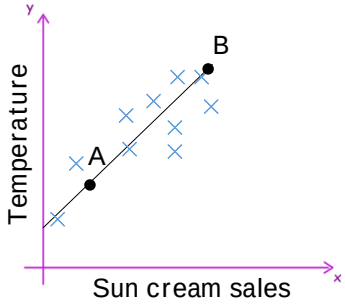
1. Describe the relationship between the two categories

2. Point A is (20, 30) and B is (50, 66), find the equation of the line of best fit

3. Use your equation to calculate the physics score if someone were to score 75 in maths

Exercise 4

Below is a scattergraph with a line of best fit, representing temperature and sun cream sales



1. Describe the relationship between the two categories

2. Point A is (8, 20) and B is (26, 56), find the equation of the line of best fit

3. Use your equation to calculate the sun cream sales if the temperature was 34°

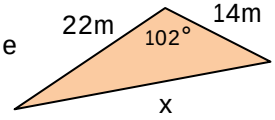
Applications	Scattergraphs – Line of Best Fit

National 5 Homework Booklet

Exercise 1

1. At 2pm the temperature of a liquid is 72°C. The temperature is increasing by 3.6% every hour. Find the temperature at 5pm.

2. For the triangle, calculate the missing side x.



3. Calculate the area of the triangle in question 2.

4. Simplify the following fractions (no calculator):

a. $3\frac{1}{5} \times 4\frac{1}{2}$ **b.** $6\frac{2}{3} \div 2\frac{1}{2}$

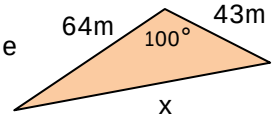
5. For the list of numbers below, find the mean and standard deviation:

7, 4, 8, 5, 1

Exercise 2

1. At 8pm the temperature of a liquid is 51°C. The temperature is increasing by 2.9% every hour. Find the temperature at midnight.

2. For the triangle, calculate the missing side x.



3. Calculate the area of the triangle in question 2.

4. Simplify the following fractions (no calculator):

a. $3\frac{1}{3} \times 2\frac{1}{5}$ **b.** $4\frac{1}{4} \div 2\frac{1}{3}$

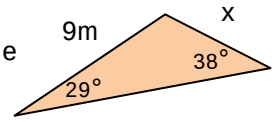
5. For the list of numbers below, find the mean and standard deviation:

8, 10, 4, 6, 9, 5

Exercise 3

1. At 3pm the temperature of a liquid is 26°C. The temperature is increasing by 1.02% every hour. Find the temperature at 8pm.

2. For the triangle, calculate the missing side x.



3. Calculate the area of the triangle in question 2.

4. Simplify the following fractions (no calculator):

a. $5\frac{1}{4} \times 2\frac{1}{3}$ **b.** $6\frac{2}{3} \div 2\frac{1}{2}$

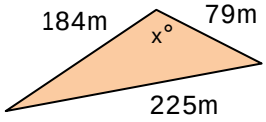
5. For the list of numbers below, find the mean and standard deviation:

9, 10, 5, 11, 13, 6

Exercise 4

1. At 9am the temperature of a liquid is 38°C. The temperature is increasing by 9.1% every hour. Find the temperature at 2pm.

2. For the triangle, calculate the missing angle x.



3. Calculate the area of the triangle in question 2.

4. Simplify the following fractions (no calculator):

a. $1\frac{1}{5} \times 3\frac{1}{6}$ **b.** $8\frac{3}{8} \div 6\frac{1}{4}$

5. For the list of numbers below, find the mean and standard deviation:

130, 160, 175, 220, 150

Applications	Mixed Exercise

Exercise 1

1. A jacket was reduced in the sale by 24% to £106.40. Calculate the original price of the jacket.

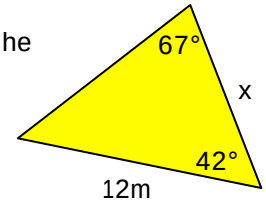
2. The coordinate of points A and B are (2, 0, 3) and (5, -1, 2) respectively. Find the components of vector $\overrightarrow{AB}$.

3. Find the magnitude of vector $\overrightarrow{AB}$ to 1.d.p

4. For the series of numbers below, find the quartiles and the IQR.

   6, 4, 9, 3, 6, 8, 10, 5

5. Calculate the length of the missing side x



Exercise 2

1. A bag was reduced in the sale by 14% to £68.80. Calculate the original price of the bag.

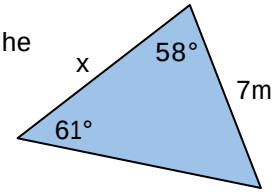
2. The coordinate of points A and B are (3, 2, -2) and (6, -1, 1) respectively. Find the components of vector $\overrightarrow{AB}$.

3. Find the magnitude of vector $\overrightarrow{AB}$ to 1.d.p

4. For the series of numbers below, find the quartiles and the IQR.

   5, 1, 8, 6, 4, 8, 11

5. Calculate the length of the missing side x



Exercise 3

1. A house increased in value by 18% to £260,000. Calculate the original price of the house.

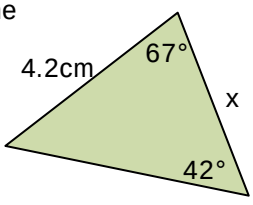
2. The coordinate of points A and B are (1, 1, -4) and (0, -3, 5) respectively. Find the components of vector $\overrightarrow{AB}$.

3. Find the magnitude of vector $\overrightarrow{AB}$ to 1.d.p

4. For the series of numbers below, find the quartiles and the SIQR.

   2, 3, 1, 6, 3, 8, 7, 5, 4

5. Calculate the length of the missing side x



Exercise 4

1. A car increased in value by 4% to £19,136. Calculate the original price of the car.

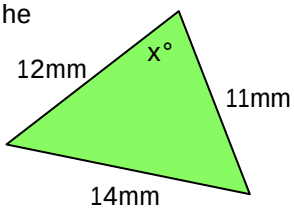
2. The coordinate of points A and B are (8, 2, -2) and (7, -3, -5) respectively. Find the components of vector $\overrightarrow{AB}$.

3. Find the magnitude of vector $\overrightarrow{AB}$ to 1.d.p

4. For the series of numbers below, find the quartiles and the SIQR.

   10, 11, 13, 11, 15, 14, 11, 10, 9, 11

5. Calculate the length of the missing angle x

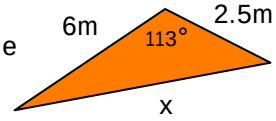


Applications	Mixed Exercise

Exercise 1

1. Water is evaporating from a jar by 8.2% every hour. At 6pm there were 120ml of water in the jar. Find the volume at 9pm.

2. For the triangle, calculate the missing side x.



3. Calculate the area of the triangle in question 2.

4. Simplify the following fractions (no calculator):

a. $2\frac{1}{3} \times 3\frac{1}{7}$ b. $8\frac{1}{4} \div 2\frac{1}{5}$

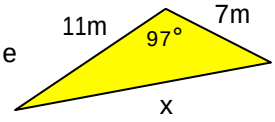
5. For the list of numbers below, find the mean and standard deviation:

9, 4, 3, 6, 8

Exercise 2

1. Water is evaporating from a jar by 2.1% every hour. At 3pm there were 180ml of water in the jar. Find the volume at 7pm.

2. For the triangle, calculate the missing side x.



3. Calculate the area of the triangle in question 2.

4. Simplify the following fractions (no calculator):

a. $1\frac{1}{6} \times 2\frac{1}{3}$ b. $6\frac{1}{2} \div 2\frac{1}{4}$

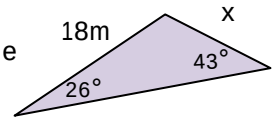
5. For the list of numbers below, find the mean and standard deviation:

1, 2, 3, 1, 2

Exercise 3

1. Water is evaporating from a jar by 3.04% every hour. At 9am there were 240ml of water in the jar. Find the volume at 3pm.

2. For the triangle, calculate the missing side x.



3. Calculate the area of the triangle in question 2.

4. Simplify the following fractions (no calculator):

a. $3\frac{1}{8} \times 2\frac{1}{5}$ b. $2\frac{5}{7} \div 1\frac{2}{3}$

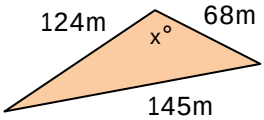
5. For the list of numbers below, find the mean and standard deviation:

0.25, 0.5, 0.1, 0.15

Exercise 4

1. Water is evaporating from a jar by 0.8% every hour. At 8pm there were 200ml of water in the jar. Find the volume at midnight.

2. For the triangle, calculate the missing angle x.



3. Calculate the area of the triangle in question 2.

4. Simplify the following fractions (no calculator):

a. $1\frac{2}{9} \times 2\frac{1}{2}$ b. $10\frac{1}{2} \div 2\frac{1}{8}$

5. For the list of numbers below, find the mean and standard deviation:

22, 24, 36, 40, 28

Applications	Mixed Exercise

Exercise 1

1. A scarf was reduced in the sale by 15% to £23.80. Calculate the original price of the scarf.

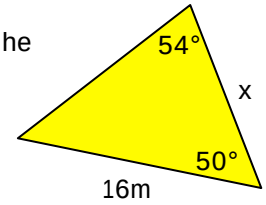
2. The coordinate of points A and B are (1, 5, 0) and (2, -2, 3) respectively. Find the components of vector $\overrightarrow{AB}$.

3. Find the magnitude of vector $\overrightarrow{AB}$ to 1.d.p

4. For the series of numbers below, find the quartiles and the IQR.

   4, 9, 8, 2, 3, 1, 4, 10

5. Calculate the length of the missing side x



Exercise 2

1. A hat was reduced in the sale by 22% to £28.08. Calculate the original price of the hat.

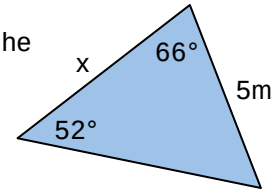
2. The coordinate of points A and B are (1, 0, -5) and (4, -1, 1) respectively. Find the components of vector $\overrightarrow{AB}$.

3. Find the magnitude of vector $\overrightarrow{AB}$ to 1.d.p

4. For the series of numbers below, find the quartiles and the IQR.

   6, 1, 3, 7, 8, 3, 4, 3, 2

5. Calculate the length of the missing side x



Exercise 3

1. A house increased in value by 12% to £324,800. Calculate the original price of the house.

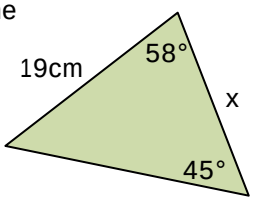
2. The coordinate of points A and B are (3, -2, -1) and (1, 1, -4) respectively. Find the components of vector $\overrightarrow{AB}$.

3. Find the magnitude of vector $\overrightarrow{AB}$ to 1.d.p

4. For the series of numbers below, find the quartiles and the SIQR.

   2, 1, 3, 1, 3, 4, 5, 3, 2, 5, 7

5. Calculate the length of the missing side x



Exercise 4

1. A car increased in value by 6% to £28,620. Calculate the original price of the car.

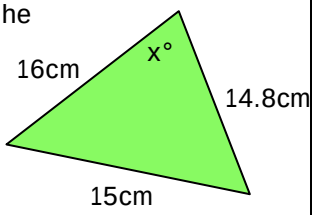
2. The coordinate of points A and B are (5, 6, 2) and (-1, -2, -1) respectively. Find the components of vector $\overrightarrow{AB}$.

3. Find the magnitude of vector $\overrightarrow{AB}$ to 1.d.p

4. For the series of numbers below, find the quartiles and the SIQR.

   5, 7, 2, 4, 8, 2, 1, 2, 5, 7

5. Calculate the length of the missing angle x



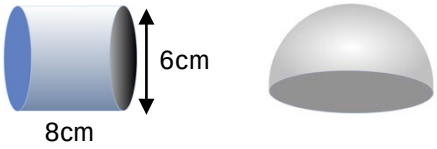
Applications	Mixed Exercise

Exercise 1

1. Find the gradient of line passing through the points (6, 17) and (10, -1).

2. Simplify: (a) $\frac{4x^2-100}{x^2-6x+5}$ (b) $\frac{6}{x}+\frac{2}{x+3}$

3. The two shapes have the same volume when rounded to 2 significant figures. Find the radius of the hemisphere



4. (a) Simplify: $\frac{x^3\times(x^2)^4}{x^9}$

(b) Hence evaluate when x = -3

5. Find the radius

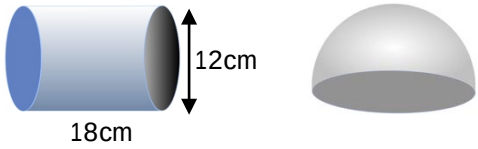
Area of sector = 60cm^2

Exercise 2

1. Find the gradient of line passing through the points (5, -4) and (9, -1).

2. Simplify: (a) $\frac{4x^2-36}{2x^2-4x-6}$ (b) $\frac{5}{x}-\frac{2}{x-2}$

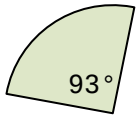
3. The two shapes have the same volume when rounded to 2 significant figures. Find the radius of the hemisphere



4. (a) Simplify: $\frac{x^5\times(x^4)^{\frac{1}{2}}}{x^3}$

(b) Hence evaluate when x = -2

5. Find the radius



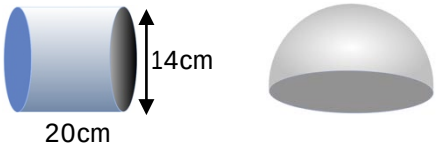
Length of arc = 130cm

Exercise 3

1. Find the gradient of line passing through the points (-10, 2) and (4, 36).

2. Simplify: (a) $\frac{x^2-x-6}{x^2-9}$ (b) $\frac{x}{x-5}\div\frac{1}{x-2}$

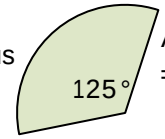
3. The two shapes have the same volume when rounded to 2 significant figures. Find the radius of the hemisphere



4. (a) Simplify: $(x^{\frac{3}{4}})^4\times x^{-\frac{7}{2}}$

(b) Hence evaluate when x = 16

5. Find the radius



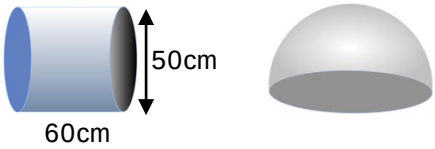
Area of sector = 12cm^2

Exercise 4

1. Find the gradient of line passing through the points (-20, 6) and (10, 46).

2. Simplify: (a) $\frac{3x^2-12}{5x^2-20}$ (b) $\frac{5x}{x-5}\div\frac{4}{x^2}$

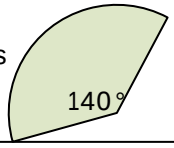
3. The two shapes have the same volume when rounded to 2 significant figures. Find the radius of the hemisphere



4. (a) Simplify: $(x^{\frac{1}{2}})^4\times x^{-\frac{3}{2}}$

(b) Hence evaluate when x = 25

5. Find the radius



Length of arc = 50cm

E&F	Revision

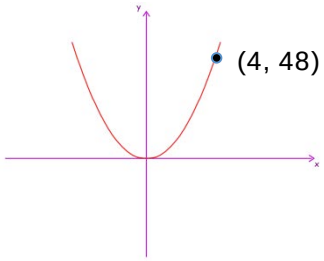
Exercise 1

1. A straight line has the equation $2y + 4x = 6$, find:
   (a) the gradient
   (b) the point where the line crosses the y-axis
   (c) the point where the line crosses the x-axis

2. Given that $f(x) = 6 - x^2$, evaluate:
   (a) $f(5)$
   (b) $f(-2)$

3. Express $x^2 + 6x - 2$ in the form $(x - a)^2 + b$

4. The graph below represents $y = kx^2$, find 'k'



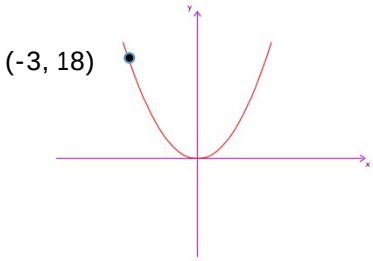
Exercise 2

1. A straight line has the equation $4y - 8x = -12$, find:
   (a) the gradient
   (b) the point where the line crosses the y-axis
   (c) the point where the line crosses the x-axis

2. Given that $f(x) = x^2 - 4x - 1$, evaluate:
   (a) $f(5)$
   (b) $f(-3)$

3. Express $x^2 - 8x + 2$ in the form $(x - a)^2 + b$

4. The graph below represents $y = kx^2$



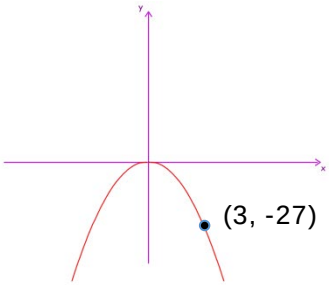
Exercise 3

1. A straight line has the equation $5y - 25x = -10$, find:
   (a) the gradient
   (b) the point where the line crosses the y-axis
   (c) the point where the line crosses the x-axis

2. Given that $f(x) = -8 + x^2$, evaluate:
   (a) $f(0)$
   (b) $f(-4)$

3. Express $x^2 + 12x - 9$ in the form $(x - a)^2 + b$

4. The graph below represents $y = kx^2$



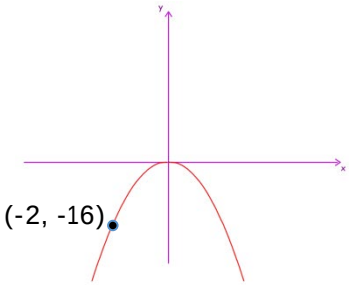
Exercise 4

1. A straight line has the equation $-y - 9x = 6$, find:
   (a) the gradient
   (b) the point where the line crosses the y-axis
   (c) the point where the line crosses the x-axis

2. Given that $f(x) = 6 - x^2 + 5x$, evaluate:
   (a) $f(-1)$
   (b) $f(-2)$

3. Express $x^2 + 6x - 7$ in the form $(x - a)^2 + b$

4. The graph below represents $y = kx^2$



Exercise 1

1. Two forces acting on a ball are represented by vectors a and b

$$a = \begin{pmatrix} 3 \\ -2 \\ 5 \end{pmatrix} \quad b = \begin{pmatrix} 6 \\ 2 \\ -8 \end{pmatrix}$$

Find the magnitude of the force $|a+b|$, giving your answer as a surd in its simplest form.

2. A property increases in value from £82,000 to £96,000, express this increase as a percentage.

3. A company invests £45,000 at an interest rate of 4.2% for 5 years. Calculate the interest gained.

4. For the following data set:

43, 43, 52, 32, 54, 42, 53, 41

(a) Find the standard deviation to 1 decimal place
(b) Produce a five figure summary
(c) Find the interquartile range.

Exercise 2

1. Two forces acting on a ball are represented by vectors a and b

$$a = \begin{pmatrix} 4 \\ 6 \\ -8 \end{pmatrix} \quad b = \begin{pmatrix} -2 \\ -1 \\ 3 \end{pmatrix}$$

Find the magnitude of the force $|a+b|$, giving your answer as a surd in its simplest form.

2. A property increases in value from £101,000 to £104,000, express this increase as a percentage.

3. A company invests £68,000 at an interest rate of 3.7% for 4 years. Calculate the interest gained.

4. For the following data set:

99, 101, 106, 104, 103, 103, 110, 100

(a) Find the standard deviation to 1 decimal place
(b) Produce a five figure summary
(c) Find the interquartile range.

Exercise 3

1. Two forces acting on a ball are represented by vectors a and b

$$a = \begin{pmatrix} 7 \\ 1 \\ -2 \end{pmatrix} \quad b = \begin{pmatrix} -3 \\ -2 \\ 3 \end{pmatrix}$$

Find the magnitude of the force $|a+b|$, giving your answer as a surd in its simplest form.

2. A property increases in value from £410,000 to £450,000, express this increase as a percentage.

3. A company invests £92,000 at an interest rate of 2.1% for 3 years. Calculate the interest gained.

4. For the following data set:

1001, 1002, 1000, 999, 998, 1005

(a) Find the standard deviation to 1 decimal place
(b) Produce a five figure summary
(c) Find the interquartile range.

Exercise 4

1. Two forces acting on a ball are represented by vectors a and b

$$a = \begin{pmatrix} 5 \\ 1 \\ 0 \end{pmatrix} \quad b = \begin{pmatrix} 5 \\ -1 \\ 3 \end{pmatrix}$$

Find the magnitude of the force $|a+b|$, giving your answer as a surd in its simplest form.

2. A property increases in value from £125,000 to £158,000, express this increase as a percentage.

3. A company invests £25,000 at an interest rate of 2.8% for 5 years. Calculate the interest gained.

4. For the following data set:

56, 59, 61, 68, 42, 57, 56, 59, 60

(a) Find the standard deviation to 1 decimal place
(b) Produce a five figure summary
(c) Find the interquartile range.

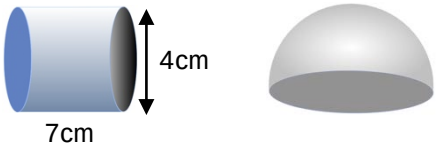
Applications	Revision

Exercise 1

1. Find the gradient of line passing through the points (6, 18) and (10, 19).

2. Simplify: (a) $\frac{4x^2-16}{x^2-4x-12}$ (b) $\frac{4}{x^2}+\frac{2}{x-1}$

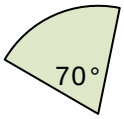
3. The two shapes have the same volume when rounded to 2 significant figures. Find the radius of the hemisphere



4. (a) Simplify: $\frac{x\times(x^4)^5}{x^{18}}$

(b) Hence evaluate when x = -2

5. Find the radius



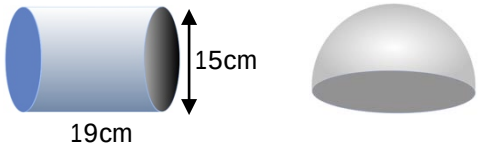
Area of sector = 55cm^2

Exercise 2

1. Find the gradient of line passing through the points (1, -3) and (12, 23).

2. Simplify: (a) $\frac{5x^2-125}{x^2-3x-10}$ (b) $\frac{6}{x}+\frac{7}{x+2}$

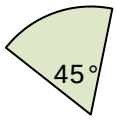
3. The two shapes have the same volume when rounded to 2 significant figures. Find the radius of the hemisphere



4. (a) Simplify: $\frac{x^4\times(x^3)^{\frac{1}{6}}}{x^3}$

(b) Hence evaluate when x = 3

5. Find the radius



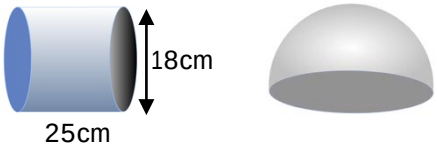
Length of arc = 180cm

Exercise 3

1. Find the gradient of line passing through the points (10, 12) and (-2, 9).

2. Simplify: (a) $\frac{3x^2-3x-18}{3x^2-27}$ (b) $\frac{2x}{x-2}-\frac{5}{x+2}$

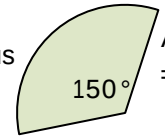
3. The two shapes have the same volume when rounded to 2 significant figures. Find the radius of the hemisphere



4. (a) Simplify: $(x^{\frac{5}{6}})^2\times x^{-\frac{5}{3}}$

(b) Hence evaluate when x = 25

5. Find the radius



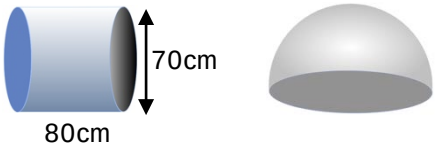
Area of sector = 15cm^2

Exercise 4

1. Find the gradient of line passing through the points (-17, 16) and (-3, 9).

2. Simplify: (a) $\frac{8x^2-32}{5x^2-20}$ (b) $\frac{3x}{x-3}-\frac{4}{-x^2}$

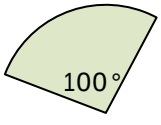
3. The two shapes have the same volume when rounded to 2 significant figures. Find the radius of the hemisphere



4. (a) Simplify: $(x^{\frac{1}{2}})^6\times x^{-\frac{4}{3}}$

(b) Hence evaluate when x = 2

5. Find the radius



Length of arc = 56cm

E&F	Revision

Exercise 1

1. Find the equation of the line joining the two points: (3, 6), (6, 18)

2. Solve (a) $\frac{2}{3}(w-5)=\frac{1}{4}(w+6)$

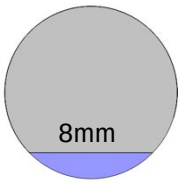
(b) $5(2x-4)\leq 3(3x+5)$

3. Solve algebraically:

$2a + 3b = 5$

$4a - 2b = -14$

4. The diagram represents a water pipe. If the diameter of the pipe is 10mm and the surface of the water is 8mm across, find the depth of the water.



Exercise 2

1. Find the equation of the line joining the two points: (3, 6), (6, 12)

2. Solve (a) $\frac{4}{3}(w-2)=\frac{1}{3}(w+8)$

(b) $4(2x+3)\leq 2(x+8)$

3. Solve algebraically:

$3a + 4b = 5$

$4a - 3b = -10$

4. The diagram represents a water pipe. If the diameter of the pipe is 26mm and the surface of the water is 24mm across, find the depth of the water.

Exercise 3

1. Find the equation of the line joining the two points: (8, 12), (4, 24)

2. Solve (a) $\frac{4}{3}(w+2)=\frac{1}{4}(w+1)$

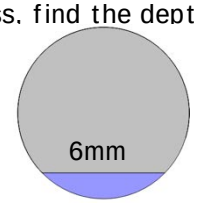
(b) $9(2x-\frac{1}{3})\leq 3(x+1)$

3. Solve algebraically:

$3a + b = 8$

$5a - 2b = 17$

4. The diagram represents a water pipe. If the radius of the pipe is 5mm and the surface of the water is 6mm across, find the depth of the water.



Exercise 4

1. Find the equation of the line joining the two points: (2, 5), (4, 1)

2. Solve (a) $\frac{4}{3}(w+1)=\frac{1}{2}(w\_6)$

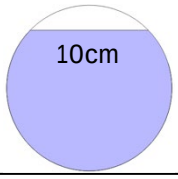
(b) $7(2x-3)\leq 2(2x-\frac{1}{2})$

3. Solve algebraically:

$4a + b = 10$

$5a - 3b = 21$

4. The diagram represents a water pipe. If the radius of the pipe is 13cm and the surface of the water is 10cm across, find the depth of the water.



Relationships	Revision

Exercise 1

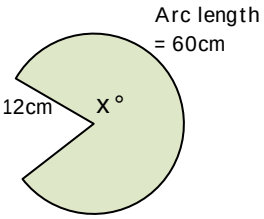
1. Multiply out the brackets and simplify:

(a) $(x + 2)^3$ (b) $4x(x – 2) – 2(x - 5)$

2. Factorise:

(a) $2x^2 – 98$ (b) $2x^2 – 5x - 3$

3. Find the angle of the sector:



4. Rationalise the denominator:

(a) $\frac{2}{\sqrt{5}}$ (b) $\frac{1}{\sqrt{8}}$

5. Simplify: (a) $\frac{2a^4}{5b^4} \times \frac{10b}{9a^2}$ (b) $6a^{\frac{1}{2}}x(3a^4)^2$

Exercise 2

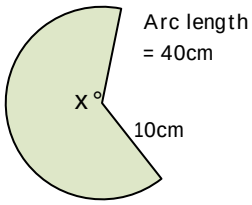
1. Multiply out the brackets and simplify:

(a) $(x - 1)^3$ (b) $2x(x + 3) – 2(x + 1)$

2. Factorise:

(a) $4x^2 – 16$ (b) $2x^2 – 2x - 12$

3. Find the angle of the sector:



4. Rationalise the denominator:

(a) $\frac{4}{\sqrt{7}}$ (b) $\frac{1}{\sqrt{5}}$

5. Simplify: (a) $\frac{4a^3}{b^4} \times \frac{9b}{12a^2}$ (b) $7a^{\frac{1}{3}}x(3a^2)^2$

Exercise 3

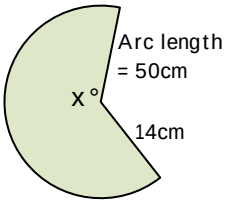
1. Multiply out the brackets and simplify:

(a) $(x + 4)^3$ (b) $-x(x – 1) + 3(x - 4)$

2. Factorise:

(a) $5x^2 – 125$ (b) $2x^2 + 5x - 3$

3. Find the angle of the sector:



4. Rationalise the denominator:

(a) $\frac{3}{\sqrt{2}}$ (b) $\frac{8}{\sqrt{12}}$

5. Simplify: (a) $\frac{27a^4}{5b^4} \times \frac{10b^3}{9a^3}$ (b) $\frac{1}{4}a^{\frac{1}{2}}x(2a^4)^3$

Exercise 4

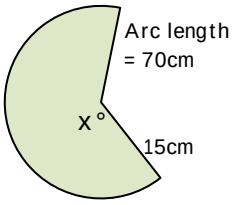
1. Multiply out the brackets and simplify:

(a) $(x - 4)^3$ (b) $-2x(x + 2) – 3(x - 6)$

2. Factorise:

(a) $3x^2 – 147$ (b) $2x^2 - 9x + 9$

3. Find the angle of the sector:



4. Rationalise the denominator:

(a) $\frac{25}{\sqrt{3}}$ (b) $\frac{5}{\sqrt{20}}$

5. Simplify: (a) $\frac{5a^4}{b^3} \times \frac{10b^6}{4a^2}$ (b) $\frac{1}{16}a^{\frac{1}{2}}x(4a^5)^2$

E&F	Revision

Exercise 1

1. Solve the following equations graphically:

$y = 2x - 4$

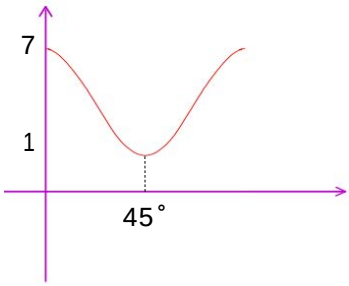
$2x + y = 2$

2. Solve (a) $y = 2x^2 + 4x$

(b) $y = x^2 + 2x - 8$

3. Sketch the quadratic $y = (x - 3)^2 - 3$ (showing where the graph cuts the y-axis)

4. Find the equation of the trig graph



Exercise 2

1. Solve the following equations graphically:

$y = -1x + 3$

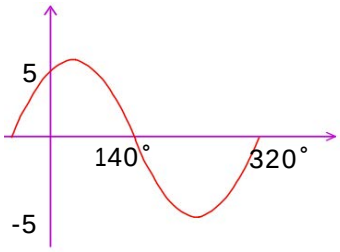
$4x - 6y = -8$

2. Solve (a) $y = 3x^2 + 9x$

(b) $y = x^2 - 4x - 12$

3. Sketch the quadratic $y = (x - 4)^2 - 2$ (showing where the graph cuts the y-axis)

4. Find the equation of the trig graph



Exercise 3

1. Solve the following equations graphically:

$y = 5x - 6$

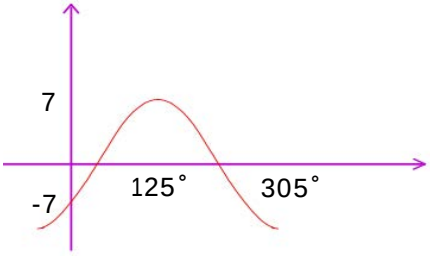
$7x - 3y = 2$

2. Solve (a) $y = 12x^2 + 24x$

(b) $y = x^2 - 1x - 12$

3. Sketch the quadratic $y = (x - 4)^2 + 5$ (showing where the graph cuts the y-axis)

4. Find the equation of the trig graph



Exercise 4

1. Solve the following equations graphically:

$y = -3x - 8$

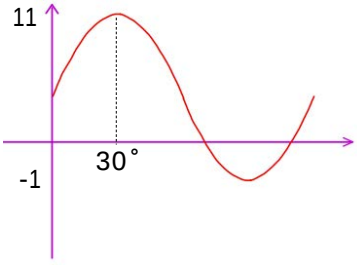
$6x - 5y = -2$

2. Solve (a) $y = 16x^2 + 48x$

(b) $y = x^2 + x - 6$

3. Sketch the quadratic $y = (x - 5)^2 - 5$ (showing where the graph cuts the y-axis)

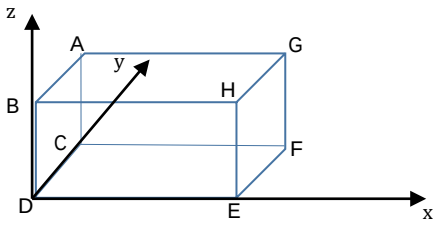
4. Find the equation of the trig graph



Relationships	Revision

Exercise 1

1. In the cuboid below the C is the point (0, 4, 0) and H is (9, 0, 5)

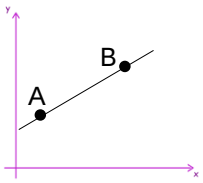


(a) Find the coordinates of A, F and G

(b) Find $\overrightarrow{BG}$

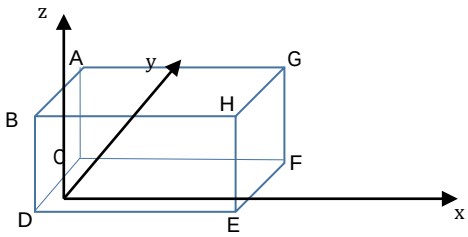
(c) Find the magnitude of $\overrightarrow{CH}$

2. The diagram represents a line of best fit for a scattergraph, A is (30, 100) B is (90, 600)
(a) Find the equation of the line.
(b) Use the equation to find y when x = 250



Exercise 2

1. In the cuboid below the B is the point (-1, -1, 7) and F is (10, 6, 0)

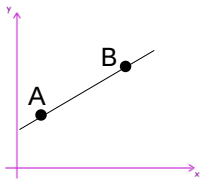


(a) Find the coordinates of A, D and G

(b) Find $\overrightarrow{BG}$

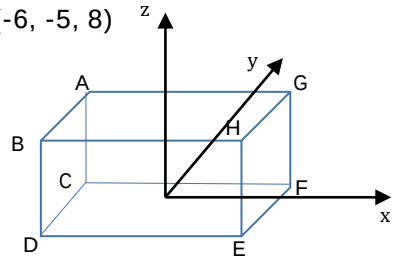
(c) Find the magnitude of $\overrightarrow{AE}$

2. The diagram represents a line of best fit for a scattergraph, A is (200, 100) B is (600, 200)
(a) Find the equation of the line.
(b) Use the equation to find y when x = 350



Exercise 3

1. In the cuboid below the F is the point (6, 2, 0) and B is (-6, -5, 8)

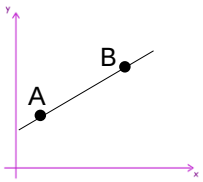


(a) Find the coordinates of A, E and G

(b) Find $\overrightarrow{BG}$

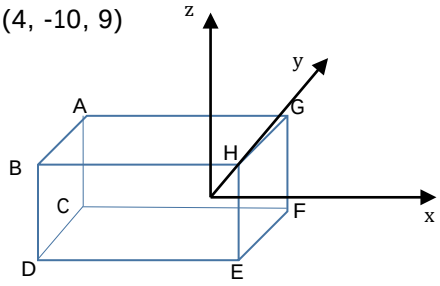
(c) Find the magnitude of $\overrightarrow{CH}$

2. The diagram represents a line of best fit for a scattergraph, A is (25, 200) B is (65, 480)
(a) Find the equation of the line.
(b) Use the equation to find y when x = 120



Exercise 4

1. In the cuboid below the C is the point (-8, -2, -1) and H is (4, -10, 9)

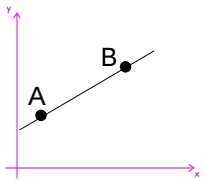


(a) Find the coordinates of A, F and G

(b) Find $\overrightarrow{BG}$

(c) Find the magnitude of $\overrightarrow{CH}$

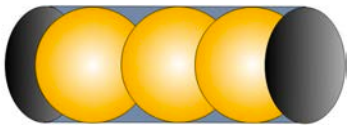
2. The diagram represents a line of best fit for a scattergraph, A is (65, 150) B is (78, 195)
(a) Find the equation of the line.
(b) Use the equation to find y when x = 210



Applications	Revision

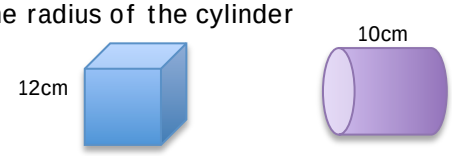
Exercise 1

1. The tube of balls below has radius 8cm. Find the volume of:
   (a) a ball (b) the tube (c) the empty space



2. Find $(3.6 \times 10^7) \times (4.65 \times 10^8)$

3. The cube and the cylinder have the same volume when rounded to 2 significant figures. Calculate the radius of the cylinder

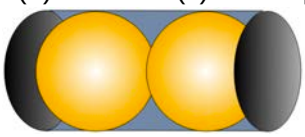


4. Write 356,000,000 in scientific notation

5. Factorise $3x^2 - 7x + 4$

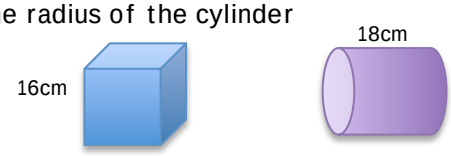
Exercise 2

1. The tube of balls below has radius 6cm. Find the volume of:
   (a) a ball (b) the tube (c) the empty space



2. Find $(4.2 \times 10^6) \times (4.36 \times 10^7)$

3. The cube and the cylinder have the same volume when rounded to 2 significant figures. Calculate the radius of the cylinder

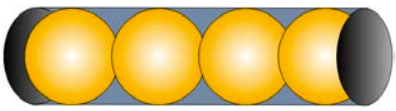


4. Write 45,900,000 in scientific notation

5. Factorise $2x^2 + 5x - 3$

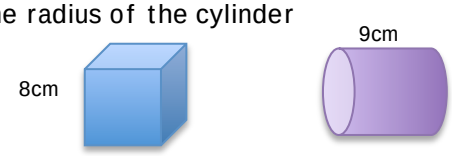
Exercise 3

1. The tube of balls below has radius 10cm. Find the volume of:
   (a) a ball (b) the tube (c) the empty space



2. Find $(5.01 \times 10^4) \times (6.66 \times 10^5)$

3. The cube and the cylinder have the same volume when rounded to 2 significant figures. Calculate the radius of the cylinder

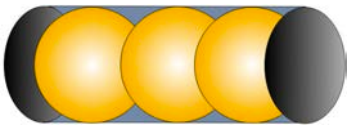


4. Write 407,000 in scientific notation

5. Factorise $2x^2 - 2x - 4$

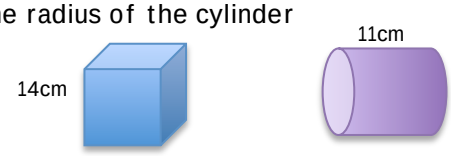
Exercise 4

1. The tube of balls below has radius 15cm. Find the volume of:
   (a) a ball (b) the tube (c) the empty space



2. Find $(6.06 \times 10^8) \times (2.85 \times 10^{10})$

3. The cube and the cylinder have the same volume when rounded to 2 significant figures. Calculate the radius of the cylinder



4. Write 26,010,000,000 in scientific notation

5. Factorise $2x^2 - 5x - 12$

E&F	Revision

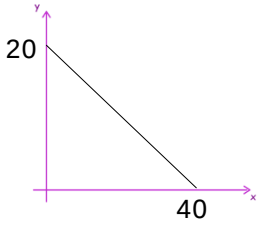
Exercise 1

1. Sketch the graph y = (x – 3)(x + 5) (showing the turning point, roots and y-intercept)

2. Change the subject:

$$V = \frac{1}{3}\pi r^2 h \qquad [h]$$

3. Determine the equation of the straight line:



4. Solve $y = x^2 + 3x - 18$

5. Sketch the graph of y = 2cos3x

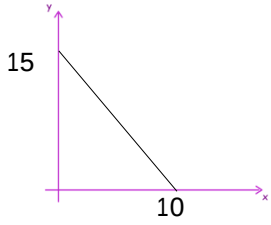
Exercise 2

1. Sketch the graph y = (x – 2)(x - 3) (showing the turning point, roots and y-intercept)

2. Change the subject:

$$V = \frac{1}{3}\pi r^2 h \qquad [r]$$

3. Determine the equation of the straight line:



4. Solve $y = x^2 + 2x - 8$

5. Sketch the graph of y = 3cos2x + 4

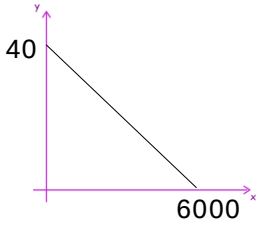
Exercise 3

1. Sketch the graph y = (x – 4)(x + 2) (showing the turning point, roots and y-intercept)

2. Change the subject:

$$R = x^2(m+n) \qquad [n]$$

3. Determine the equation of the straight line:



4. Solve $y = x^2 + 2x - 24$

5. Sketch the graph of y = -2sin3x + 2

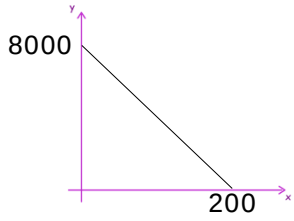
Exercise 4

1. Sketch the graph y = (x + 3)(x + 6) (showing the turning point, roots and y-intercept)

2. Change the subject:

$$n = \frac{tw+3}{3y} \qquad [w]$$

3. Determine the equation of the straight line:



4. Solve $y = x^2 - 12x - 45$

5. Sketch the graph of y = -5sin4x - 6

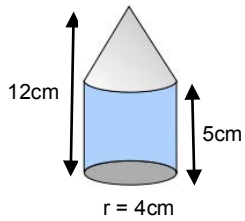
Relationships	Revision

Exercise 1

1. Find the gradient of line passing through the points (7, 16) and (9, 12).

2. Simplify: (a) $\frac{x^2-9}{x^2+x-6}$ (b) $\frac{x}{x-2}-\frac{2}{x+3}$

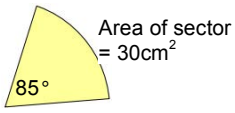
3. Find the volume of the shape.



4. Simplify:

(a) $\sqrt{50}+\sqrt{18}$ (b) $\frac{x^3\times(x^2)^4}{x^2}$

5. Find the radius

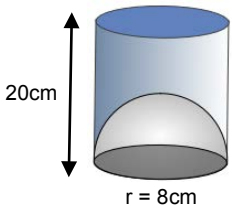


Exercise 2

1. Find the gradient of line passing through the points (-4, 16) and (-10, -8).

2. Simplify: (a) $\frac{3x+9}{x^2-2x-15}$ (b) $\frac{2x}{x-1}-\frac{1}{x+3}$

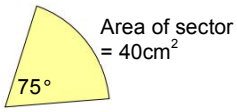
3. Find the volume of the shape.



4. Simplify:

(a) $3\sqrt{12}+3\sqrt{27}$ (b) $\frac{x\times x^8}{(x^2)^4}$

5. Find the radius

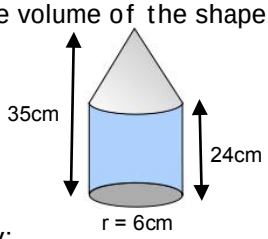


Exercise 3

1. Find the gradient of line passing through the points (6, 24) and (-9, 36).

2. Simplify: (a) $\frac{x^2-x-12}{x^2-16}$ (b) $\frac{x}{x-5}+\frac{1}{x-2}$

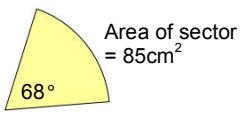
3. Find the volume of the shape.



4. Simplify:

(a) $5\sqrt{75}-5\sqrt{147}$ (b) $\frac{x^9\times(x^3)^5}{x^5}$

5. Find the radius

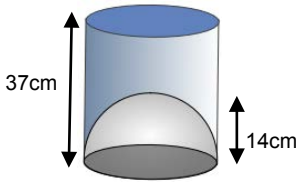


Exercise 4

1. Find the gradient of line passing through the points (8, 4) and (10, 4).

2. Simplify: (a) $\frac{5x^2-45}{x^2+x-6}$ (b) $\frac{3x}{x-3}+\frac{x}{x-4}$

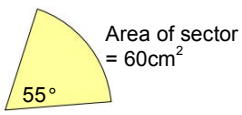
3. Find the volume of the shape.



4. Simplify:

(a) $6\sqrt{750}-12\sqrt{120}$ (b) $\frac{(x^3)^7\times x^8}{x^{13}}$

5. Find the radius



E&F	Revision

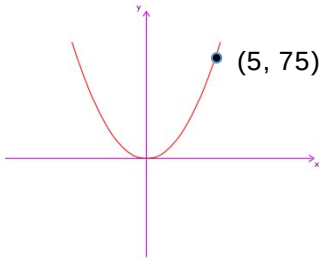
Exercise 1

1. A straight line has the equation 5y - 15x =- 6, find:
   (a) the gradient
   (b) the point where the line crosses the y-axis
   (c) the point where the line crosses the x-axis

2. Given that $f(x) = 9 + x^2$, evaluate:
   (a) f(-3)
   (b) f(-1)

3. Express $x^2 + 4x - 6$ in the form $(x - a)^2 + b$

4. The graph below represents $y = kx^2$, find 'k'



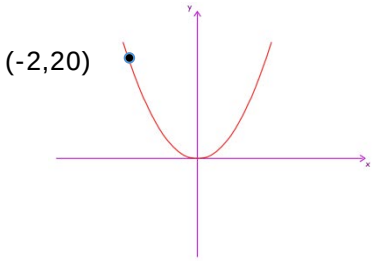
Exercise 2

1. A straight line has the equation 12y - 2x = -8, find:
   (a) the gradient
   (b) the point where the line crosses the y-axis
   (c) the point where the line crosses the x-axis

2. Given that $f(x) = x^2 - 6x - 5$, evaluate:
   (a) f(-1)
   (b) f(2)

3. Express $x^2 - 8x + 3$ in the form $(x - a)^2 + b$

4. The graph below represents $y = kx^2$



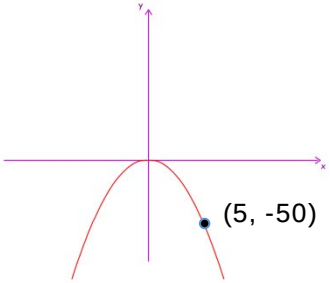
Exercise 3

1. A straight line has the equation 7y - 21x = -28, find:
   (a) the gradient
   (b) the point where the line crosses the y-axis
   (c) the point where the line crosses the x-axis

2. Given that $f(x) = - 12 + 2x^2$, evaluate:
   (a) f(3)
   (b) f(-2)

3. Express $x^2 + 10x - 3$ in the form $(x - a)^2 + b$

4. The graph below represents $y = kx^2$



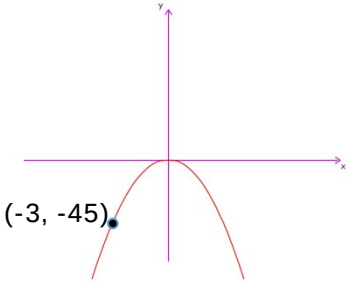
Exercise 4

1. A straight line has the equation -2y - 6x = -6, find:
   (a) the gradient
   (b) the point where the line crosses the y-axis
   (c) the point where the line crosses the x-axis

2. Given that $f(x) = 12 - x^2 - x$, evaluate:
   (a) f(4)
   (b) f(6)

3. Express $x^2 + 4x + 9$ in the form $(x - a)^2 + b$

4. The graph below represents $y = kx^2$



Exercise 1

1. Two forces acting on a ball are represented by vectors a and b

$$a = \begin{pmatrix} 2 \\ -3 \\ 1 \end{pmatrix} \quad b = \begin{pmatrix} 7 \\ -1 \\ -3 \end{pmatrix}$$

Find the magnitude of the force $|a+b|$, giving your answer as a surd in its simplest form.

2. A property increases in value from £73,000 to £86,000, express this increase as a percentage.

3. A company invests £26,000 at an interest rate of 3.1% for 4 years. Calculate the interest gained.

4. For the following data set:

24, 43, 72, 32, 54, 72, 53, 31

(a) Find the standard deviation to 1 decimal place
(b) Produce a five figure summary
(c) Find the interquartile range.

Exercise 2

1. Two forces acting on a ball are represented by vectors a and b

$$a = \begin{pmatrix} 7 \\ 5 \\ -3 \end{pmatrix} \quad b = \begin{pmatrix} -4 \\ 6 \\ 4 \end{pmatrix}$$

Find the magnitude of the force $|a+b|$, giving your answer as a surd in its simplest form.

2. A property increases in value from £201,000 to £204,000, express this increase as a percentage.

3. A company invests £35,000 at an interest rate of 6.3% for 2 years. Calculate the interest gained.

4. For the following data set:

99, 90, 106, 106, 103, 143, 110, 120

(a) Find the standard deviation to 1 decimal place
(b) Produce a five figure summary
(c) Find the interquartile range.

Exercise 3

1. Two forces acting on a ball are represented by vectors a and b

$$a = \begin{pmatrix} 8 \\ 7 \\ -3 \end{pmatrix} \quad b = \begin{pmatrix} -10 \\ 2 \\ 5 \end{pmatrix}$$

Find the magnitude of the force $|a+b|$, giving your answer as a surd in its simplest form.

2. A property increases in value from £450,000 to £470,000, express this increase as a percentage.

3. A company invests £105,000 at an interest rate of 8.1% for 5 years. Calculate the interest gained.

4. For the following data set:

1021, 1000, 1030, 999, 997, 1015

(a) Find the standard deviation to 1 decimal place
(b) Produce a five figure summary
(c) Find the interquartile range.

Exercise 4

1. Two forces acting on a ball are represented by vectors a and b

$$a = \begin{pmatrix} 0 \\ 5 \\ 1 \end{pmatrix} \quad b = \begin{pmatrix} -5 \\ -2 \\ 3 \end{pmatrix}$$

Find the magnitude of the force $|a+b|$, giving your answer as a surd in its simplest form.

2. A property increases in value from £176,000 to £198,000, express this increase as a percentage.

3. A company invests £400,000 at an interest rate of 12.8% for 3 years. Calculate the interest gained.

4. For the following data set:

54, 56, 61, 68, 42, 67, 56, 49, 61

(a) Find the standard deviation to 1 decimal place
(b) Produce a five figure summary
(c) Find the interquartile range.

Applications	Revision

Exercise 1

1. Solve $y = x^2 - 7x - 4$ to 1 decimal place

2. The two shapes are similar, find the volume of the larger bottle in ml:

500ml

3. There are 100 seats on a coach; some are first class and the rest standard class. The first class seats cost £50 and the standard £35, if when they are all sold they cost £3800, find how many of each seat there are.

4. Solve $3\sin x + 2 = 0$ for $0 \leq x \leq 360$

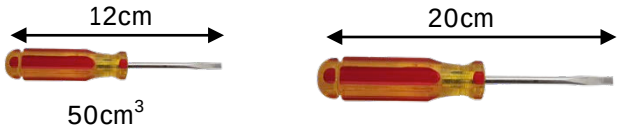
5. Sketch the graph of $y = 3\cos(x + 30)$

6. Determine the nature of the roots of $y = x^2 - 4$

Exercise 2

1. Solve $y = 2x^2 - 8x - 7$ to 1 decimal place

2. The two shapes are similar, find the volume scale factor and the volume of the larger shape:



$50cm^3$

3. There are 250 seats on a train; some are first class and the rest standard class. The first class seats cost £80 and the standard £32, if when they are all sold they cost £10,400, find how many of each seat there are.

4. Solve $2\cos x - 1 = 0$ for $0 \leq x \leq 360$

5. Sketch the graph of $y = 4\sin x + 3$

6. Determine the nature of the roots of $y = x^2 + 4$

Exercise 3

1. Solve $y = x^2 + 9x - 4$ to 1 decimal place

2. The two shapes are similar, find the volume of the larger bottle in ml

500ml

3. There are 80 seats on a coach; some are first class and the rest standard class. The first class seats cost £120 and the standard £70, if when they are all sold they cost £6350, find how many of each seat there are.

4. Solve $4\tan x + 8 = 0$ for $0 \leq x \leq 360$

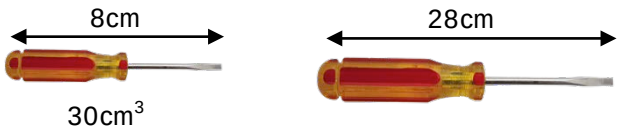
5. Sketch the graph of $y = -2\cos x + 1$

6. Determine the nature of the roots of $y = 5x^2$

Exercise 4

1. Solve $y = 3x^2 - 15x - 3$ to 1 decimal place

2. The two shapes are similar, find the volume scale factor and the volume of the larger shape:



$30cm^3$

3. There are 350 seats on a train; some are first class and the rest standard class. The first class seats cost £220 and the standard £150, if when they are all sold they cost £57,750, find how many of each seat there are.

4. Solve $9\sin x + 5 = 0$ for $0 \leq x \leq 360$

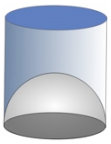
5. Sketch the graph of $y = 2\sin(x - 30)$

6. Determine the nature of the roots of $y = x^2 + 12$

Relationships	Revision

Exercise 1

1. The cylinder below has a radius of 6cm and a hemisphere cut out of the bottom. Find the volume of the shape in litres (give your answer to 2 significant figures)



2. Find $(6 \times 10^{-7}) \times (4.65 \times 10^{-5})$

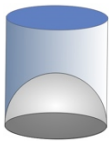
3. The cube has a volume of 4 litres. Find the length of one of its sides to the nearest whole number.

4. Write 0.0000638 in scientific notation

5. Factorise $3x^2 - 7x + 4$

Exercise 2

1. The cylinder below has a radius of 4cm and a hemisphere cut out of the bottom. Find the volume of the shape in litres (give your answer to 2 significant figures)



2. Find $(7 \times 10^{4}) \times (9.15 \times 10^{-9})$

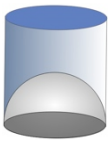
3. The cube has a volume of 16 litres. Find the length of one of its sides to the nearest whole number.

4. Write 0.00007912 in scientific notation

5. Factorise $2x^2 - 7x + 3$

Exercise 3

1. The cylinder below has a radius of 9cm and a hemisphere cut out of the bottom. Find the volume of the shape in litres (give your answer to 2 significant figures)



2. Find $(63 \times 10^{-9}) \times (2.75 \times 10^{-8})$

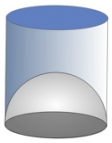
3. The cube has a volume of 25 litres. Find the length of one of its sides to the nearest whole number.

4. Write 0.0000456 in scientific notation

5. Factorise $3x^2 - 4x + 1$

Exercise 4

1. The cylinder below has a radius of 10cm and a hemisphere cut out of the bottom. Find the volume of the shape in litres (give your answer to 2 significant figures)



2. Find $(9 \times 10^{-8}) \times (7.32 \times 10^{-4})$

3. The cube has a volume of 5 litres. Find the length of one of its sides to the nearest whole number.

4. Write 0.0000745 in scientific notation

5. Factorise $2x^2 + x - 1$

E&F	Revision

Exercise 1

1. Find the equation of the line joining the two points: (3, 15), (6,-30)

2. Solve (a) $\frac{1}{8}(w-4)=\frac{1}{2}(w-3)$

(b) $-4(x+4)\leq 2(3x-4)$

3. Solve algebraically:

$-8a - 5b = -7$

$3a + 12b = 33$

4. The diagram represents a water pipe. If the diameter of the pipe is 10mm and the surface of the water is 6mm across, find the depth of the water.

Exercise 2

1. Find the equation of the line joining the two points: (11, -8), (7, -12)

2. Solve (a) $\frac{3}{2}(w-4)=\frac{1}{3}(w+6)$

(b) $9(x-3)\leq -4(x-8)$

3. Solve algebraically:

$-12a - 8b = 0$

$5a + 3b = 1$

4. The diagram represents a water pipe. If the diameter of the pipe is 30mm and the surface of the water is 24mm across, find the depth of the water.

Exercise 3

1. Find the equation of the line joining the two points: (8, 1), (4, -2)

2. Solve (a) $\frac{4}{6}(w-2)=\frac{1}{2}(w-1)$

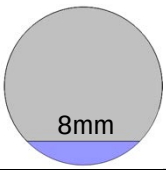
(b) $-8(x-\frac{1}{2})\leq 4(x+4)$

3. Solve algebraically:

$9a + 5b = 12$

$4a - 2b = 18$

4. The diagram represents a water pipe. If the diameter of the pipe is 10mm and the surface of the water is 8mm across, find the depth of the water.



Exercise 4

1. Find the equation of the line joining the two points: (3, 12), (-4, 26)

2. Solve (a) $\frac{1}{2}(w+4)=\frac{1}{5}(w-1)$

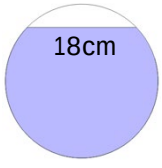
(b) $3(x+12)\leq 2(x-\frac{3}{2})$

3. Solve algebraically:

$7a - 6b = -27$

$4a + 4b = -8$

4. The diagram represents a water pipe. If the radius of the pipe is 15cm and the surface of the water is 18cm across, find the depth of the water.



Relationships	Revision

Exercise 1

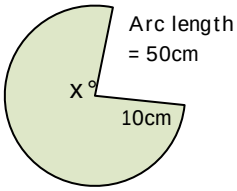
1. Multiply out the brackets and simplify:

(a) $(x - 2)^3$ (b) $6x(x - 4) + 2(x - 3)$

2. Factorise:

(a) $7x^2 - 63$ (b) $4x^2 - 5x + 1$

3. Find the angle of the sector:



4. Rationalise the denominator:

(a) $\frac{9}{\sqrt{3}}$ (b) $\frac{1}{\sqrt{2}}$

5. Simplify: (a) $\frac{24a^4}{6b^8} \times \frac{13b^3}{3a^2}$ (b) $6a^{\frac{1}{3}}x(3a^4)^3$

Exercise 2

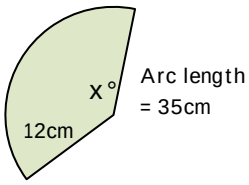
1. Multiply out the brackets and simplify:

(a) $(x - 7)^3$ (b) $7x(x + 1) - 3(x + 1)$

2. Factorise:

(a) $9x^2 - 36$ (b) $3x^2 - x - 2$

3. Find the angle of the sector:



4. Rationalise the denominator:

(a) $\frac{5}{\sqrt{6}}$ (b) $\frac{12}{\sqrt{8}}$

5. Simplify: (a) $\frac{8a^3}{b^7} \times \frac{15b}{10a^6}$ (b) $7a^{\frac{1}{3}}x(3a^2)^2$

Exercise 3

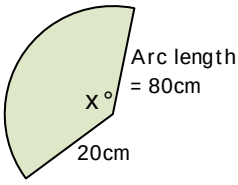
1. Multiply out the brackets and simplify:

(a) $(x - 4)^3$ (b) $-5x(x + 1) + 4(x - 3)$

2. Factorise:

(a) $6x^2 - 96$ (b) $2x^2 + 3x + 1$

3. Find the angle of the sector:



4. Rationalise the denominator:

(a) $\frac{13}{\sqrt{3}}$ (b) $\frac{5}{\sqrt{10}}$

5. Simplify: (a) $\frac{2a^9}{5b^{14}} \times \frac{16b^3}{8a^8}$ (b) $\frac{1}{8}a^{\frac{1}{4}}x(25a^3)^{\frac{1}{2}}$

Exercise 4

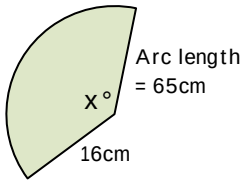
1. Multiply out the brackets and simplify:

(a) $(x + 5)^3$ (b) $-3x(2x + 1) + 3(2x - 1)$

2. Factorise:

(a) $11x^2 - 99$ (b) $3x^2 + 5x - 2$

3. Find the angle of the sector:



4. Rationalise the denominator:

(a) $\frac{7}{\sqrt{6}}$ (b) $\frac{4}{\sqrt{24}}$

5. Simplify: (a) $\frac{8a^5}{b^9} \times \frac{14b^7}{4a^8}$ (b) $a^{\frac{1}{12}}x(9a^3)^{\frac{1}{2}}$

E&F	Revision

Exercise 1

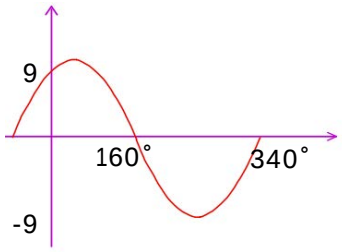
1. Solve the following equations graphically:
   $y = 12x - 8$
   $2x + y = 6$

2. Solve (a) $y = 5x^2 + 25x$

   (b) $y = x^2 + 5x - 14$

3. Sketch the quadratic $y = (x - 2)^2 - 5$ (showing where the graph cuts the y-axis)

4. Find the equation of the trig graph



Exercise 2

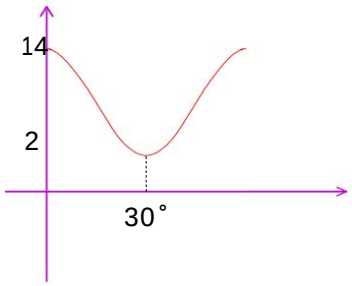
1. Solve the following equations graphically:
   $y = -5x + 2$
   $2x - y = 12$

2. Solve (a) $y = 6x^2 + 3x$

   (b) $y = x^2 - 10x + 16$

3. Sketch the quadratic $y = (x + 6)^2 - 1$ (showing where the graph cuts the y-axis)

4. Find the equation of the trig graph



Exercise 3

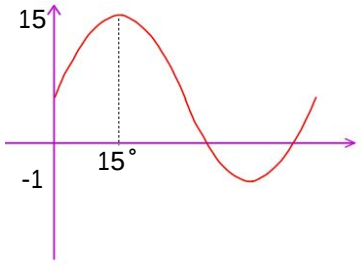
1. Solve the following equations graphically:
   $-y = 3x - 2$
   $-x - y = 5$

2. Solve (a) $y = 8x^2 - 16x$

   (b) $y = x^2 - 1x - 20$

3. Sketch the quadratic $y = (x - 3)^2 + 1$ (showing where the graph cuts the y-axis)

4. Find the equation of the trig graph



Exercise 4

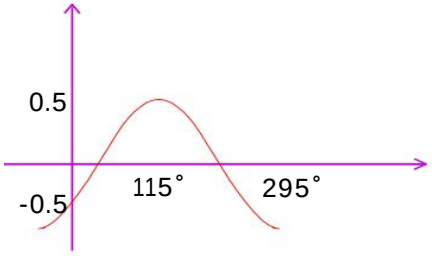
1. Solve the following equations graphically:
   $y = -8x - 4$
   $x - y = 13$

2. Solve (a) $y = 15x^2 + 60x$

   (b) $y = x^2 - 6x + 9$

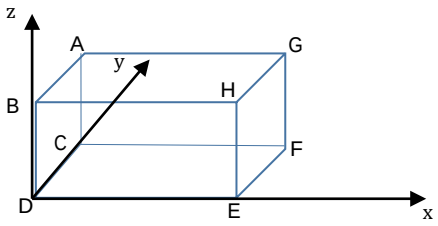
3. Sketch the quadratic $y = (x - 4)^2 + 2$ (showing where the graph cuts the y-axis)

4. Find the equation of the trig graph



Exercise 1

1. In the cuboid below the C is the point (0, 6, 0) and H is (6, 0, 4)

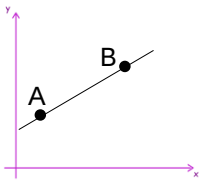


(a) Find the coordinates of A, F and G

(b) Find $\overrightarrow{BG}$

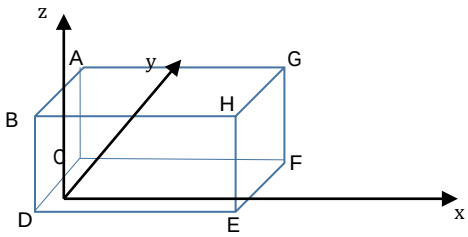
(c) Find the magnitude of $\overrightarrow{CH}$

2. The diagram represents a line of best fit for a scattergraph, A is (40, 110) B is (80, 500)
(a) Find the equation of the line.
(b) Use the equation to find y when x = 200



Exercise 2

1. In the cuboid below the B is the point (-2, -2, 7) and F is (12, 8, 0)

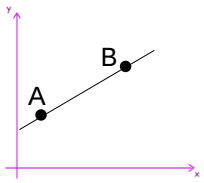


(a) Find the coordinates of A, D and G

(b) Find $\overrightarrow{BG}$

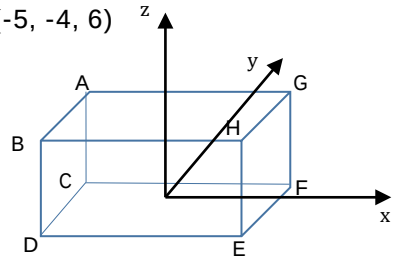
(c) Find the magnitude of $\overrightarrow{AE}$

2. The diagram represents a line of best fit for a scattergraph, A is (300, 200) B is (900, 700)
(a) Find the equation of the line.
(b) Use the equation to find y when x = 3000



Exercise 3

1. In the cuboid below the F is the point (9, 3, 0) and B is (-5, -4, 6)

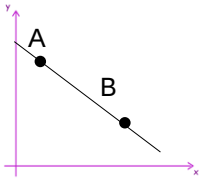


(a) Find the coordinates of A, E and G

(b) Find $\overrightarrow{BG}$

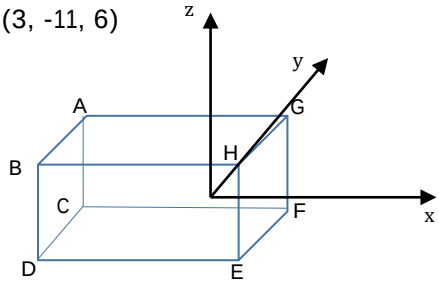
(c) Find the magnitude of $\overrightarrow{CH}$

2. The diagram represents a line of best fit for a scattergraph, A is (30, 2250) B is (55, 450)
(a) Find the equation of the line.
(b) Use the equation to find y when x = 130



Exercise 4

1. In the cuboid below the C is the point (-9, -4, -5) and H is (3, -11, 6)

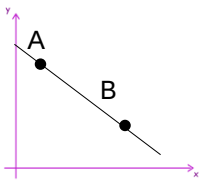


(a) Find the coordinates of A, F and G

(b) Find $\overrightarrow{BG}$

(c) Find the magnitude of $\overrightarrow{CH}$

2. The diagram represents a line of best fit for a scattergraph, A is (75, 140) B is (70, 190)
(a) Find the equation of the line.
(b) Use the equation to find y when x = 200



Applications	Revision

Exercise 1

1. Solve $y = x^2 - 9x - 4$ to 1 decimal place

2. The two bags are similar, find the volume of the larger bag in ml:

3. At the cinema 5 adults and 2 children cost £43.50; 4 adults and 3 children cost £42.50. Find the cost of 1 adult and 1 child.

4. Solve $3\tan x + 2 = 0$ for $0 \leq x \leq 360$

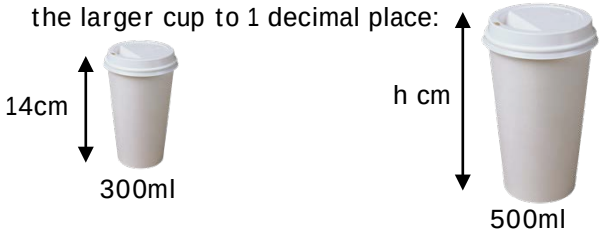
5. Sketch the graph $y = 5\cos(x + 20)$

6. Determine the nature of the roots of $y = 4x^2 - 4$

Exercise 2

1. Solve $y = 3x^2 - 8x - 2$ to 1 decimal place

2. The two shapes are similar. Find the height of the larger cup to 1 decimal place:



3. At the cinema 3 adults and 4 children cost £39.80; 2 adults and 3 children cost £28.10. Find the cost of 1 adult and 1 child.

4. Solve $4\sin + 2 = 0$ for $0 \leq x \leq 360$

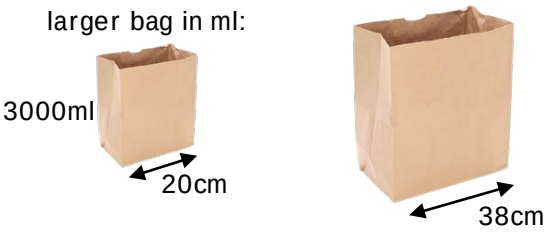
5. Sketch the graph of $y = -3\cos(x - 50)$

6. Determine the nature of the roots of $y = 2x^2 - 4x + 5$

Exercise 3

1. Solve $y = x^2 + 10x - 4$ to 1 decimal place

2. The two bags are similar, find the volume of the larger bag in ml:



3. At the cinema 5 adults and 3 children cost £62; 3 adults and 3 children cost £45. Find the cost of 1 adult and 1 child.

4. Solve $3\cos x - 2 = 0$ for $0 \leq x \leq 360$

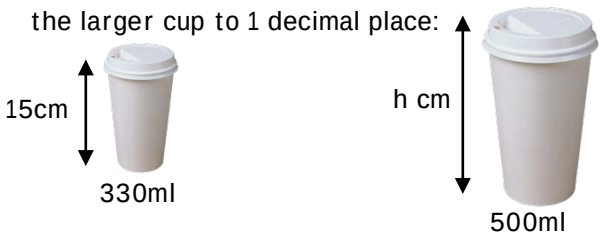
5. Sketch the graph of $y = 5\sin(x + 30)$

6. Determine the nature of the roots of $y = 2x^2 - 4 + 2$

Exercise 4

1. Solve $y = 5x^2 + 15x - 3$ to 1 decimal place

2. The two shapes are similar. Find the height of the larger cup to 1 decimal place:



3. At the cinema 6 adults and 5 children cost £74.70; 4 adults and 3 children cost £47.70. Find the cost of 1 adult and 1 child.

4. Solve $5\sin x - 2 = 0$ for $0 \leq x \leq 360$

5. Sketch the graph of $y = -4\sin(x - 40)$

6. Determine the nature of the roots of $y = x^2 - 2x + 3$

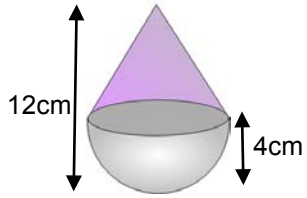
Relationships	Revision

Exercise 1

1. Find the gradient of line passing through the points (11, 36) and (9, 20).

2. Simplify: (a) $\frac{x^2-25}{x^2-4x-5}$ (b) $\frac{2x}{2x-2}+\frac{2}{x+3}$

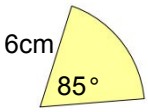
3. Find the volume of the shape.



4. Simplify:

(a) $\sqrt{162}+4\sqrt{2}$ (b) $\frac{x^9\times(x^7)^4}{x}$

5. Find the length of arc:

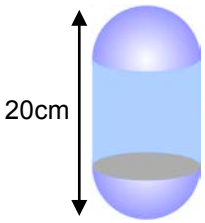


Exercise 2

1. Find the gradient of line passing through the points (-4, -8) and (-10, -4).

2. Simplify: (a) $\frac{4x^2+16}{x^2-2x-8}$ (b) $\frac{x}{x+1}-\frac{6}{2x+3}$

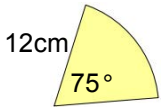
3. Find the volume of the shape.



4. Simplify:

(a) $3\sqrt{192}-3\sqrt{147}$ (b) $\frac{x^4\times x^7}{(x^2)^{13}}$

5. Find the area of sector:

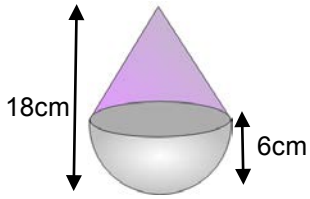


Exercise 3

1. Find the gradient of line passing through the points (-3, 45) and (-9, 15).

2. Simplify: (a) $\frac{x^2+x-12}{x^2-2x-24}$ (b) $\frac{-x}{x-1}-\frac{1}{2x-2}$

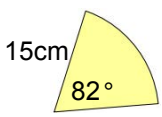
3. Find the volume of the shape.



4. Simplify:

(a) $5\sqrt{242}-9\sqrt{2}$ (b) $\frac{x^6\times(x^3)^9}{x^4}$

5. Find the length of arc:

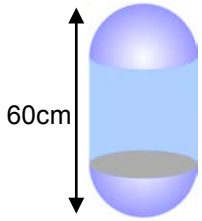


Exercise 4

1. Find the gradient of line passing through the points (8, 9) and (13, -14).

2. Simplify: (a) $\frac{6x^2-150}{x^2+x-20}$ (b) $\frac{-3x}{x+3}-\frac{4x}{x}$

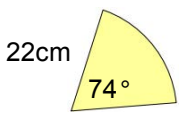
3. Find the volume of the shape.



4. Simplify:

(a) $15\sqrt{7}+5\sqrt{175}$ (b) $\frac{(x^3)^7\times x^7}{x^{28}}$

5. Find the area of sector:



E&F	Revision

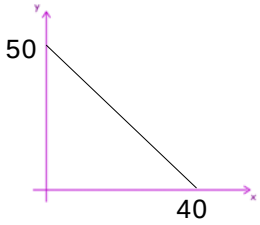
Exercise 1

1. Sketch the graph y = (x – 4)(x + 2) (showing the turning point, roots and y-intercept)

2. Change the subject:

$$q = \frac{1}{3}mr^2 \qquad [m]$$

3. Determine the equation of the straight line:



4. Solve $y = x^2 - 7x + 12$

5. Sketch the graph of y = 3cos2x

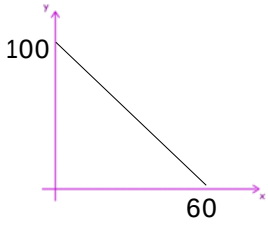
Exercise 2

1. Sketch the graph y = (x – 8)(x - 4) (showing the turning point, roots and y-intercept)

2. Change the subject:

$$A = 5rph - 4n \qquad [n]$$

3. Determine the equation of the straight line:



4. Solve $y = x^2 - 8x + 16$

5. Sketch the graph of y = cos3x + 1

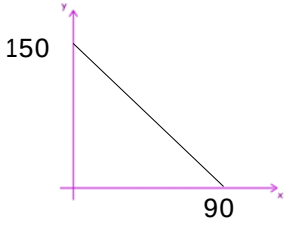
Exercise 3

1. Sketch the graph y = (x – 1)(x + 3) (showing the turning point, roots and y-intercept)

2. Change the subject:

$$W = 4\sqrt{m+n} \qquad [m]$$

3. Determine the equation of the straight line:



4. Solve $y = x^2 + -2x - 15$

5. Sketch the graph of y = 3cos3x - 2

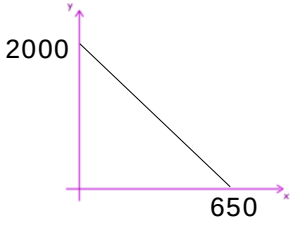
Exercise 4

1. Sketch the graph y = (x - 7)(x + 5) (showing the turning point, roots and y-intercept)

2. Change the subject:

$$k = 7hn^2 - 2 \qquad [h]$$

3. Determine the equation of the straight line:



4. Solve $y = x^2 + 9x + 18$

5. Sketch the graph of y = 3cosx +3

Relationships	Revision