

National 5 Maths: S5/6 Revision from National 4

Exercise 1: Negative Numbers

- Calculate :
(a) $3 + (-2)$ (b) $-3 + (-2)$ (c) $6 - 3$ (d) $4 + 4$
(e) $-5 + 7$ (f) $9 - 2$ (g) $7 - 3$ (h) $8 + 2$
(i) $10 + (-5)$ (j) $-2 + (-4)$ (k) $12 + (-7)$ (l) $-4 + 8$
(m) $-3 + 2$ (n) $-5 + (-8)$ (o) $8 + (-7)$ (p) $4 - 5$
- Calculate
(a) $20 - 30$ (b) $70 + (-20)$ (c) $-50 + 10$ (d) $-30 - 40$
(e) $-18 + 8$ (f) $35 - 40$ (g) $-27 - 15$ (h) $21 + (-37)$
(i) $12 - 35$ (j) $-13 + 49$ (k) $15 + (-15)$ (l) $130 - 200$
(m) $-37 + 14$ (n) $58 - 85$ (o) $-19 - 52$ (p) $-72 + (-17)$
- The temperature in Glasgow was 7°C . The temperature in Oslo was 11 degrees lower. What was the Oslo temperature?
- My bank balance was $-\text{£}25$. I paid in $\text{£}20$ my aunt gave me for my birthday. What is my new balance?
- When a plane took off the outside temperature was 14°C . By the time it had climbed to 30000feet, the outside temperature was -45°C . By many degrees had the temperature fallen?
- Freezers operate at different temperatures depending on their star ratings. A 1 star freezer operates at -6°C and a 2 star at -12°C . What is the difference in the operating temperatures of these two freezers?
- A year such as 123BC can be thought of as -123 and one such as 2003AD as $+2003$. The Roman Emperor Tiberius Caesar Augustus was born in the year 42BC and died in the year 37AD. How old was he when he died?
- Put the answers to these calculations in order starting with the smallest.
A $-12 - (-2)$ B $-3 + 13$ C $-5 + (-6)$



Exercise 2: Percentages

- Littletrees** department store is offering discounts of 10% to customers who take a store card. Calculate the cost of the following items after the discount is applied:
(a) $\text{£}50$ (b) $\text{£}100$ (c) $\text{£}25$ (d) $\text{£}30$
(e) $\text{£}95$ (f) $\text{£}10$ (g) $\text{£}200$ (h) $\text{£}150$
- The **Carillon Call Company** is giving a 15% loyalty discount to telephone customers. Calculate the cost of these bills after the discount is applied:
(a) $\text{£}70$ (b) $\text{£}25$ (c) $\text{£}98$ (d) $\text{£}43$
(e) $\text{£}120$ (f) $\text{£}50$ (g) $\text{£}77$ (h) $\text{£}114$

3. **CutscoCash'n'Carry** charge VAT at the rate of 20%. Calculate the final cost of these bills:
- | | | | |
|----------|----------|---------|----------|
| (a) £100 | (b) £30 | (c) £50 | (d) £70 |
| (e) £250 | (f) £180 | (g) £90 | (h) £400 |

4. Calculate the final cost of these bills at the **CutscoCash'n'Carry**
- | | | | |
|----------|----------|----------|-----------|
| (a) £100 | (b) £50 | (c) £80 | (d) £30 |
| (e) £45 | (f) £250 | (g) £700 | (h) £2000 |

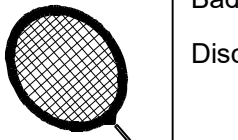
5. In a quiz there were 60 questions altogether:

Team A answered 20% of the questions correctly
 Team B answered 25% of the questions correctly
 Team C answered 50% of the questions correctly



How many questions did each team answer correctly?

6. 75% of the pupils in a school do not attend on the last day before a holiday. If there are 1244 pupils in the school, how many did attend on the last day?
7. Find the following amounts:
 (a) 45% of £450 (b) 23% of £236 (c) 78% of £890
8. During a period of 55 minutes a pupil spent 15% of the time day dreaming. How many minutes is this?
9. A packet of crisps weighs 30g. Special offer packs give 40% extra free. What weight of crisps do you get in a packet now?
10. Susan was buying a new computer. She had to pay a deposit of 30%. How much deposit would have to pay if her computer was going to cost £900?
11. In a sale, a bike which normally costs £290 is being offered with a 24% discount. How much would be paid for the bike after discount?
12. The local sports shop is having a sale and offering the reductions shown in the diagrams. Calculate the 'sale' price of each item.

(a) 

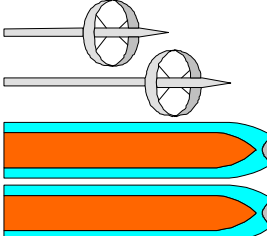
Badminton Racquet: £30
Discount: 20%

(b) 

Ice Skates: £45
Discount: 10%

(c)

Skis: £256
Discount: 25%



13. The table below shows Gianni's test scores for his school subjects.

	English	Maths	French	History	Biology	Craft	Physics	Art
score	42	22	60	16	21	45	18	36
out of	50	25	75	20	25	60	30	40

- (a) Express each score as a percentage.
(b) In which subject did he do best?
14. What percentage is
- (a) 19 of 76 (b) 54 of 60 (c) 15 of 25 (d) 28 of 80
(e) 84 of 168 (f) 56 of 160 (g) 126 of 180 (h) 72 of 180
(i) 63 of 315 (j) 126 of 280 (k) 54 of 360 (l) 108 of 150

Exercise 3: More fractions

1. Find the following:

(a) $\frac{3}{4}$ of 256 m (b) $\frac{2}{5}$ of £400 (c) $\frac{5}{8}$ of £308

2. There are 48 sweets in a packet. $\frac{3}{4}$ of them are citrus flavours.

How many citrus sweets are there in the packet?

3. In a class of 24 pupils $\frac{7}{8}$ of them are present.

(a) How many pupils are present?

(b) How many are absent?

4. In a school there are 1450 pupils. $\frac{4}{5}$ of them bring a mobile phone to school.

(a) How many pupils bring a mobile phone?

(b) How many do not bring a phone with them?



5. In a box of 36 chocolates, $\frac{4}{9}$ of them are milk chocolate, $\frac{1}{3}$ of them are white chocolate and the rest are dark chocolate.

(a) How many are milk chocolate?

(b) How many are white chocolate?

(c) How many are dark chocolate?

6. $\frac{5}{7}$ of the cars in a car park were grey. If there were 560 cars altogether, how many of them were grey?

7. There are 100 pencils in a box. $\frac{3}{5}$ of them are plain. $\frac{3}{8}$ of the remainder have rubber tips and the rest are coloured.
- (a) How many plain pencils are there?
 (b) How many rubber-tipped pencils are there?
 (c) How many coloured pencils are there?
8. Daniel was building a jigsaw which had 600 pieces in it. If he had fitted in $\frac{5}{12}$ of the pieces, how many had he **still to fit**?
9. In a box of 36 coloured pencils, $\frac{2}{9}$ of them were shades of red. How many were **not** shades of red?

Exercise 4: - Significant figures

1. Round to 1 significant figure:
- | | | | | | |
|----------|-----------|----------|-----------|----------|------------|
| (a) 23 | (b) 5.5 | (c) 78 | (d) 31 | (e) 125 | (f) 309 |
| (g) 291 | (h) 843.6 | (i) 7646 | (j) 1928 | (k) 8003 | (l) 5192.7 |
| (m) 10.9 | (n) 556.2 | (o) 3.98 | (p) 12345 | (q) 1.01 | (e) 93 |
- 0.86 (t) 606 (s)
2. Round to 2 significant figures:
- | | | | | | |
|------------|-------------|-------------|-----------|-----------|-----------|
| (a) 8.72 | (b) 92.8 | (c) 0.186 | (d) 679 | (e) 2.112 | (f) 6.463 |
| (g) 31.4 | (h) 25.8 | (i) 24.27 | (j) 18.76 | (k) 6397 | (l) 4.99 |
| (m) 0.0526 | (n) 0.00613 | (o) 0.08702 | (p) 13814 | (q) 2.456 | (r) 45192 |
- 9.302 (t) 0.756 (s)


Exercise 5: Volume of Cube and Cuboid

1. Calculate the volume of a cube with:
- | | | | |
|----------------------|-----------------------|-----------------------|-----------------------|
| (a) $l = 3\text{cm}$ | (b) $l = 7\text{cm}$ | (c) $l = 2\text{cm}$ | (d) $l = 4\text{cm}$ |
| (e) $l = 5\text{cm}$ | (f) $l = 10\text{cm}$ | (g) $l = 6\text{cm}$ | (h) $l = 9\text{cm}$ |
| (i) $l = 8\text{cm}$ | (j) $l = 14\text{cm}$ | (k) $l = 11\text{cm}$ | (l) $l = 20\text{cm}$ |
2. Calculate the volume of a cuboid with:
- | | |
|---|--|
| (a) $l = 5\text{cm}, b = 4\text{cm}, h = 3\text{cm}$ | (b) $l = 7\text{cm}, b = 3\text{cm}, h = 2\text{cm}$ |
| (c) $l = 10\text{cm}, b = 8\text{cm}, h = 3.5\text{cm}$ | (d) $l = 4\text{cm}, b = 4\text{cm}, h = 3\text{cm}$ |
| (e) $l = 20\text{mm}, b = 8\text{mm}, h = 10\text{mm}$ | (f) $l = 5.5\text{cm}, b = 1.4\text{cm}, h = 7\text{cm}$ |

Exercise 6: Proportion

1. 300g of flour is used to make 6 cakes. How much flour is needed to make:
- | | | |
|--------------------|--------------|--------------|
| (a) 12 such cakes? | (b) 3 cakes? | (c) 9 cakes? |
|--------------------|--------------|--------------|
2. Eight bars of chocolate cost £3.36. Calculate the cost of:
- | | | |
|------------------------|------------|--------------|
| (a) 1 bar of chocolate | (b) 3 bars | (c) 11 bars. |
|------------------------|------------|--------------|

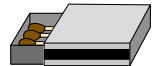


3. A stack of six identical books weighs 1.38kg. How much would a stack of 10 books weigh?
4.
 - (a) 4 cakes cost £3.12. Find the cost of 9 cakes.
 - (b) The height of 12 stacked CD cases is 136.8mm. Calculate the height of 7 such cases.
 - (c) A row of 24 staples measures 14.4 mm. How long would a row of 38 staples be?
 - (d) The weight of 3 baskets of fruit is 5.4 kg. Calculate the weight of 5 baskets.
5. Carpet is priced relative to its area.
A rectangular carpet measuring 5m by 4m costs £264.
 
 - (a) Calculate the cost for 1 square metre of this carpet. (the cost per sq.m)
 - (b) How much would a carpet measuring 8m by 6m cost?
6. A bedroom carpet measuring 4m by 7m costs £180.60.
How much would the same type of carpet measuring 5m by 8m cost?
7. A car uses 15 litres of petrol to travel 210 miles. How much petrol would the car use for a journey of 378 miles at the same rate of consumption?
8. Fifteen books cost £123. How many books could you buy for £73.80?
9. For £250 you receive 2750 francs. How much would 1364 francs cost you in pounds sterling?

Exercise 7: Averages

1. Two makes of matches are being compared, "Brighto" and "Sparky", they both cost the same per box.
14 boxes of each type are sampled to find the number of matches in a box. Here are the results.

Brighto 48 45 47 39 52 36 58 Sparky 38 42 49 39 62 56 52
 41 38 39 46 50 61 37 40 58 49 29 51 64 57



- (a) Construct a back-to-back stem-and-leaf diagram to represent this information.
 - (b) Which make of match, if any, is a better buy? Give a reason for your answer.
2. Paul works in a shoe shop on a Saturday. The manager wants to make a special purchase of "Trainers". He asked Paul to do a tally of sizes of men's shoes sold that day.

Size	6	6½	7	7½	8	9	10
Pairs Sold	5	17	21	16	15	11	2

- (a) Which size of shoe will the manager order most of?
 - (b) What do we call this measure in statistics?
3. The **Lucky Strike Match Company** advertises the *average* contents of its boxes as 48. Here is a sample of the boxes contents :
 45 47 46 50 48 51 46 47 49 51
 Is the company correct in their advert? Give a reason for your answer.

4. The ages of the players in a local football team are given below :

19 23 25 24 19 25
31 27 29 30 34



- (a) Calculate the mean, median and mode.
 (b) Jake is 25 years old. Is he above or below the average age?
 (c) The two oldest players leave and are replaced by two players aged 18 and 25. Calculate the mean median and modal age of the team now.
 (d) How would you describe Jake's age now?
5. A small firm employs 10 people. The salaries of the employees are as follows :
 £40 000, £18000, £15000, £9000, £15000, £15000, £13000, £15000, £15000, £15000.
 (a) Calculate the mean, median and mode.
 (b) Which of the three measures best describes the *average* salary in the company?
6. Diane does a lot of travelling in her job. She keeps a note of the miles she drove each week for the first 10 weeks.
 785 846 816 704 685 723 960 788 729 814
 (a) Calculate the mean weekly mileage.
 (b) If Diane's mean weekly mileage stays the same, how many miles would she expect to travel in a year? (She has 6 weeks holiday when she does no driving)
7. In a 5-a-side football competition, the average age of a team must not exceed 16. Below are the ages of 2 groups of 10 players who want to enter 2 teams each.
 A : 14 , 16 , 14 , 17 , 15 , 18 , 16 , 15 , 17 , 18
 B : 14 , 15 , 16 , 17 , 15 , 16 , 14 , 16 , 18 , 14
 (a) How would you arrange the teams?
 (b) Here are the ages of another team: 15, 17, 16, 17, 16
 Will they be allowed to take part in the competition?

Exercise 8: Collecting Like Terms

1. Write each of the following in a shorter form:

(a) $3x + 2x$	(b) $4p + 2p + 6p$	(c) $8a - 3a$	(d) $5m + 3m - 2m$
(e) $3v + v$	(f) $4y + 6y - y$	(g) $5a + 4a + 6$	(h) $9f - 4f + 6$
(i) $8x + 3 + 2x$	(j) $4c + 6 + 3$	(k) $5m + 3 + 4m$	(l) $4y + 5 + 2y$
(m) $8 + 3x - 4$	(n) $7d + 6 - 3d$	(o) $5y + 6z + y$	(p) $6a + 5b - 2a$
(q) $12 + 7x - 7$	(r) $5g + 6h + 4g$	(s) $5r + 8 - 2$	(t) $6x + 3 + 3x$

2. Write each of the following in a shorter form:

(a) $3x + 4x + 3y + 4y$	(b) $4a + 5b + 6c + 7c$	(c) $4a + 3a + 4b + 2b$
(d) $2g + 4g + 3k + 2k$	(e) $3m + 4m + 2p + 8p$	(f) $7q + 3q + 2r + 4r$
(g) $3x + 2 - 8x$	(h) $2a + 4 - a + 4$	(i) $7k - 3k - 4p - 2p$
(j) $9n - 4n + 3p - p$	(k) $15t + 16b - 5t - 4b$	(l) $20r + 18r + 5r - 9s$
(m) $24r + 17w - 16r - 2w$	(n) $6x + 3 - 3x - 5x$	

Exercise 9: Removing Brackets

1. Multiply out the brackets:

- (a) $4(2a + 5)$ (b) $7(3y + 4)$ (c) $2(12x + 11)$ (d) $9(4c + 7)$ (e) $2(3a + 4)$
(f) $5(2x + 7)$ (g) $10(3 + 2y)$ (h) $3(5t + 6)$ (i) $3(2x + 9)$ (j) $2(7 + 5y)$
(k) $4(3b + 8)$ (l) $5(5x + 4)$ (m) $2(4a - 3)$ (n) $6(4y - 3)$ (o) $3(2x - 5)$
(p) $4(5c - 6)$ (q) $7(2a - 1)$ (r) $2(8x - 3)$ (s) $5(6 - 7y)$ (t) $3(8t - 5)$
(u) $3(9x - 4)$ (v) $8(7 - 5y)$ (w) $7(2b - 9)$ (x) $2(12x - 7)$ (y) $4(6 - 7u)$

2. Remove the brackets and simplify where possible:

- (a) $10(c + 2) + 5$ (b) $2(e + 4) - 7$ (c) $6(f + 4) - 7f$ (d) $4(t + 8) - 7$
(e) $7(g - 3) + 5g$ (f) $8(w - 1) - 3w$ (g) $6(h + 2) + 9$ (h) $9(p + 3) + 5p$
(i) $3(2 + f) - 4$ (j) $4(7 - u) - 15$ (k) $5(5 + p) - 2p$ (l) $4(7 - u) - 15$
(m) $6(1 + e) + e$ (n) $3(6 + w) + w$ (o) $8(11 + q) - 4q$ (p) $6(3g + 2) + 7$
(q) $2(2e + 4) - 3$ (r) $7(4c + 5) - 20c$ (s) $3(2t + 8) - t$ (t) $3(8f + 3) - 4$
(u) $3(4a + 1) - 4$ (v) $5(2 + 2t) + 3t$ (w) $4(1 + 9u) + 2u$ (x) $(6 + 5x) - x$
(y) $3(10 + 2d) - 5d$ (z) $5(4 + 7u) - 28$

Exercise 10: Finding a Common Factor

1. Factorise:

- (a) $2x + 2y$ (b) $3c + 3d$ (c) $6s + 6t$ (d) $12x + 12y$ (e) $9a + 9b$
(f) $8b + 8c$ (g) $5p + 5q$ (h) $7g + 7h$ (i) $4m + 4n$ (j) $9e + 9f$
(k) $13j + 13k$ (l) $14v + 14w$ (m) $2x + 8$ (n) $3m + 12$ (o) $4y - 4$

2. Factorise:

- (a) $4x + 10$ (b) $6g - 15$ (c) $4f + 2$ (d) $8y - 4$ (e) $12e + 8$
(f) $6m + 21$ (g) $10a - 6$ (h) $9h + 12$ (i) $6r - 14$ (j) $10r + 5s$
(k) $12k - 3l$ (l) $7w + 21x$ (m) $4q + 8$ (n) $6 + 18g$ (o) $12m - 9$

3. Factorise:

- (a) $3x - 6$ (b) $4y - 8$ (c) $16 - 8a$ (d) $10c - 15$ (e) $9s - 12$
(f) $2b - 14$ (g) $12x - 100$ (h) $22m - 33$ (i) $15x - 10$ (j) $18 - 12y$
(k) $25b - 20$ (l) $18d - 30$ (m) $2a + 4b$ (n) $10x - 12y$ (o) $18m + 24n$

Exercise 11: Evaluating Expressions

1. If $x = 10$ and $y = 4$, calculate

- (a) $x + y$ (b) $x - y$ (c) $2x$ (d) xy
(e) $5y$ (f) $x + 7$ (g) $x - 3$ (h) $y + 15$

2. If $a = 8$, $b = 5$ and $c = 2$, calculate

- (a) $a + b$ (b) $a - b$ (c) $b + c$ (d) $a + 10$
(e) $a - c$ (f) $3a - 6$ (g) $2a + 3c$ (h) $8c - 3b$
(i) $a + b + c$ (j) $a + c - b$ (k) $a - b - c$ (l) $2a + 3b + 4c$

3. Given that $a = b + d$, find a when

- (a) $b = 7$ and $d = 9$ (b) $b = 14$ and $d = 15$ (c) $b = 18$ and $d = 5$
(d) $b = 33$ and $d = 12$ (e) $b = 24$ and $d = 17$ (f) $b = 190$ and $d = 40$
(g) $b = 51$ and $d = 16$ (h) $b = 68$ and $d = 28$ (i) $b = 121$ and $d = 38$

4. Given that $X = 3Y - Z$, find X when

- (a) $Y = 4$ and $Z = 5$ (b) $Y = 10$ and $Z = 15$ (c) $Y = 20$ and $Z = 10$
(d) $Y = 12$ and $Z = 8$ (e) $Y = 15$ and $Z = 5$ (f) $Y = 100$ and $Z = 80$
(g) $Y = 50$ and $Z = 23$ (h) $Y = 17$ and $Z = 4$ (i) $Y = 11$ and $Z = 32$

5. (a) If $p = r - q$, find p when $r = 42$ and $q = 17$

(b) If $y = 4x - 9$, find y when $x = 7$

(c) If $A = 7B + C$, find A when $B = 9$ and $C = 8$

(d) If $R = S + 5T$, find R when $S = 22$ and $T = 6$

(e) If $H = G - 2F$, find H when $G = 50$ and $F = 15$

(f) If $k = 2m + 3n$, find k when $m = 12$ and $n = 3$

6. The formula for distance is $D = S \times T$, where D is the distance in kilometres, S is the speed in km/h and T is the time in hours. Find D when

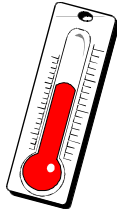
- (a) $S = 30$ km/h and $T = 2$ h (b) $S = 50$ km/h and $T = 3$ h
(c) $S = 60$ km/h and $T = 5$ h (d) $S = 80$ km/h and $T = 4$ h
(e) $S = 55$ km/h and $T = 3$ h (f) $S = 70$ km/h and $T = 3\frac{1}{2}$ h
(g) $S = 68$ km/h and $T = 2\frac{1}{2}$ h (h) $S = 54$ km/h and $T = 4\frac{1}{2}$ h

7. The formula $V = IR$ is used in electrical calculations. Use the formula to find V when

- (a) $I = 18$ and $R = 5$ (b) $I = 5$ and $R = 20$ (c) $I = 2.6$ and $R = 4.5$
(d) $I = 4.1$ and $R = 10$ (e) $I = 3.5$ and $R = 12$ (f) $I = 7$ and $R = 9.2$

8. The formula $F = 1.8C + 32$ is used to change a temperature from degrees Celsius ($^{\circ}\text{C}$) to degrees Fahrenheit ($^{\circ}\text{F}$).

Change the following Celsius temperatures to Fahrenheit.



- | | | | |
|---------------------------|---------------------------|---------------------------|---------------------------|
| (a) 15 $^{\circ}\text{C}$ | (b) 35 $^{\circ}\text{C}$ | (c) 10 $^{\circ}\text{C}$ | (d) 20 $^{\circ}\text{C}$ |
| (e) 33 $^{\circ}\text{C}$ | (f) 5 $^{\circ}\text{C}$ | (g) 40 $^{\circ}\text{C}$ | (h) 22 $^{\circ}\text{C}$ |

9. The area of a triangle is given by the formula $A = \frac{1}{2}bh$.

Find the areas of the following triangles:

- | | | | |
|------------------------|--------------------|-------------------------|---------------------|
| (a) $b = 10\text{cm}$ | $h = 8\text{cm}$ | (b) $b = 50\text{mm}$ | $h = 90\text{mm}$ |
| (c) $b = 12\text{cm}$ | $h = 15\text{cm}$ | (d) $b = 140\text{m}$ | $h = 60\text{m}$ |
| (e) $b = 18\text{mm}$ | $h = 100\text{mm}$ | (f) $b = 27\text{cm}$ | $h = 35\text{cm}$ |
| (g) $b = 16.4\text{m}$ | $h = 12.2\text{m}$ | (h) $b = 2240\text{mm}$ | $h = 1560\text{mm}$ |
10. The scale on a map is 1: 20000. The formula to change a distance d centimetres on the map to the real distance D metres is

$$D = \frac{20000 \times d}{100}$$

Change these map distances to real distances :

- | | | |
|------------|-------------|------------|
| (a) 4cm | (b) 5cm | (c) 3.5cm |
| (d) 7.2cm | (e) 0.7cm | (f) 0.96cm |
| (g) 1.04cm | (h) 12.57cm | |

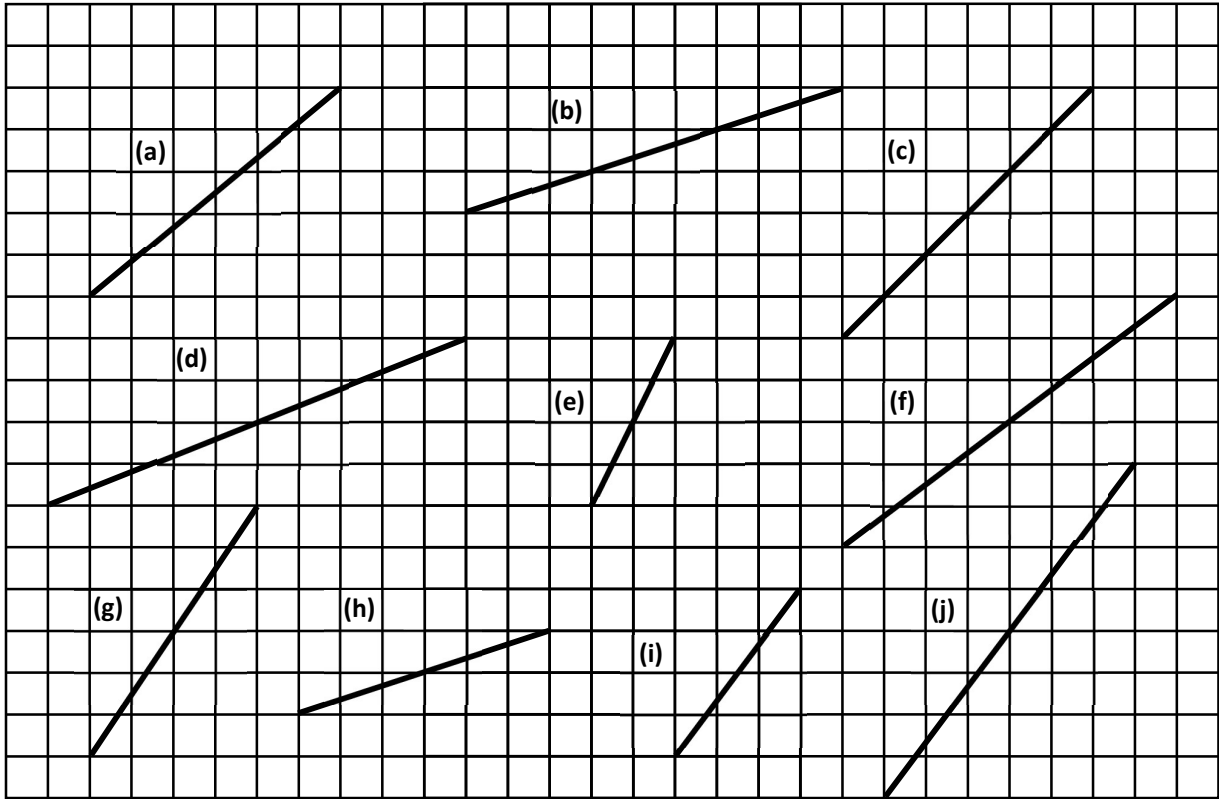


11. In a regular polygon with n sides, the size of an exterior angle is $\frac{360^{\circ}}{n}$.

Find the size of the exterior angle in a polygon with

- | | | | |
|--------------|--------------|--------------|--------------|
| (a) 5 sides | (b) 9 sides | (c) 12 sides | (d) 8 sides |
| (e) 18 sides | (f) 10 sides | (g) 30 sides | (h) 25 sides |
12. A formula is given as $E = p^2 + 2$. Find the value of E when
- | | | | |
|-------------|-------------|-------------|-------------|
| (a) $p = 2$ | (b) $p = 3$ | (c) $p = 6$ | (d) $p = 1$ |
|-------------|-------------|-------------|-------------|
13. A formula is given as $Q = 36 - r^2$. Find the value of Q when
- | | | | |
|-------------|-------------|-------------|-------------|
| (a) $r = 3$ | (b) $r = 4$ | (c) $r = 6$ | (d) $r = 1$ |
|-------------|-------------|-------------|-------------|
14. A formula is given as $L = 2p^2 - 6$. Find the value of L when
- | | | | |
|-------------|-------------|-------------|--------------|
| (a) $p = 2$ | (b) $p = 3$ | (c) $p = 5$ | (d) $p = 10$ |
|-------------|-------------|-------------|--------------|

3. Calculate the gradient of each line below, leaving your answer as a fraction in its simplest form where necessary.



Exercise 13: Straight Line Graphs

1. Write down the gradient and y-intercept for each of these lines

(a) $y = x + 3$	(b) $y = 2x + 2$	(c) $y = 3x + 1$
(d) $y = 4x + 2$	(e) $y = 2x + 3$	(f) $y = \frac{1}{2}x + 4$

2. For each line, write down the gradient and the coordinates of the point where it crosses the y - axis.

(a) $y = 3x + 1$	(b) $y = \frac{1}{2}x - 5$	(c) $y = -2x + 3$
(d) $y = -\frac{1}{4}x - 2$	(e) $y = 8x - \frac{1}{2}$	(f) $y = -x + 4$

3. Write down the equations of these lines:

(a) $m = 4$ passing through the point (0, 5)	(b) $m = 3$ passing through the point (0, 1)
(c) $m = 2$ passing through the point (0, -1)	(d) $m = \frac{1}{4}$ passing through the point (0, 2)
(e) $m = \frac{1}{2}$ passing through the point (0, -2)	(f) $m = -2$ passing through the point (0, -4)

Exercise 14: Circles (Use $\pi = 3 \cdot 14$ in all questions)

1. Calculate the circumference of circles with **diameter**:

- | | | | |
|----------|----------|-----------|-----------|
| (a) 10cm | (b) 20cm | (c) 100mm | (d) 8cm |
| (e) 25mm | (f) 30cm | (g) 500mm | (h) 60m |
| (i) 16mm | (j) 15cm | (k) 50cm | (l) 200cm |

2. Calculate the circumference of circles with **radius**:

- | | | | |
|----------|----------|----------|-----------|
| (a) 10cm | (b) 15cm | (c) 50cm | (d) 30mm |
| (e) 3m | (f) 5m | (g) 4m | (h) 20cm |
| (i) 2m | (j) 12cm | (k) 25cm | (l) 100cm |

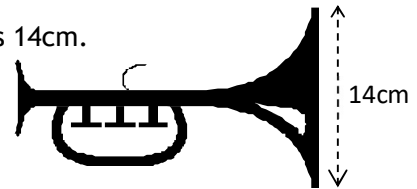
3. Martin has to replace the circular seal in the door of his washing machine.

The radius of the door is 12cm.

What is the circumference of the door seal?

4. The diameter of the 'bell' on the end of a trumpet measures 14cm.

Calculate its circumference



5. Calculate the area of circles with **radius**:

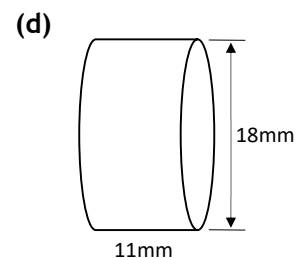
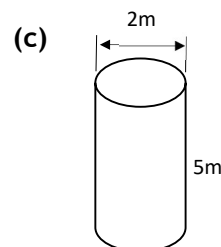
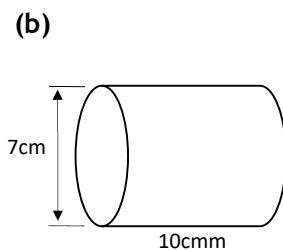
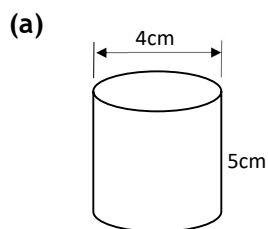
- | | | | |
|----------|----------|------------|------------|
| (a) 10cm | (b) 20cm | (c) 100 mm | (d) 8 cm |
| (e) 25mm | (f) 30cm | (g) 500 mm | (h) 60 m |
| (i) 16mm | (j) 15cm | (k) 50 cm | (l) 200 cm |

6. Calculate the area of circles with **diameter**:

- | | | | |
|----------|----------|----------|-----------|
| (a) 10cm | (b) 16cm | (c) 50cm | (d) 30mm |
| (e) 2m | (f) 12m | (g) 4m | (h) 20cm |
| (i) 3m | (j) 5cm | (k) 25cm | (l) 100cm |

Exercise 15: Calculating the volume of a cylinder

1. Calculate the volume of each cylinder below:



Exercise 16: Solving Equations

1. Solve:

(a) $x + 3 = 5$ (b) $x + 5 = 9$ (c) $x + 9 = 12$ (d) $x + 2 = 7$ (e) $a + 2 = 4$
(f) $y + 3 = 8$ (g) $p + 7 = 11$ (h) $c + 4 = 5$ (i) $b + 7 = 9$ (j) $q + 8 = 8$

2. Solve:

(a) $2x = 6$ (b) $5x = 20$ (c) $8x = 16$ (d) $3x = 27$ (e) $4a = 16$
(f) $7y = 28$ (g) $6p = 18$ (h) $5c = 25$ (i) $9b = 36$ (j) $2q = 18$

3. Solve:

(a) $2x + 3 = 5$ (b) $4x + 5 = 9$ (c) $3x + 3 = 12$ (d) $5x + 2 = 7$ (e) $2a + 2 = 14$
(f) $5y + 3 = 18$ (g) $2p + 7 = 21$ (h) $3c + 4 = 16$ (i) $6b + 7 = 49$ (j) $8q + 8 = 8$

4. Solve:

(a) $\frac{1}{2}x = 6$ (b) $\frac{1}{4}x = 5$ (c) $\frac{1}{3}x = 7$ (d) $\frac{1}{8}x = 3$ (e) $\frac{1}{5}x = 2$
(f) $\frac{1}{3}x = 3$ (g) $\frac{1}{7}x = 4$ (h) $\frac{1}{2}x = 8$ (i) $\frac{1}{4}x = 1$ (j) $\frac{1}{6}x = 8$

5. Solve:

(a) $2(x + 5) = 12$ (b) $5(y + 7) = 45$ (c) $3(a + 6) = 36$ (d) $6(x + 4) = 54$
(e) $4(x + 9) = 48$ (f) $3(c + 8) = 30$ (g) $7(d + 3) = 56$ (h) $5(m + 5) = 55$

6. Solve:

(a) $6y + 3 = y + 18$ (b) $5a + 7 = a + 15$ (c) $9c + 5 = c + 21$ (d) $10x + 1 = 4x + 19$
(e) $5b + 3 = 2b + 9$ (f) $7n + 6 = 3n + 18$ (g) $3x + 2 = x + 14$ (h) $9c + 58 = 6c + 73$

7. Solve:

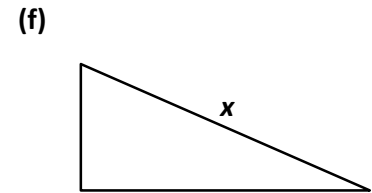
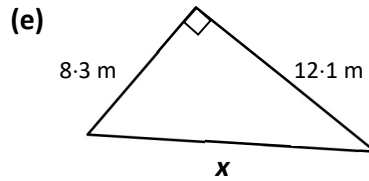
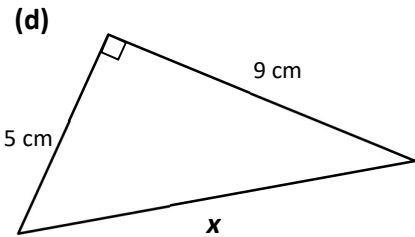
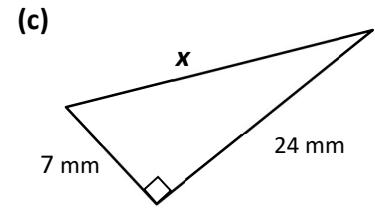
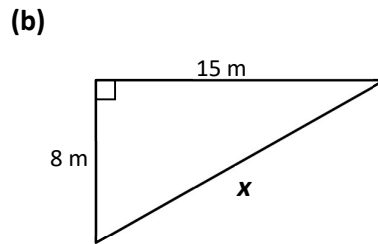
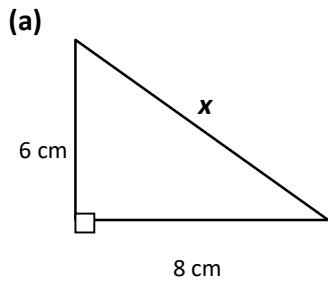
(a) $3(a + 2) = a + 12$ (b) $4(x + 3) = 2x + 30$ (c) $5(m + 3) = 2m + 24$ (d) $7(d + 1) = 3d + 15$
(e) $8(h + 3) = 3h + 29$ (f) $6(y + 1) = 2y + 24$ (g) $4(a + 1) = 2(a + 8)$

8. Solve:

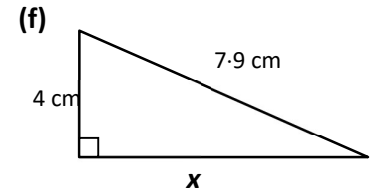
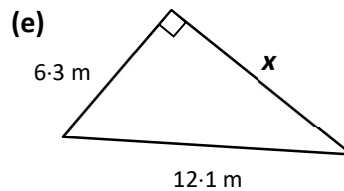
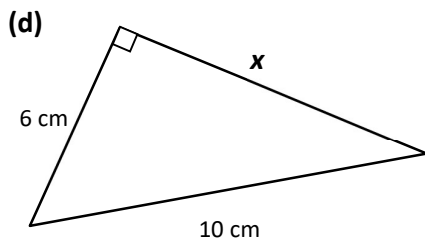
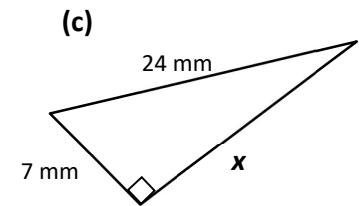
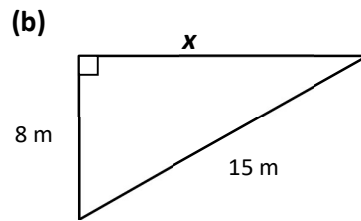
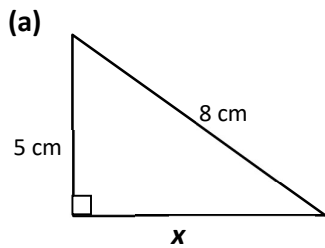
(a) $3x = 12 - x$ (b) $5m = 24 - 3m$ (c) $y = 21 - 2y$ (d) $5t = 42 - t$
(e) $2a = 20 - 2a$ (f) $6x = 40 - 4x$ (g) $2y + 1 = 21 - 3y$ (h) $p - 3 = 21 - 5p$
(i) $8r - 5 = 45 - 2r$ (j) $6 + x = 12 - 2x$ (k) $14 + 4a = 26 - 2a$ (l) $2 + 6d = 24 - 5d$

Exercise 17: Using Pythagoras' Theorem

1. Find the length of the hypotenuse, marked x , in each of the following triangles.

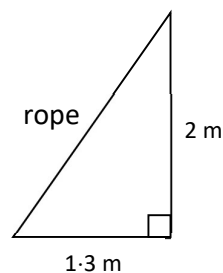


2. Find the length of the side, marked x , in each of the following triangles.

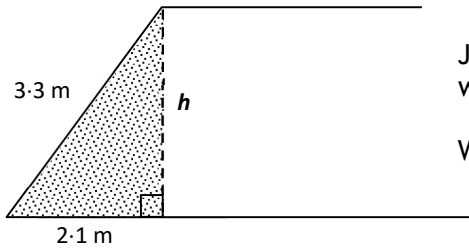


3. Guy ropes are used to support a tent pole. The pole is 2 metres high and the guy rope is fixed 1.3 metres from the bottom of the pole.

What is the length of the guy rope?



4.

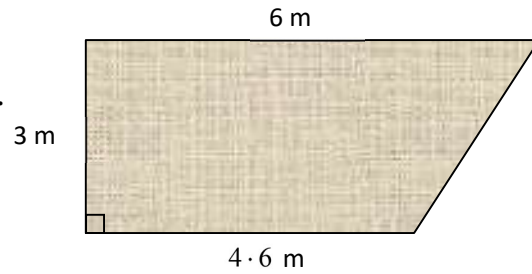


Jim's house has an attic room with a sloping end wall. He is going to make a fitted cupboard.

What will be the height of the cupboard, h ?

5. The room shown opposite has two parallel sides.

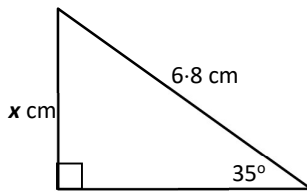
Using the given dimensions calculate the perimeter of the room.



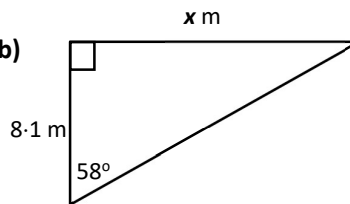
Exercise 18: SOHCAHTOA

1. Calculate the length of the side marked x in these right-angled triangles. You will have to choose which ratio to use.

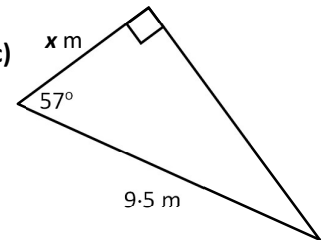
(a)



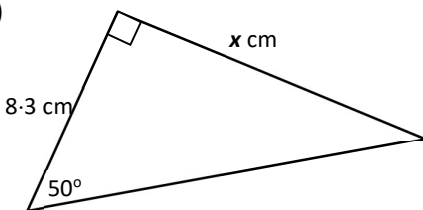
(b)



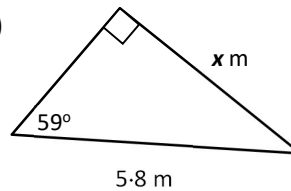
(c)



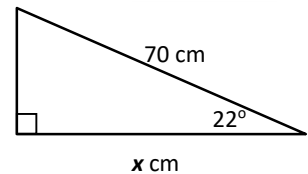
(d)



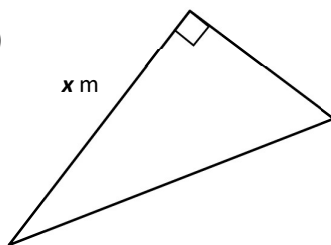
(e)



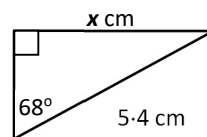
(f)



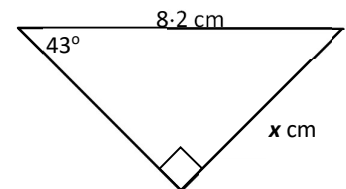
(g)



(h)

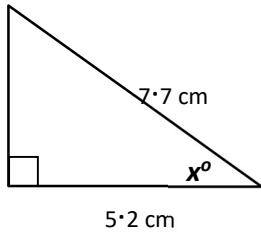


(i)

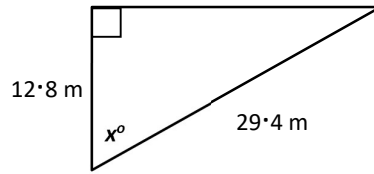


2. Calculate the size of the angle marked x° in these right-angled triangles. You will have to choose which ratio to use.

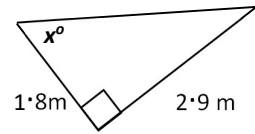
(a)



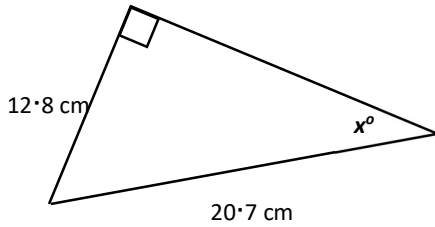
(b)



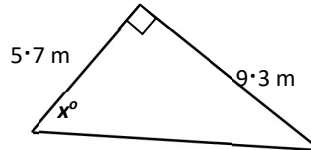
(c)



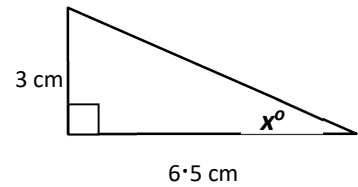
(d)



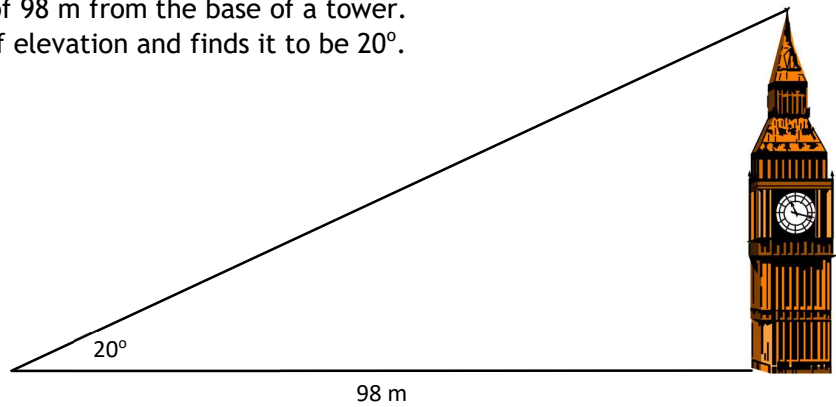
(e)



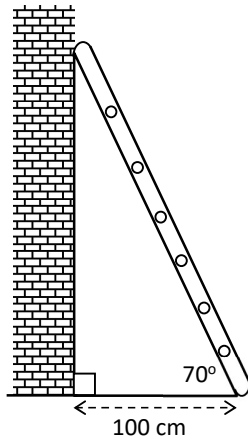
(f)



3. Peter stands a distance of 98 m from the base of a tower. He measures the angle of elevation and finds it to be 20° . How high is the tower?



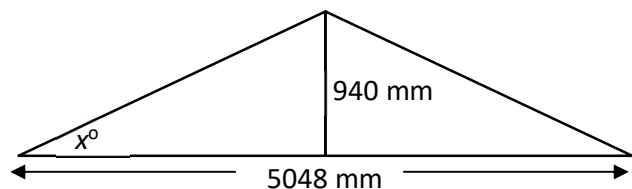
4.



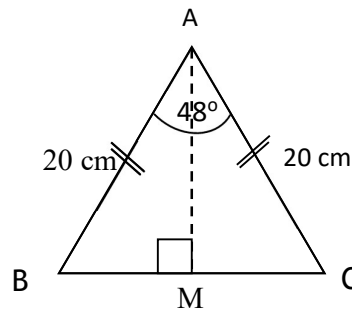
A ladder rests against a wall with its foot 100 cm from the wall. How high up the wall does the ladder reach?

5. A manufacturer of concrete roof tiles states that to be suitable for concrete tiles the angle of a roof (pitch) must be greater than 21° .

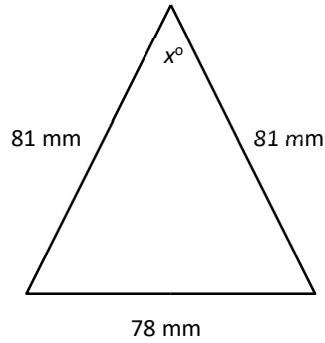
This roof is symmetrical. Is this roof suitable for concrete tiles?



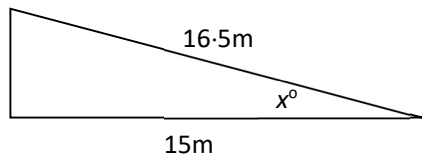
6. In triangle ABC, angle BAC is 48° . Calculate the length of BC.



7. Find angle x in this isosceles triangle



8. A skateboard ramp has been designed to have the following dimensions.



The ramp can only be used in competitions if the angle, x° , is between 24 and 26 degrees.

Can this ramp be used in a competition?

You must show all working and give a reason for your answer.

9. A security camera is secured to a beam on a ceiling in a warehouse. The length of the warehouse is 11.8 metres and the angle of depression of the camera is 15° .

Calculate the height of the warehouse.

