HODDER GIBSON LEARN MORE

TeeJay

National 5

Revison/Assessment Topics

Index

created by Jim Geddes for TeeJay

Rev/Assess 1

Percentages

You may use a calculator in this revⁿ/assessᵗ, but you must **show all working**.

1. Write 85% as a decimal **and** as a fraction, (*in its simplest form*).

2. In Auchtermully High School, 55% of the pupils are girls.

   If the role at Auchtermully is 640, how many of the pupils are **boys** ?

3. David scored 19 out of 25 in his History test and 24 out of 30 in his Geography test.

   In which test did David do better ? (*You **must** support your answer with working*).

4. Adsa Stores bought in a box of 24 tins of beans for a total price of £12·00.
   They sold all 24 tins for 62p each.

   (a) Calculate the **total** profit when all the tins were sold.

   (b) Express this profit as a **percentage** of the cost price.

5. Jenny was left £12000 in her Gran's will. She deposited the money in SCOTIA Bank and left it there for 3 years.

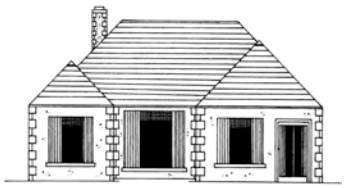
   Calculate how much her £12000 savings were worth at the end of the 3 year period. (*Interest rate* = **4%** *p.a.*).

   SCOTIA BANK
   annual rate of interest = **4%**

6. I bought my new car three years ago for £10500.

   - It lost 20% of its value in the first year
   - It lost a further 10% in the second year
   - It also lost 15% of its value this year.

   How much is my car now valued at ?

7. 

   The value of my flat rose by 8% during this year.

   It is now valued at £162 000.

   Calculate how much it must have been worth last year.

8. When a jug of water was left in the sun 20% of it evaporated.
   There was **then** 640 millilitres of water left in the jug.

   How much water was in the jug before it was left in the sun ?

9. Round :-

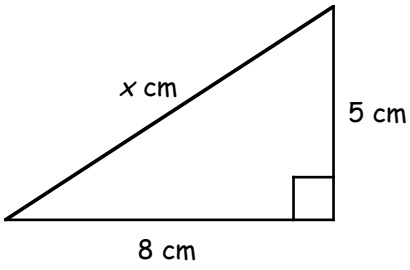
   (a) 37924 to **two** significant figures. (b) 0·0047049 to **three** significant figures.

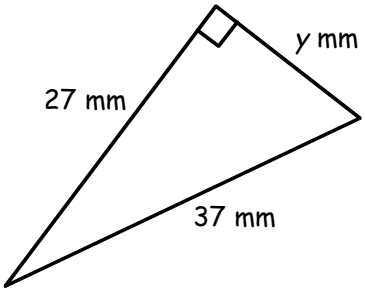
Rev/Assess 2

Pythagoras/Percentages

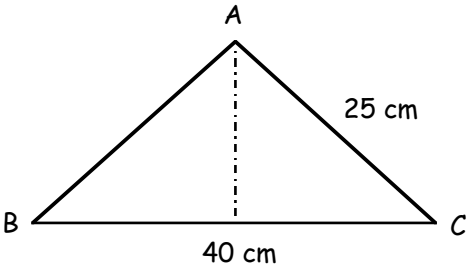
You may use a calculator in this rev^{n}/assess^{t}, but you must **show all working**.
Unless specified, answer correct to **3 significant figures**.

1. Calculate the lengths of the sides marked x and y here.





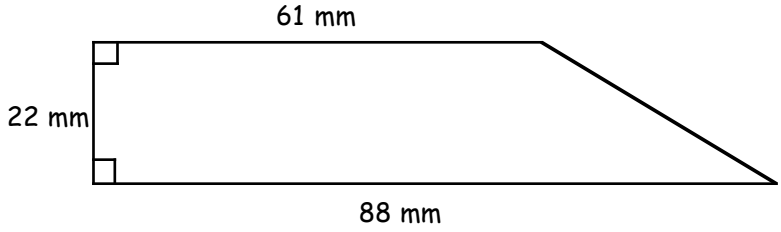
2. Triangle ABC is isosceles with AB = AC.



(a) Calculate the height of triangle ABC.

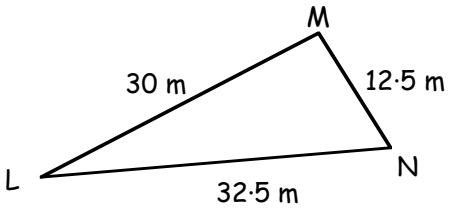
(b) Now calculate its area.

3. Calculate the **perimeter** of this shape.



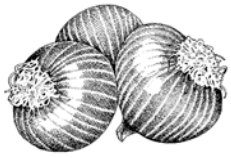
4. Draw a set of coordinate axes and plot the two points P(–6, 4) and Q(5, –2).
Calculate the length of the line PQ to 2 decimal places.

5. Prove that triangle LMN is a right angled triangle.



6. James left £600 in his building society account where the interest rate was 4·5% p.a.
Calculate how much his £600 savings would be worth if he left it there for 3 years.

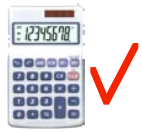
7. "Torrisons" bought in a 45 kg bag of onions for £15·00.
The onions were packed into 3 kg bags and sold for £1·20 per bag.
Calculate the total profit and express it as a percentage of the cost price.



8. Since the beginning of the week, my sunflower has grown by 15% to a new height of 138 cm.
How tall must my sunflower plant have been at the beginning of the week ?

Rev/Assess 3

Time, Distance and Speed



You may use a calculator in this rev^{n}/assess^{t}, but you must **show all working**.

Answers must be given in the correct units.

1. Change these times into decimals of an hour :-

   (a) 15 minutes (b) 42 minutes

2. Change these times (given in hours) into **hours and minutes** :-

   (a) 4·2 hours (b) 1·9 hours

3. Change 5 metres/second into km/hr.

4. A light aircraft is flying at a speed of 180 kilometres per hour.

   How far will it travel in $2\frac{1}{2}$ hours ?

5. 

   Two girls ran 100 metres in 40 seconds.

   What was their average speed ?

6. A motorcyclist travelled 238 miles at a steady speed of 68 mph.

   How long did he take ? *(answer in hours and minutes)*

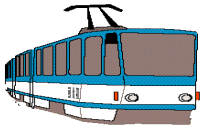
7. 

   A caravan was towed along for 1 hour 45 minutes at a slow speed of 20 miles per hour.

   How far did it go ?

8. A train travelled 126 kilometres at an average speed of 90 km/hr.

   How long was the journey, in hours and minutes ?



Please Turn Over

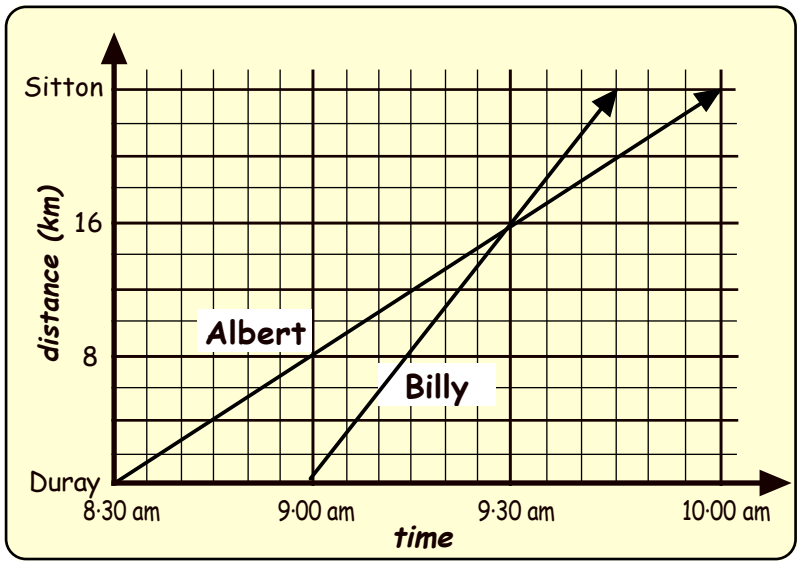
9. An ocean liner left port at 1455 hours.

At 1910 hours, she was 76·5 kilometres from port.

What was the liner's average speed for that part of its journey ?

10. Albert left Duray at 8.30 am and cycled to Sitton.

Billy went by car from Duray to Sitton, leaving at 9 am.



(a) Calculate **Billy's** average speed.

(b) What was the time when Billy overtook Albert ?

(c) How far away from Sitton were they at that time ?

Rev/Assess 4

Scientific Notation

You may use a calculator in this revⁿ/assessᵗ, but you must **show all working**.

1. Write the following numbers in scientific notation, $a \times 10^n$:-

   (a) 654 000 (b) 17·25

   (c) 0·0061 (d) 0·000 000 92

2. Write out these numbers **in full**, then change them into scientific notation :-

   (a) $8\frac{1}{2}$ million (b) 235 million

3. Each of the following is written in scientific notation.

   Change them back into **normal** form.

   (a) $3{\cdot}28 \times 10^3$ (b) $4{\cdot}001 \times 10^8$

   (c) $5{\cdot}1 \times 10^{-2}$ (d) 6×10^{-7}

4. The roll-over in the Lotto means that Saturday's prize fund stands at £$9{\cdot}225 \times 10^6$.

   Write this amount as we would know it.

5. The population of France is 60 660 000.

   Write this number in scientific notation.

6. The mass of a particle of dust is 0·000 000 000 75 kg.

   Write this number in scientific notation.

7. Work out the following, giving your answers in scientific notation :-

   (a) $(2{\cdot}3 \times 10^3) \times (8{\cdot}5 \times 10^5)$ (b) $(8{\cdot}55 \times 10^{-3}) \div (1{\cdot}9 \times 10^{-2})$

8. The speed of light is (3×10^8) m/s.

   If the sun is $(1{\cdot}5 \times 10^{11})$ metres from the earth,
   how many seconds does it take light to reach the earth ?

   Give your answer in scientific notation.

9. How many TOFFOS will be eaten in the year 2008 ?

   Give your answer in scientific notation.

Rev/Assess 5

The Circle (1)

You may use a calculator in this rev^{n}/assess^{t}, but you must **show all working**.

Give all answers correct to 3 significant figures, with correct units.

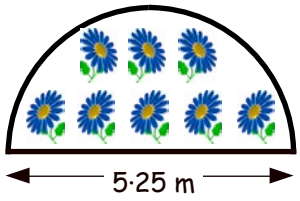
1. Calculate the **circumference** of each of these badges :-

(a)

(b)

2. A semi-circular flower bed has a diameter of 5·25 metres.

Calculate the **perimeter** of the flower bed.

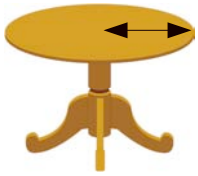


3.

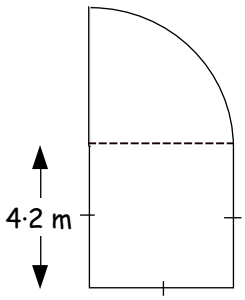
circumference = 173 cm

Calculate the **radius** of a bicycle wheel, given that its circumference is 173 centimetres.

4. Work out the **area** of this circular table-top which has a radius of 85 centimetres.



5.



The side view of a conservatory is shown.

It is made entirely of glass.

Calculate its **area**.

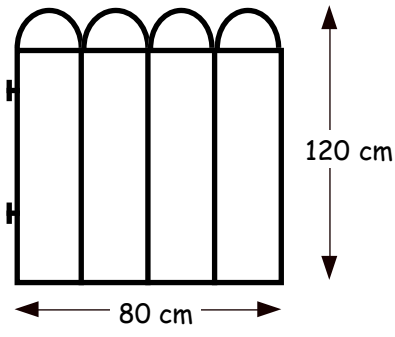
6. A decorative gate, made of iron rod, consists of a rectangular base with four identical semi-circular loops on top.

(a) Use the figure to help you write down the **diameter** of each semi-circle and then show that you need 8·40 metres of rod, (*to nearest 10 cm*) to make it.

(b) The iron rod costs £6·50 per metre.

A blacksmith also charges £75 for making the gate.

What is the final cost of the gate ?



7. A circular "donut" has area of 1256 square centimetres.

Calculate the **circumference** of the "donut".

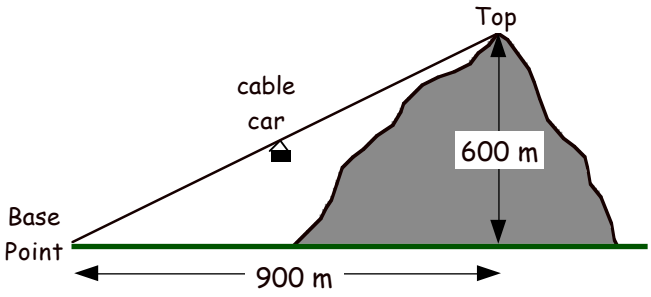
Gradients & Lines

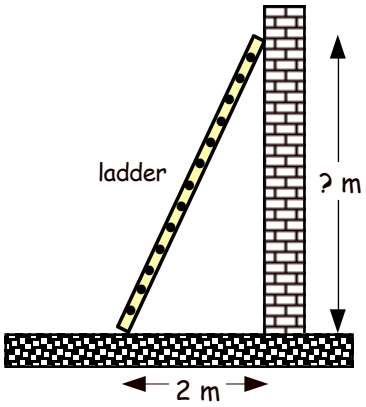
You may use a calculator in this revn/assesst, but you must **show all working**.

1. A cable car travels from a base point to the top of a mountain as shown.

   Find the gradient of the wire which supports the cable car.

   Give your answer as a fraction in its simplest form.



2. 

   A ladder is placed against a wall, two metres out from the wall as shown.

   The gradient of the ladder is 0·75.

   How far up the wall the does the ladder reach ?

3. Calculate :-

   (a) the gradient of the line PQ which passes through the points P(5,–3) and Q(–1,9).

   (b) the gradient of the line with equation $y = 6$.

4. The equations of two lines are given below.

   For each of them, write :- (a) what the gradient is.

   (b) the point where it meets the y-axis.

   (i) $y = -2x$ (ii) $y = \frac{1}{2}x - 1$

5. Line KL cuts the y-axis at the point (0, –7) and is **parallel** to the line with equation $y = -5x + 1$.

   (a) Write down the gradient of the line KL.

   (b) Write the equation of this line KL.

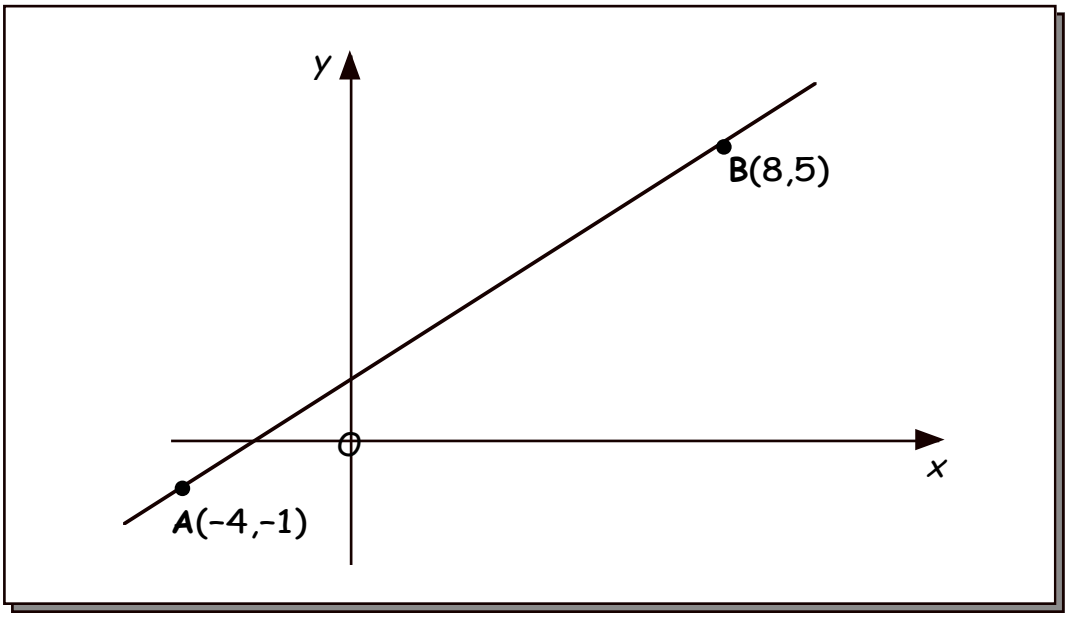
6. For the line with equation $2y - 8x + 10 = 0$, write down :-

   (a) its gradient.

   (b) the point where it meets the y-axis.

Please Turn Over

7. Find the equation of the line AB, shown in the diagram below.



8. The line passing through the points C(6,1) and D(0,4) is **parallel** to another line which passes through the two points E(0,2) and F(6,***k***).

   Calculate the value of ***k***.

Rev/Assess 7

Integers

A calculator should **NOT** be used in this rev^{n}/assess^{t}. **All working should be shown.**

1. (a) $(-1) + 11$ (b) $(-32) - 19$ (c) $(-15) + 25 - 5$

   (d) $(-2x) - 9x$ (e) $8a + 2b - a - 5b$ (f) $(-2a) - 7b - 8a + 4b$

   (g) $(-3) - (-9)$ (h) $(-30) - (-31)$ (i) $7p - (-15p)$

   (j) $(-6m) - (-6m)$ (k) $(-7x^2) - 13x^2$ (l) $6w + 6w - (-6w)$

   (m) $3a + b - (-3a) - b$ (n) $(-7g) - 7g - 7g$ (o) $-3k^2 - (-3k^2)$

2. $a = 4$, $b = -1$ and $c = -5$.

   Find the value of :-

   (a) $a + b$ (b) $a - b$ (c) $b - c$ (d) $b + 2c$

   (e) $3a - c$ (f) $c + 2a$ (g) $(-a) - c$ (h) $-(-b) - 2c$

3. Work out the answers to the following :-

   (a) $(-9) \times 5$ (b) $(-50) \times 0$ (c) $8 \times (-3x)$

   (d) $2a \times (-5a)$ (e) $(-40) \div 8$ (f) $(-25y) \div 5$

   (g) $(-21b) \div 3b$ (h) $9 \times (-1) \times 3$ (i) $((-5) - 2) \times 4$

   (j) $((-27) - 13) \div 5$ (k) $(-50) \times (-4)$ (l) $(-48) \div (-8)$

   (m) $3 \times (-4) \times (-5)$ (n) $((-20) + (-12)) \div (-8)$ (o) $(-3a) \times (-5a)$

   (p) $(-6)^2$ (q) $(-3)^3$ (r) $(-5)^2 - (-2)^4$

4. $p = 3$, $q = 0$ and $r = -4$.

   Calculate the value of :-

   (a) pqr (b) $p + q + r$ (c) $p^2 + q^2 + r^2$

   (d) $pq + qr + pr$ (e) $p^2 - 2r$ (f) $3p^2 - 2r^2$

   (g) $p^3 - 3r$ (h) $-2r^3$ (i) $(p - r)^2$

Rev/Assess 8

Volumes

You may use a calculator in this revn/assesst, but you must **show all working**.

The correct formula must be clearly stated in each question.

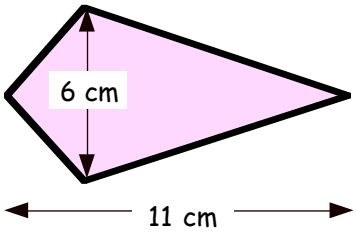
(Some) Formulae for Areas & Volumes

(None at all are given in S Grade Credit)

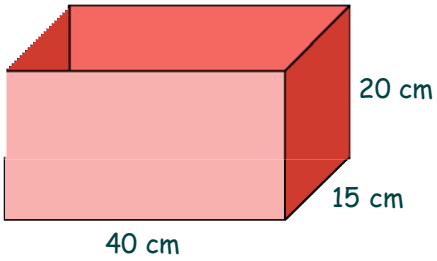
Prism $V = Ah$ Pyramid $V = \frac{1}{3}Ah$ Sphere $V = \frac{4}{3}\pi r^3$

Cylinder $V = \pi r^2 h$ Cone $V = \frac{1}{3}\pi r^2 h$ CSA Cylinder $CSA = 2\pi rh$

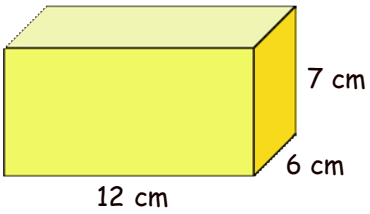
1. Calculate the **area** of this kite.



2. How many **litres** will this tank hold when full ?

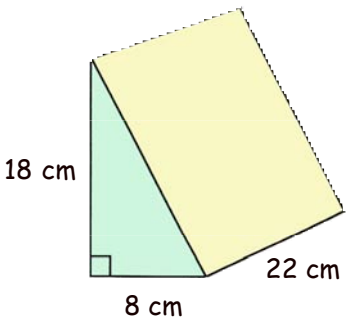


3. This cuboid measures 12 cm by 6 cm by 7 cm.
Calculate its total surface area.

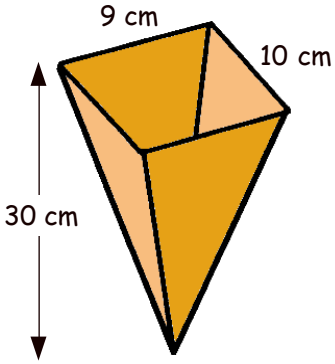


4. Calculate the volumes of these shapes :-

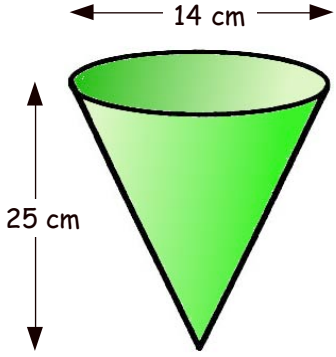
(a)



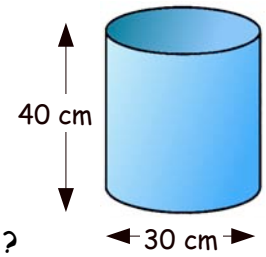
(b)



(c)



5. Milk is kept warm in a large cylindrical urn.



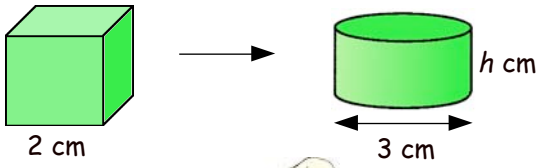
(a) Calculate the volume of milk in the urn when the urn is full.

(b)  Each cup can hold $\frac{1}{4}$ litre of milk.

How many cups can be **filled** from the urn ?

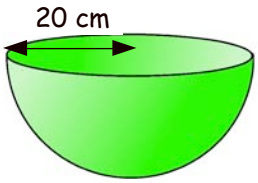
6. A sweetie manufacturer buys mallows in cubical blocks of side 2 cm which she reshapes into the form of cylinders.

Each cylinder has a base with a **diameter** of 3 cm.



Calculate the **height** (h) of the newly formed cylinder.

(Give you answer correct to 3 sig. figs)

7. 

The radius of this **hemispherical** bowl is 20 cm.

(a) Calculate its volume.

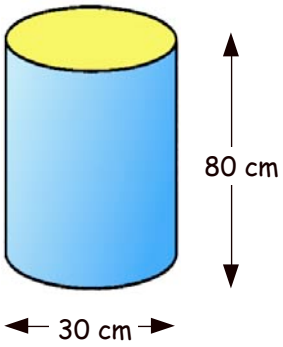
(b) How many whole litres of water will it hold when full ?

8. For the solid wooden cylinder shown, calculate :-

(a) the area of the top.

(b) the curved surface area.

(c) the total surface area.



Rev/Assess 9

Algebra

A calculator should **NOT** be used in this rev^{n}/assess^{t}. **All working should be shown.**

1. Simplify :-

(a) $6p^2 + q^2 - 5p^2 - 2q^2$ (b) $2m \times 5m$ (c) $(3k)^2 \times 4$

(d) $9p^2 q^2 \times 2p$ (e) $18x^2 \div 6x$ (f) $35g^3 h \div 5g^2 h$

2. Work out the brackets and tidy up the terms :-

(a) $4(a + 2) - 7$ (b) $3(5 + c) - 8c$ (c) $5 - 3(x - 1)$

(d) $6(m + 2) + 2(m - 1)$ (e) $7k - 3(1 - 2k)$ (f) $w(w - 2) - 3(2w - 1)$

3. Multiply out the brackets and simplify :-

(a) $(e - 23)(e + 7)$ (b) $(2x + 3)(4x + 5)$ (c) $(2 - 5a)(5 - 2a)$

(d) $(3p - 1)^2$ (e) $(k - 1)^3$ (f) $(n^2 + 3)^2$

(g) $(3x - 2)(2x - 1) - (5x - 1)(x + 2)$ (h) $(2x - 1)(5x^2 + x - 2)$

4. Factorise **fully** :-

(a) $18x - 12y$ (b) $2ab - 10hb$ (c) $a^3 - a^2$ (d) $p^2 - 64$

(e) $7q^2 - 63$ (f) $x^2 - 2x - 3$ (g) $4y^2 - 12y + 9$ (h) $2p^2 + 7pq + 3q^2$

(i) $8m^3n - 32m^2n$ (j) $5mn^2 - 5mp^2$ (k) $x^4 - 2x^2 + 1$.

5. Shown is a picture of a rectangular flower bed with a 2 metre grass border surrounding it.

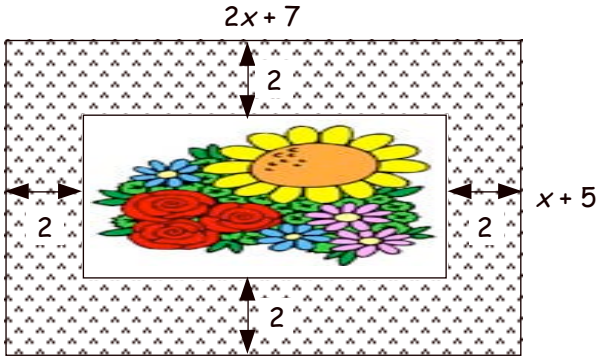
Write down an expression in x for :-

(a) the length of the flower bed.

(b) the breadth of the flower bed.

(c) the area of the flower bed.

(d) the area of the shaded grass border.

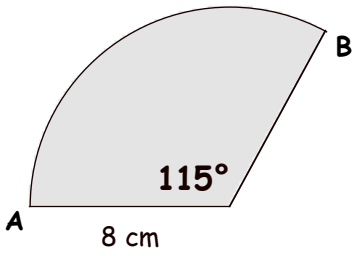


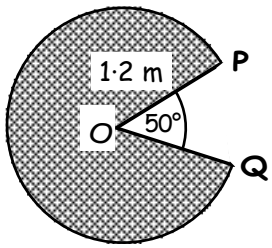
units are in metres

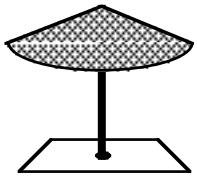
The Circle (2)

You may use a calculator in this rev^{n}/assess^{t}, but you must **show all working**.

1. Calculate the length of the arc AB.



2. 



Al is replacing the fabric on his garden parasol.

He uses a major sector of a circle, with radius 1·2 metres.

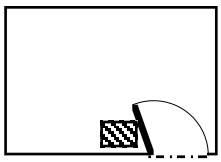
Calculate the **area** of fabric needed to replace the old material.

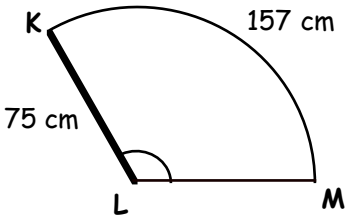
3. A door can only open so far into a room due to a television set positioned behind the door.

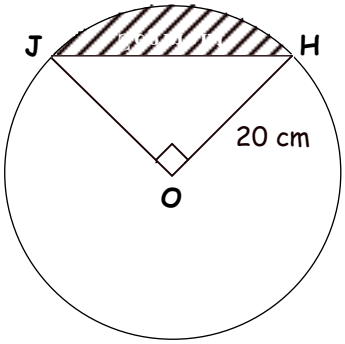
The door is 75 centimetres wide.

The length of the arc through which the door can rotate is 157 centimetres.

Calculate the size of the angle (∠KLM) through which the door can rotate.





4. 

The **striped** shaded area shown is called a **segment** of the circle, centre O.

(a) Calculate the **area** of the **sector** JOH.

(b) Calculate the area of the right angled **triangle** JOH.

(c) Determine the area of the striped segment.

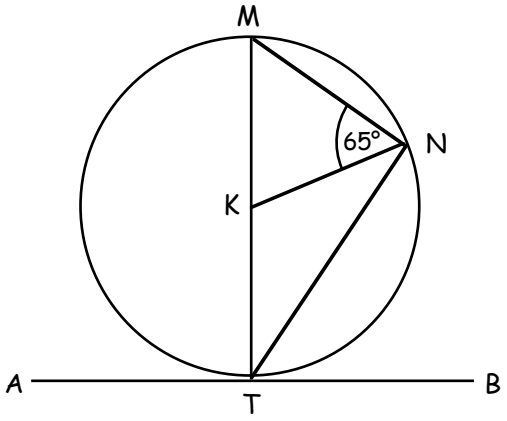
Please Turn Over

5. AB is a tangent to this circle, centre K and it meets the circle at point T.

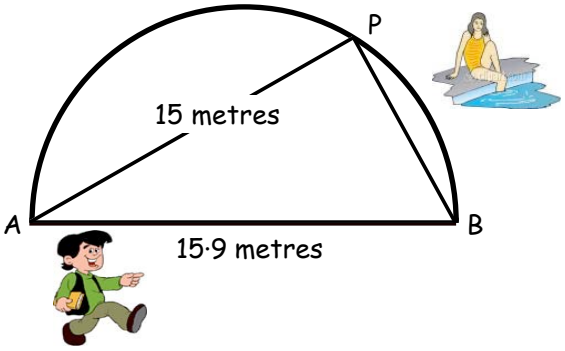
MT is a diameter and N is a point on the circumference of the circle.

$\angle MNK = 65°$

Make a neat sketch of the diagram and fill in as many angles as you can to help you find the size of $\angle NTB$.



6.



A swimming pool, in the shape of a semi-circle, has a diameter of 15·9 metres.

Donald walked from A to B.

Sarah swam from A to P to B.

How much further had Sarah travelled than Donald ?

(Answer correct to 1 decimal place)

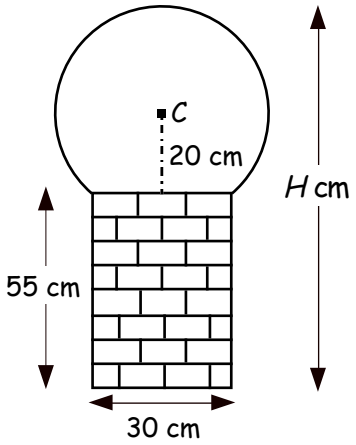
7. Sophie built a small tower, made of bricks, in her back garden. On top of it she fitted a large glass light-bulb holder.

The diagram shows it as part of a circle.

Centre, C, is 20 centimetres above the top of the wall.

(a) Calculate the **radius** of the circular bulb holder.

(b) Use this to find the total height (*H cm*) of the structure.



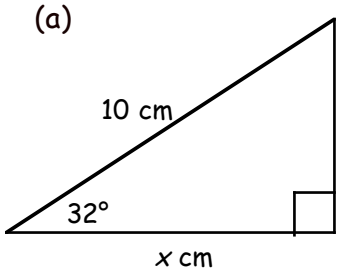
Rev/Assess 11

RAT Trigonometry

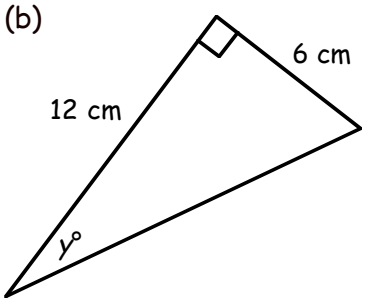
You may use a calculator in this rev^{n}/assess^{t}, but you must **show all working**.
Unless otherwise instructed, answer correct to **1 decimal place**.

1. Calculate the value of x, y and z in the following triangles :-

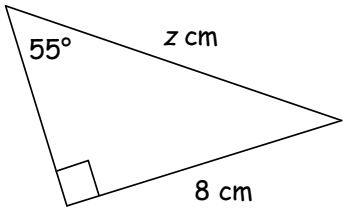
(a)



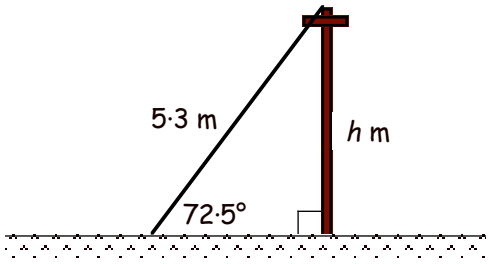
(b)



(c)



2.

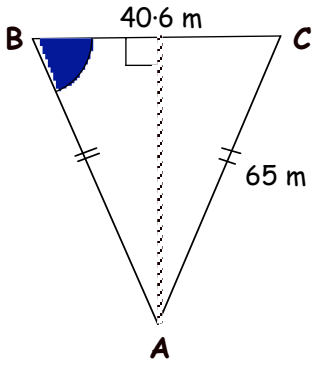


A telephone pole has a support cable 5·3 metres long attached from its top to a stake on the ground.
The cable makes an angle of 72·5° with the ground.

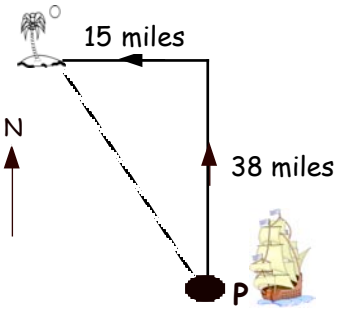
Calculate the height of the telephone pole.

3. Triangle ABC is **isosceles** with sides BC = 40·6 m and AC = 65 m.

Calculate the size of angle ABC.



4.

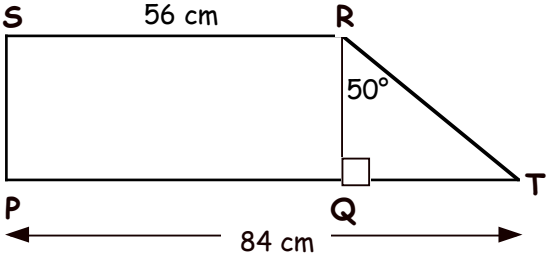


A ship leaves port P and travels 38 miles due North and then 15 miles due West to an island.

On what **bearing** must it travel to return to port ?

(*answer to nearest degree*)

5.



The figure shows a right angled triangle RQT with angle QRT = 50° joined to a rectangle PQRS. PT = 84 cm and SR = 56 cm.

(a) Write down the length of line QT.

(b) Calculate the length of line PS.

Rev/Assess 12

Equations/Inequalities

A calculator should **NOT** be used in this rev^{n}/assess^{t}. **All working should be shown.**

1. Copy each equation and solve to find the value of the letter.

   (a) $6 + x = 5$ (b) $4y = 30$ (c) $3a + 5 = 18$

   (d) $12g - 1 = 3g + 26$ (e) $8(2k - 1) = 11k + 27$ (f) $5(3u + 1) - 2(u - 3) = 2u$

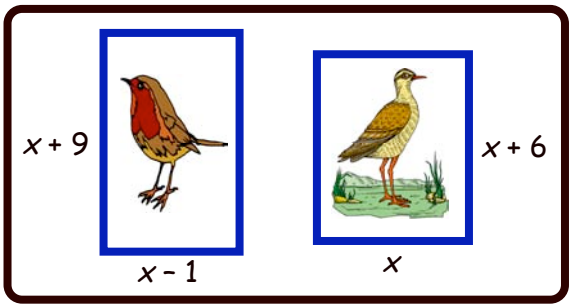
2. Multiply out the brackets and solve for x :-

   (a) $4x(x + 5) = 4x^2 + 10$ (b) $(x - 3)^2 = (x + 1)^2$

3. Both pictures shown opposite have the same **area**.
   (*All sizes are in centimetres*).

   (a) Form an equation in x.

   (b) Solve the equation to find the dimensions of each picture.



4. Solve these equations by firstly removing the fractions :-

   (a) $\frac{1}{2}x + 6 = 11$ (b) $\frac{2}{5}x + 1 = \frac{1}{3}x - 2$ (c) $\frac{5x + 1}{6} - \frac{x - 4}{3} = 10$

5. Solve the following inequalities :-

   (a) $p + 5 \leq 0$ (b) $-3p > 12$ (c) $3p - 9 \geq -15$

   (d) $8 - p < -22$ (e) $5p + 3 \leq 15 - p$ (f) $22 - 5p > 3p + 6$

   (g) $10 - (1 - p) \geq -1$ (h) $4(1 - p) < 2(4p + 2)$

6. (a) Write down the cost of tennis for h hours **with 2 racquets** at :-

   (i) Robertson Park (ii) Brodie Park.

   (b) Make an inequality if tennis at Brodie Park is said to cost **less** than Robertson Park for h hours, and solve it.

   (c) Suggest a reason why most people play at Robertson Park

Robertson Park

£1 per hour
PLUS
£2·50 per Racquet

Brodie Park

£1·50 per hour
PLUS
£2 per Racquet

Rev/Assess 13

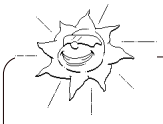
Graphs/Charts/Tables

A calculator should **NOT** be used in this revⁿ/assessᵗ. **All working should be shown.**

1. Use this table to construct a **Comparative Bar Graph** showing the number of Arsenal and Chelsea football tops sold one day in three High St. stores in London.

	Groves	JJT	Empire
Arsenal	10	18	6
Chelsea	16	3	17

2. (a) Construct a **Comparative Line Graph** showing the average number of hours of sunshine per week in two French villages over a period of five weeks during the summer.



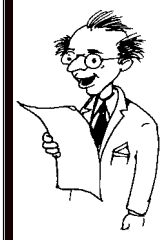
	Wk 1	Wk 2	Wk 3	Wk 4	Wk 5
La PAZ	40	50	100	35	75
La MERE	10	80	65	90	75

(b) On how many occasions is the temperature at La Mere higher than at La Paz ?

3. Shown below are the **Physics** and **Chemistry** percentage marks of ten pupils who sat S3 exams in both subjects.

Name	Phy	Chem
Ann	60	80
Brian	40	70
Claire	10	10
Dean	50	75
Eck	70	90

Name	Phy	Chem
Fran	80	5
Gill	50	65
Henry	45	50
Ian	30	40
Jan	25	30



.

(a) Construct a **scattergraph** to represent this information.

(b) Comment on the **correlation** in this example.

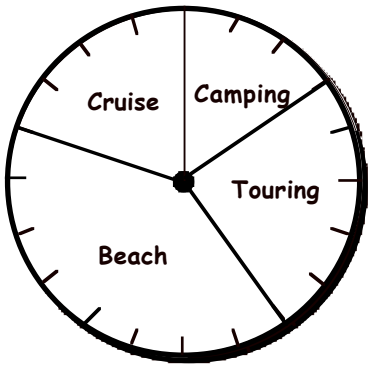
(c) Comparing both subjects, there is one pupil who has scored differently from the others - who is it ? Explain your answer.

(d) Draw a **Line of Best Fit** on your scattergraph.

(e) An eleventh pupil scored 55 for physics but was given an estimated mark for chemistry. Estimate that **chemistry mark** using your line.

Please turn over

4. This pie chart shows the different kinds of holidays which people choose to take.



(a) What fraction of the people prefer to go on a cruise ?

(b) What percentage of the people like to go on a beach holiday ?

(c) If 240 people took part in this survey, **how many** preferred to tour whilst on holiday.

5. The number of fish caught by two 8-man Fishing Teams in a competition was recorded. One team used worms to fish, the other used flies.

Worm Fishing	27	13	17	29	38	24	41	9
Fly Fishing	43	26	33	27	21	26	30	20

(a) Draw an **ordered back to back** stem and leaf diagram to represent this information.

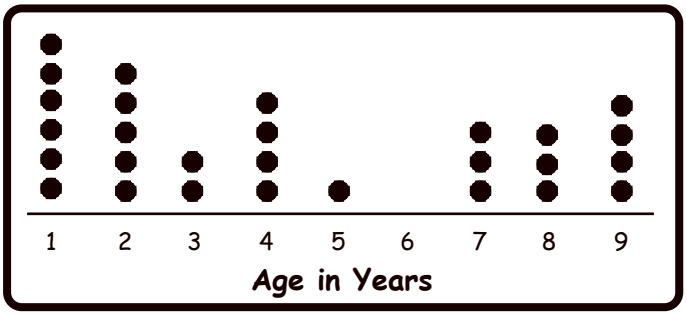
(b) Find the **median** number of fish caught by the team using worms.

(c) Write down the **modal** number of fish caught by the team using flies.

(d) Fishermen who caught more than 35 fish received a silver medal.

How many fishermen received a silver medal ?

6. This dot plot shows the age of each second-hand car which is on display at Arnold's Motors.



(a) How many cars are 4 years old or under ?

(b) How many cars in total are on display ?

(c) What is the **modal** age of the cars ?

(d) Find the **median** age.

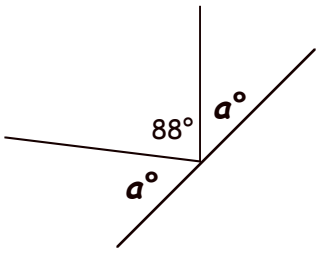
Rev/Assess 14

Angle Properties

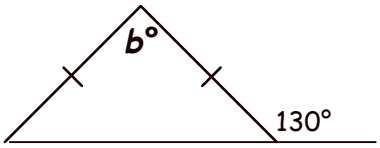
A calculator should **NOT** be used in this rev^{n}/assess^{t}. **All working should be shown.**

1. Make a neat sketch of each diagram and find the size of the angles marked with a letter.

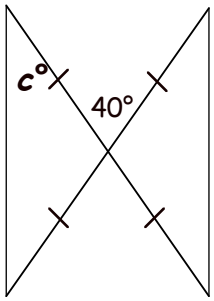
(a)



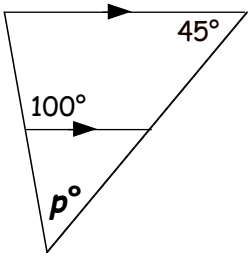
(b)



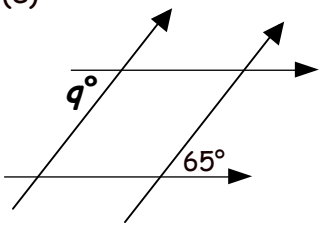
(c)



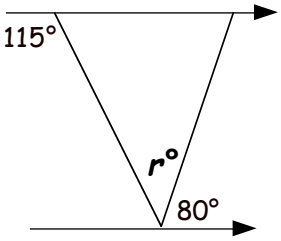
(d)



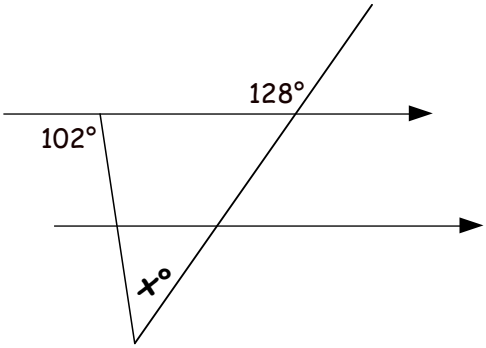
(e)



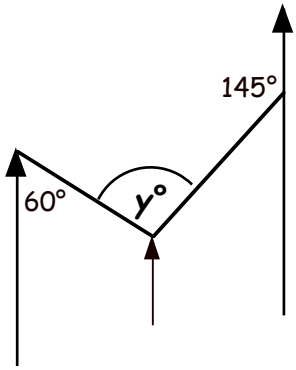
(f)



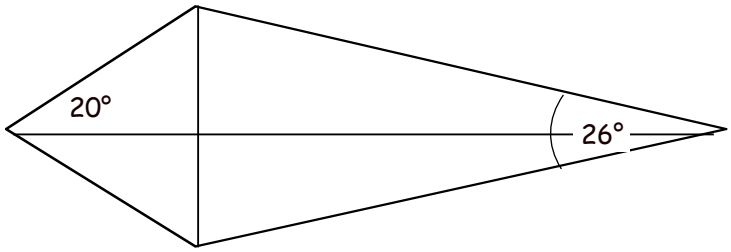
(g)



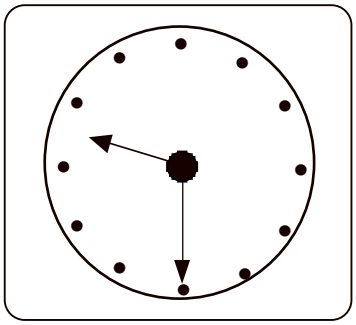
(h)



2.
- Name the figure shown opposite.
- Copy the diagram.
- Fill in the sizes of the other **eleven** missing angles.



3.



Calculate the size of the **OBTUSE** angle between the minute hand and the hour hand of a clock at **half past nine**.

Rev/Assess 15

Simultaneous Equations

A calculator should **NOT** be used in this rev^{n}/assess^{t}. **All working should be shown.**

1. Sketch the line with equation $y = 5 - 4x$ on a coordinate diagram.

2. Solve this pair of simultaneous equations **graphically** :- $2y + 3x = 12$, $2y = x + 4$

3. Solve each pair of simultaneous equations using **elimination** :-

   (a) $5y + 4x = 14$, $3y - 4x = 2$

   (b) $3x + 2y = 3$, $5x + 4y = 7$

   (c) $2x + 7y = -24$, $3x + 3y = -6$

4. Rearrange this pair of simultaneous equations and then solve :-

   $4x + y - 17 = 0$

   $3x = 13 - y$

5. 3 coffees and 2 slices of cake costs £7.

   For £8·50 I can buy 4 coffees and 2 slices of cake.

   What is the price of a cup of coffee ?

6. The bill for **five** adults and **three** children for an overnight stay at The Castle Hotel is £500.
   £310 is the charge for **three** adults and **two** children staying overnight at this hotel.

   (a) Write down two equations to represent this information.

   (b) Calculate the tariff for **four** adults and **four** children to stay overnight at The Castle.

   (c) How much would it cost in total for a family of **two** adults and **six** children to stay overnight for 2 nights if, for the 2nd night only, the adults paid full price and the children stayed for free that night ?

Rev/Assess 16

Fractions

A calculator should **NOT** be used in this revⁿ/assessᵗ. **All working should be shown.**

1. Change to a mixed number and simplify where required :- (a) $\frac{17}{3}$ (b) $\frac{58}{8}$.

2. Write $6\frac{5}{7}$ as a top heavy fraction.

3. How many $\frac{1}{5}$ litre milk cartons can be filled from an urn containing $4\frac{3}{5}$ litres ?

4. Copy and complete the following additions and subtractions, giving your answers in **fully simplified** form :-

   (a) $\frac{5}{9} + \frac{2}{9}$ (b) $2\frac{1}{3} + 1\frac{1}{4}$ (c) $5\frac{5}{6} + 3\frac{1}{2}$

   (d) $\frac{8}{11} - \frac{3}{11}$ (e) $5\frac{2}{3} - 2\frac{1}{5}$ (f) $6\frac{1}{2} - 1\frac{4}{7}$

5. Carry out the following multiplications and divisions, giving your answers in **fully simplified** form :-

   (a) $\frac{3}{4} \times \frac{3}{5}$ (b) $1\frac{1}{2} \times 2\frac{1}{3}$ (c) $\frac{5}{6} \div \frac{2}{3}$ (d) $3\frac{1}{2} \div 1\frac{1}{6}$

6. Billy's first attempt at the long jump was $10\frac{3}{4}$ metres.

   His second attempt was $1\frac{2}{5}$ metres longer.

   How long was Billy's second jump ?

7. 

   A box of chocolate cremes weighs $1\frac{5}{8}$ kilograms.

   Work out the weight of 5 boxes.

8. A crate, filled with 7 identical watermelons, weighs $5\frac{3}{4}$ kilograms.

   The crate itself when empty weighs $\frac{1}{2}$ kg.

   Calculate the weight of **one** watermelon.

9. Divide 100 by $\frac{1}{2}$;

   Divide your answer by $3\frac{1}{3}$;

   then finally find **four fifths** of that answer.

Statistical Analysis

You may use a calculator in this rev^{n}/assess^{t}, but you must **show all working**.

1. The ages of some of the children who attended a disco in a village hall were :-

17	**13**	**11**	**12**	**11**	**13**	**11**	**10**	**13**	**14**	**11**	**15**

Calculate :-

(a) the **range** of ages

(b) the **modal** age

(c) the **median** age

(d) the **mean** age (to 1 decimal place).

2. The mean height of a group of 4 girls was 1·65 metres.

When Daisy, (who is 1·72 metres tall) and Mandy joined them, the mean height of the six girls then became 1·67 metres.

How tall was Mandy ?

3. A group of people were asked how many phones, including mobile phones, they possessed.

The results are shown in the table.

(a) Write down the mode.

(b) **Copy** the table and add a third column to enable you to **calculate the mean** number of phones (to 1 decimal place).

No. of Phones x	Freq f
2	1
3	11
4	7
5	3
6	4

4. In a tournament, a group of golfers recorded the following scores :-

74	**72**	**70**	**75**	**71**	**71**	**73**	**76**
75	**74**	**71**	**72**	**72**	**70**	**72**	**73**

(a) Construct a frequency table from the above data and add a cumulative frequency table.

(b) Calculate the median score.

(c) What is the probability that a golfer, chosen at random, scored more than 71 ?

Please Turn Over

5. A hotel books taxis from a taxi firm called ClydeCars.

The receptionist notes the waiting time for every cab ordered over a two week period.

These times are recorded in the stem and leaf diagram shown below.

Waiting Time (minutes)

0	6 7
1	2 3 4
2	5 6 9 9
3	2 5 7
4	2 4

1 | 5 = 15 minutes

n = 14

(a) Calculate :-

(i) the median

(ii) the lower quartile

(iii) the upper quartile

(b) Calculate the semi-interquartile range.

In another two week period, the hotel books taxis from another company called WhiteCabs.

The semi-interquartile range for WhiteCabs is found to be 10·4 minutes.

(c) Which company provides the more consistent service ?

Give a reason for your answer.

6. A sample of third year pupils was asked how many DVD's they watch per week.

The results are shown opposite.

4	**3**	**5**	**4**	**4**	**4**	**1**	**1**	**4**	**6**
3	**3**	**1**	**2**	**2**	**2**	**3**	**4**	**1**	**1**	**2**

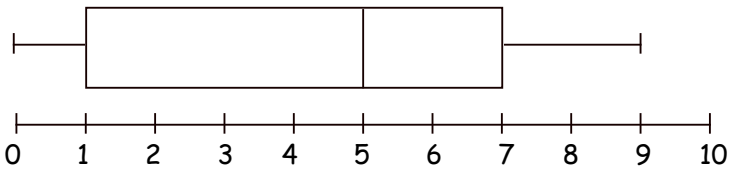
(a) From the data, find the median, the lower quartile and the upper quartile.

(b) Construct a boxplot for the data.

(c) A sample of second year pupils was asked the same question.

The boxplot shows their answers.

Compare the two boxplots, making **TWO** comments.



7. (a) The price, in pence, of a carton of orange juice in six different supermarkets is shown below.

70	**66**	**75**	**89**	**59**	**79**

Calculate the mean and the standard deviation of these prices.

(b) In six local shops, the mean price of a carton of orange juice is 73 pence with a standard deviation of 17·7.

Compare the supermarket prices with those of the local shops.

(make 2 comparisons)

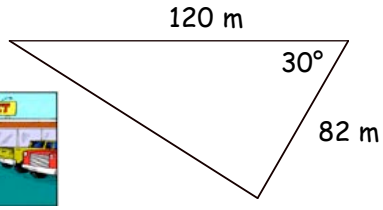
Further Trigonometry

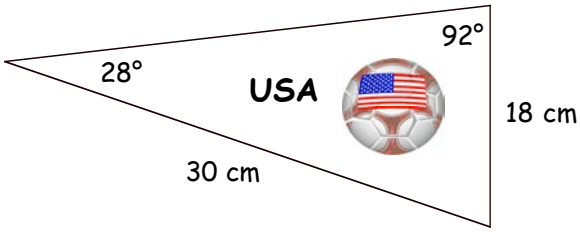
You may use a calculator in this rev^{n}/assess^{t}, but you must **show all working**.
Unless otherwise instructed, answer correct to **3 significant figures**.

1. The car park at Troscos Supermarket is triangular in shape.

   The management decide it needs resurfacing.

   Calculate the exact cost of doing this if they are quoted a price of £8 per square metre.



2. 

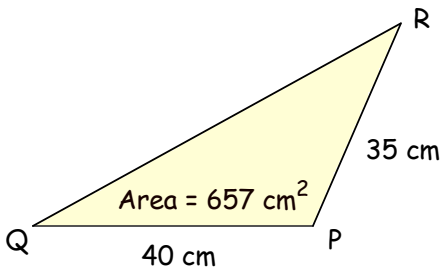
This is a replica of USA's World Cup soccer pennant.

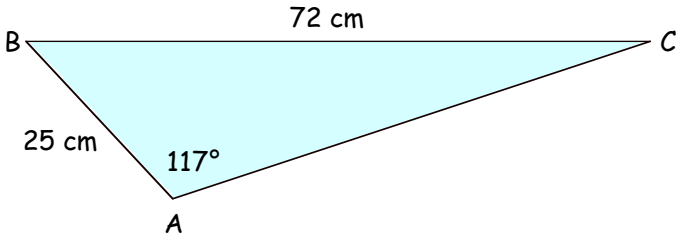
Calculate the area of the pennant.

3. The area of a triangle PQR is 657 cm^2.

   QP = 40 cm and PR = 35 cm.

   Calculate the size of obtuse angle QPR.

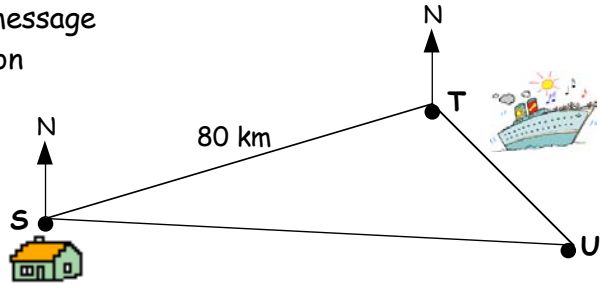


4. 

Find the size of acute ∠BCA in ΔABC.

5. A coastguard station at **S** picks up a distress message from a ship at **T** which is 80 kilometres away on a bearing of 070°.

   The ship leaves **T** and travels on a bearing of 155° towards **U**.



   (a) Prove that ∠STU = 95°.

   (A sketch will help)

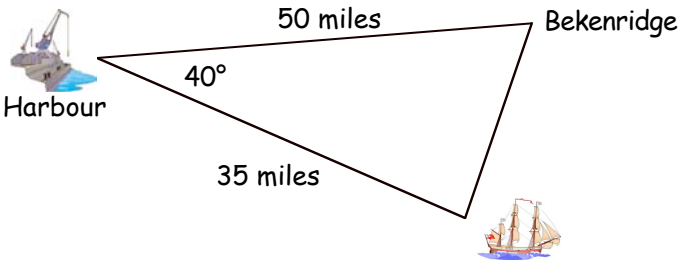
   The coastguard station sends a rescue craft to intercept the ship at **U**.

   The bearing of **U** from **S** is 115°.

   (b) What distance, to the nearest km, does the rescue craft have to travel to reach **U**?

Please Turn Over

6.



Bonny Rose

The *Bonny Rose* leaves harbour bound for Bekenridge 50 miles away.

Due to an error in its navigation system, it steers in a straight line but 40° off course.

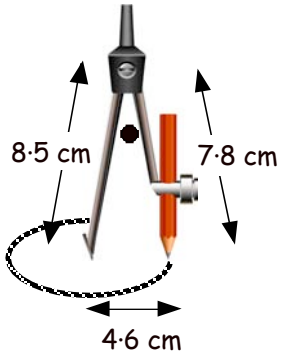
It travels 35 miles before the error is noticed.

How far from Bekenridge is the *Bonny Rose* when the error is discovered ?

7. The pair of compasses shown opposite is used to draw the circle which has a radius of 4·6 cm.

The legs of the compasses measure 8·5 cm and 7·8 cm.

Calculate the angle marked ● which one leg makes with the other.

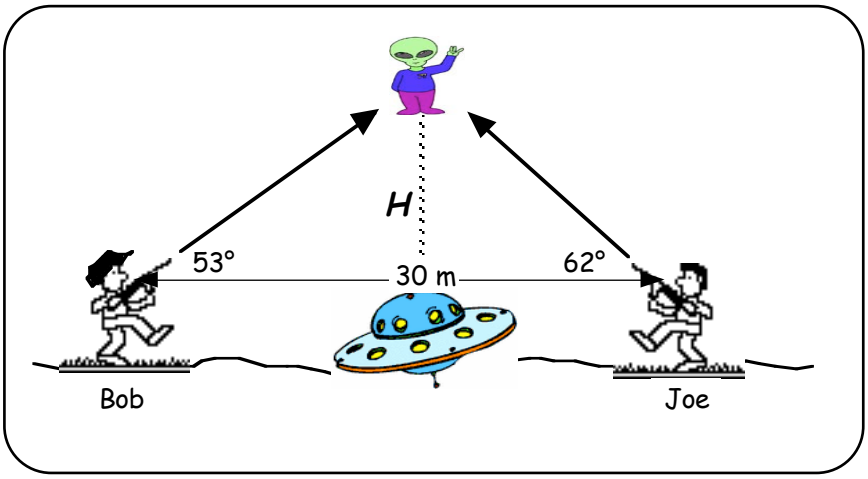


8. The idea in the computer game below is to position the two men so that they can shoot the alien as it appears from the spaceship.

In a frame from one such game, the alien was exterminated when :-

- the two men were standing 30 metres apart
- the angle of elevation of Bob's gun was 53°
- the angle of elevation of Joe's gun was 62°.

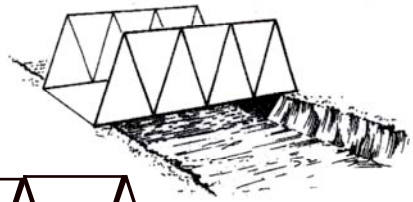
Calculate the height (H m) of the alien above the spaceship when he was hit.



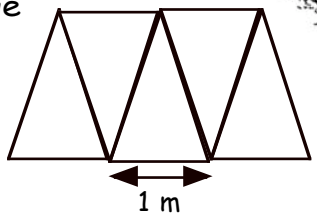
Patterns

A calculator should **NOT** be used in this exercise. **All working should be shown.**

1. The sides of bridges can be made by joining together identical triangular plates, each with a base length of 1 metre.



This diagram shows one side of a bridge 3 metres long, which needs 5 plates.



(a) ***COPY*** and *COMPLETE* the table.

Length of bridge in metres (L)	3	4	5	6	7
Number of plates for one side (N)	5	copy & complete			

(b) Write down a formula for the number of plates, N, needed to make one side of a bridge L metres. $N =$ .....

(c) Can one side of a bridge of this design have exactly 90 plates ?
Explain your answer clearly.

(d) A bridge with 2 sides has a total of 250 plates.
How long is this bridge ?

2. The following number pattern can be used to sum consecutive square whole numbers:-

$$1^2 + 2^2 = \frac{2 \times 3 \times 5}{6}$$

$$1^2 + 2^2 + 3^2 = \frac{3 \times 4 \times 7}{6}$$

$$1^2 + 2^2 + 3^2 + 4^2 = \frac{4 \times 5 \times 9}{6}$$

(a) Express $1^2 + 2^2 + 3^2 + \ldots\ldots + 10^2$ in the same way.

(b) Express $1^2 + 2^2 + 3^2 + \ldots\ldots + n^2$ in the same way.

(c) Write an expression for $11^2 + 12^2 + 13^2 + \ldots\ldots + n^2$.

Rev/Assess 20

Algebraic Operations

A calculator should **NOT** be used in this exercise. **All working should be shown.**

1. Simplify each fraction, giving your answer in its simplest form.

(a) $\frac{pq^2}{q}$ (b) $\frac{(5a+1)^2}{(a-5)(5a+1)^2}$ (c) $\frac{8m^2}{12m^3(m+n)}$

2. Factorise these expressions **fully**, then simplify :-

(a) $\frac{6x+18}{x+3}$ (b) $\frac{2w-12}{w^2-36}$ (c) $\frac{x^2-6x+8}{4x-8}$

(d) $\frac{p^2+3pq-4q^2}{(p+4q)^2}$

3. Simplify these additions and subtractions :-

(a) $\frac{1}{a}+\frac{2}{b}$ (b) $\frac{3}{g}+\frac{2-g}{g^2}$ (c) $\frac{x-1}{4}-\frac{x-2}{5}$

4. Simplify the following multiplications and divisions :-

(a) $\frac{21}{12p}\times\frac{6p}{7}$ (b) $\frac{4}{y^2}\div\frac{12}{y}$ (c) $\frac{5x^2}{y}\times\frac{3y}{10x^3}$ (d) $\frac{5m}{18m^2n}\div\frac{m}{6n^2}$

5. Change the subject of each formula to x.

(a) $x - a = c$ (b) $y = g - 2x$ (c) $k = m(x+h)$

(d) $y = \frac{z-x}{p}$ (e) $W = a + \frac{5}{x}$

6. For the formula $P = \frac{6}{q^3}$ what happens to P if :-

(a) q is doubled ?

(b) q is halved ?

Rev/Assess 21

Money Matters

You may use a calculator in this exercise, but you must **show all working**.

1. Mr Don Briggs is a bus driver and gets paid each week.
Miss Hazel Jones is an estate agent. She receives a cheque each month.

Don's annual salary is £16926.
Hazel's annual salary is £29808.

(a) What does Don get in his weekly pay packet ?

(b) How much does Hazel get in her monthly cheque ?

2. 

Sandra is paid £10·80 an hour basic rate as a salesperson for Lynx Deodorant, working 10 am to 4.30 pm (Mon to Fri).

She also works 10 am - 3 pm on a Saturday (paid at **time and a half**).

Sandra also earns 7·5% commission on all sales.

Last week she sold £1250 worth of goods.

What was her total wage for the week ?

3. Dean earned £2624 in total last month.
His basic wage of £2189 is supplemented by a percentage commission on all sales.

Last month his total sales were £14500.

What percentage commission does Dean receive ?

4. The table shows the income tax rate calculations.

Calculate the total amount of income tax a person has to pay if his/her taxable income is £46400.

Rate of Tax on	
first £2020 of taxable income	10%
next £29380 of taxable income	22%
all remaining taxable income	40%

5. 

A make of car appears in a showroom priced at £16850 + VAT @ 17·5%.

How much did Mr Davis pay for one of the cars, including VAT, if he was given a complementary 12% discount off the advertised price of the car.

Money Matters (2)

You may use a calculator in this exercise, but you must **show all working**.

1. The flat screen TV shown was bought in Makro for £1173·59 including 17·5% VAT.

   Makro had stated that this TV actually cost less than £1000 before the VAT was added on.

   Is Makro's claim true ? *Explain with working.*

2. 

   Cara paid £850 for an intel pentium laptop. She paid a 10% deposit and agreed to pay equal monthly payments over a period of a year and a half.

   How much was each payment ?

3. The table opposite shows the monthly premiums per £10000 which have to be made when insuring a house or its contents.

   Calculate the **total** insurance cost for a group 3 house whose building is worth £245000 and whose contents are estimated to be worth £38000.

House and Contents Insurance
(Monthly premiums per £10000)

Group	Buildings Ins.	Contents Ins.
1	£1·08	£7·80
2	£1·78	£8·24
3	£2·10	£9·00

4. The sofa shown is on sale in the UK for £472.

   How many euros would the same sofa cost in Italy with the exchange rate stable at 1·42€ to the pound.

£472 = ?€

5. Chelsea had $2500 to spend on her round the world trip. She spent £820 in the UK and 47196 Rupees in India.

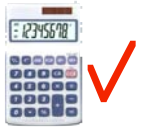
Exchange Rates

£1 = 1·70 USA Dollars

£1 = 78·66 Rupee

How many dollars did she have left when she returned home to USA ?

Functions & Graphs



You may use a calculator in this exercise, but you must **show all working**.

1. The function $f(x)$ is given by the formula $f(x) = 3\sqrt{x} + 8$.

   (a) Find the positive value of $f(25)$.

   (b) Find the negative value of $f(9)$.

   (c) Find the value of p for which $f(p) = 38$.

2. If $h(x) = 2x^2$, write down an expression for $h(4w)$ in terms of w and determine the values of w given that $h(4w) = 32$.

3. Consider the function $g(x) = x^2 - 2x - 3$ and the set of values $\{-2 \leq x \leq 4\}$.

   (a) Find $g(-2)$, $g(-1)$, ... $g(4)$.

   (b) Draw the parabola corresponding to the function.

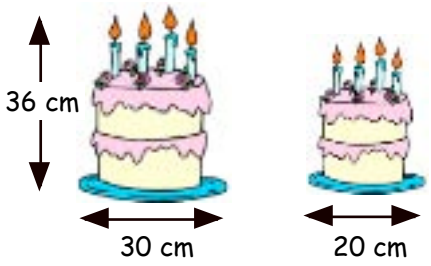
   (c) What are the two roots of the function ?

   (d) Write down the equation of the line of symmetry of the parabola.

   (e) Write down the coordinates of its minimum turning point.

Similar Figures

You may use a calculator in this exercise, but you must **show all working**.

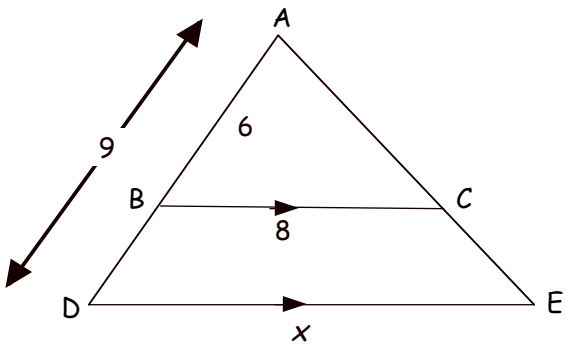
1. 

A birthday cake is baked in two sizes, both similar.
The larger cake has a 30 cm base and is 36 cm in height.

Calculate the height of the smaller cake which has a 20 cm base.

2. In the triangle shown below, BC is parallel to DE.

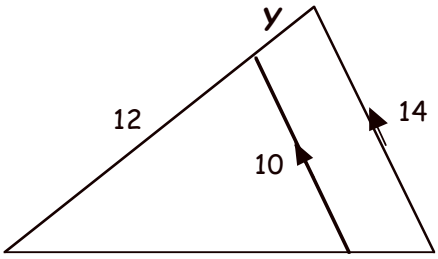
All units are centimetres.



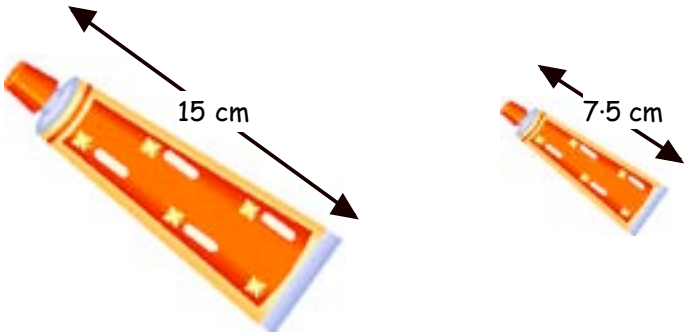
(a) Prove, with reasoning, that ΔABC is **similar** to ΔADE.

(b) Calculate the value of x.

3. In the triangle shown below, calculate the length of the side marked y.

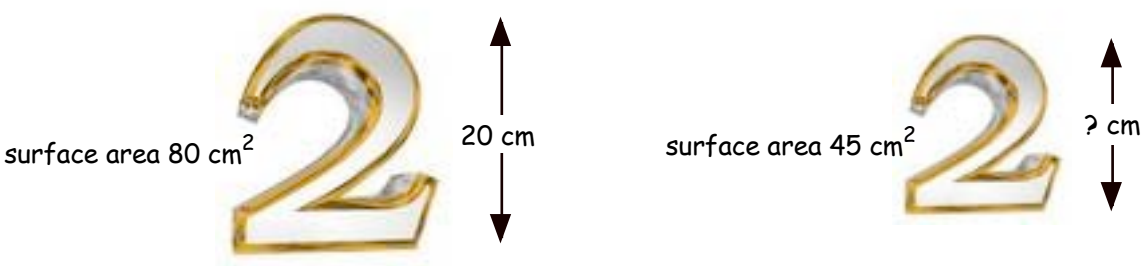


4. The diagram shows two tubes of toothpaste.
The two tubes are mathematically similar and the cost of a tube of toothpaste depends only on the volume of paste in the tube.



If a large one costs £2, what should a small one cost ?

5. The two "number 2's" are similar.



If the large "two" has a surface area of 80 cm^2 and the small "two" has a surface area of 45 cm^2, calculate the height of the small "two".

Quadratic Function 1

A calculator should **NOT** be used in this exercise. **All working should be shown.**

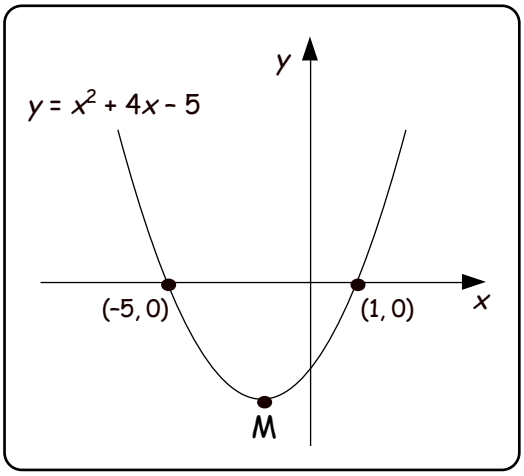
1. Shown is the graph of $y = x^2 + 4x - 5$.

   Use the graph to write down :-

   (a) the solution to the quadratic equation $x^2 + 4x - 5 - 0$.

   (b) the equation of the axis of symmetry of the parabola.

   (c) the coordinates of M, the minimum turning point of the graph.



2. Solve the following quadratic equations using factorisation :-

   (a) $7x - x^2 = 0$ (b) $5x^2 - 20x = 0$ (c) $x^2 - 100 = 0$

   (d) $2x^2 = 18x$ (e) $x^2 - 6x + 5 = 0$ (f) $2x^2 + 5x - 3 = 0$.

3. The parabola $f(x) = x^2 - 2x - 3$ cuts the x-axis at the two points A and B and intersects with the y-axis at point C.

   (a) Calculate the coordinates of point A and point B.

   (b) Work out the coordinates of point C.

   (c) Make a neat sketch of the parabola.

   (d) Write down the equation of the axis of symmetry.

   (e) Determine the coordinates of the minimum turning point of the parabola.

   (f) Describe briefly what the parabola $g(x) = 3 + 2x - x^2$ looks like, without actually drawing it. (*2 comments !*)

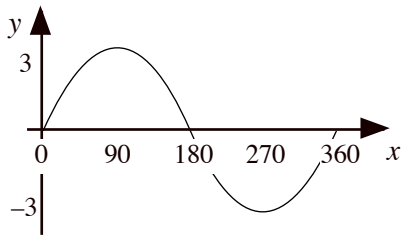
4. **Calculate** the coordinates of the two points where the parabola $y = x^2 - 4x - 10$ and the line $y = 2x - 3$ meet.

Trig Graphs

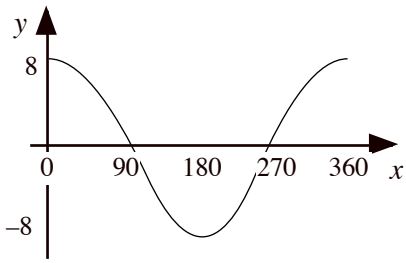
A calculator should **NOT** be used in this exercise. **All working should be shown.**

1. Write down the equations of the following graphs :-

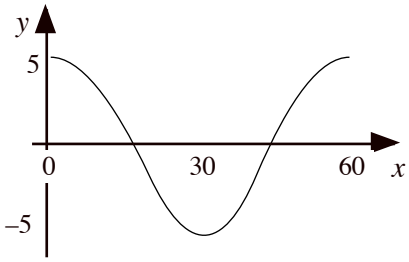
(a)



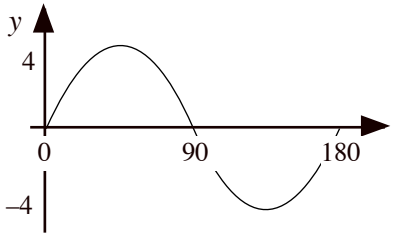
(b)



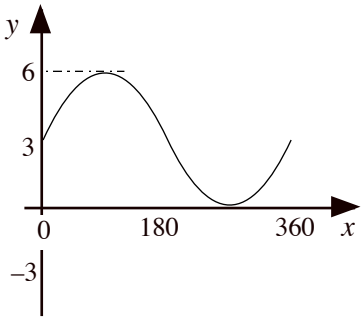
(c)



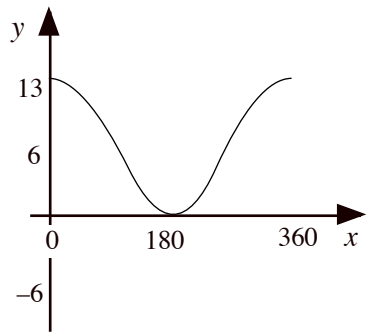
(d)



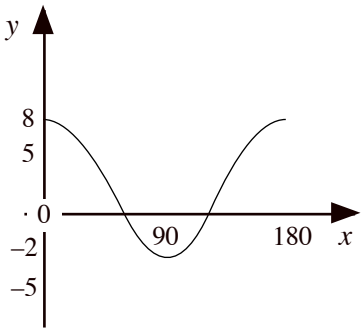
(e)



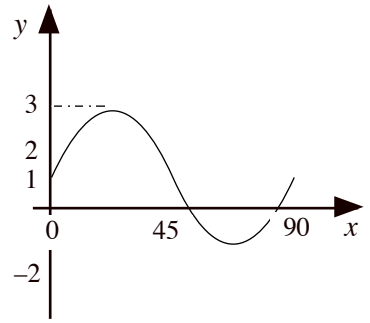
(f)



(g)



(h)



2. Make a neat sketch of the function $y = 5\sin 3x°$, $0 \leq x \leq 360$, showing the shape, scale and all important values on the graph.

3. A pump releases releases fuel according to the formula

$$P = 0{\cdot}7\sin(21t)° + 2{\cdot}5$$

where P millilitres is the volume of fuel released and t is the time, in seconds, after the point at which the pump is switched on.

(a) Calculate the volume of fuel released 10 seconds after the pump is switched on.

(b) What is the difference between the largest and the smallest amount of fuel which can be released ?

Surds & Indices

A calculator should **NOT** be used in this exercise. **All working should be shown.**

1. Simplify these surds, giving your answers in their simplest form :-

   (a) $7\sqrt{7} - \sqrt{7}$ (b) $\sqrt{500}$ (c) $\sqrt{3} \times \sqrt{8}$

   (d) $(1 + 4\sqrt{3})(2 - \sqrt{3})$ (e) $(\sqrt{a} + \sqrt{b})(\sqrt{a} - \sqrt{b})$ (f) $\sqrt{18} - \sqrt{2}$

2. Simplify, giving your answers with ***positive indices*** :-

   (a) $2y^2 \times 3y^3$ (b) $\dfrac{p}{p^4}$ (c) $(a^4)^{-1}$

3. (a) $g(x) = 3\sqrt{x}$.

   Find the exact value of $g(12)$, giving your answer as a surd in its simplest form.

   (b) A function f is given by $f(x) = 4^x$.

   Find the value of $f\left(\frac{3}{2}\right)$.

4. Express in its simplest form :-

   (a) $\dfrac{y^4 \times y}{y^{-2}}$ (b) $\dfrac{b^{\frac{1}{2}} \times b^{\frac{3}{2}}}{b}$ (c) $\dfrac{x^8}{(x^3)^{-2}}$

5. Remove the brackets and simplify $a^{\frac{1}{2}}(a^{\frac{1}{2}} + a^{-\frac{1}{2}})$.

6. Simplify $\dfrac{\sqrt{3}}{\sqrt{24}}$, expressing your answer with a rational denominator.

Rev/Assess 28

Quadratic Function 2

You may use a calculator in this exercise, but you must **show all working**.

1. Consider the quadratic equation $y = (x + 3)^2 - 5$.

   (a) Does the parabola which represents this equation have a maximum or a minimum turning point ?

   (b) Write down the coordinates of this turning point.

   (c) Write down the equation of the axis of symmetry of the parabola.

   (d) Calculate the coordinates of the y-intercept.

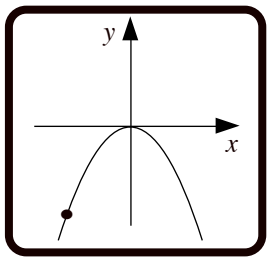
2. Make a neat sketch of the parabola $y = 1 - (x - 3)^2$ highlighting :-

   (a) its turning point with coordinates.

   (b) its axis of symmetry with its equation stated.

3. The parabola with equation $y = kx^2$ passes through the origin and the point $(-3,-18)$.

   Calculate the value of k.



4. Solve the equation $2x^2 - x - 5 = 0$, giving your answers correct to two decimal places.

Trig Equations

You may use a calculator in this exercise, but you must **show all working**.

1. Solve the following trigonometric equations, where $0 \leq x \leq 360$.

   Give your answers correct to 3 significant figures where necessary.

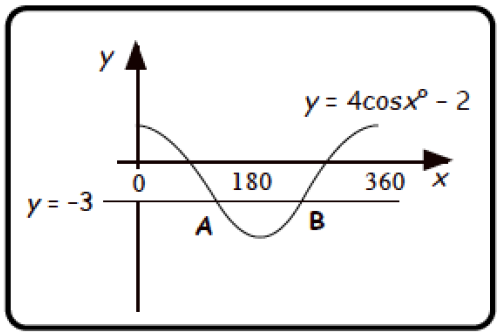
   (a) $\sin x^\circ = 0{\cdot}749$ (b) $\cos x^\circ = -0{\cdot}928$ (c) $\tan x^\circ = 9{\cdot}51$

   (d) $6\cos x^\circ - 3 = 0$ (e) $7\sin x^\circ + 1 = 3\sin x^\circ$ (f) $5\tan x^\circ + 2 = \tan 40^\circ$

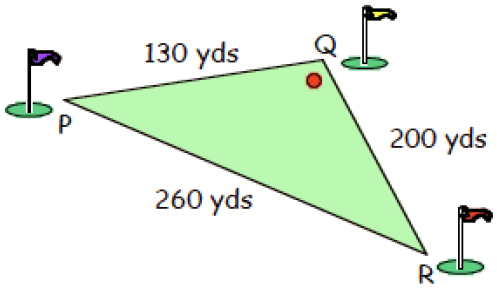
2. Calculate the eight values for a when $\sin^2 a^\circ = 0{\cdot}25$, where $0 \leq a \leq 720$.

3. The curve with equation $y = 4\cos x^\circ - 2$, $0 \leq x \leq 360$, meets the line with equation $y = -3$ at the points A and B where B is to the right of A.

   Calculate the coordinates of A and B.



4. Calculate the size of obtuse angle PQR in a plan of the golf course shown below.



5. $\cos W = -\frac{4}{5}$, and angle W is **obtuse**.

   Find the EXACT value of :- (a) sin W (b) tan W.

ANSWERS and MARKING SCHEMES

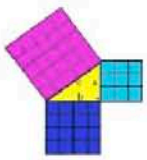
TEST 1 PERCENTAGES

Qu	Marking Scheme Give 1 mark for each •
1	**ans: 0·85 $17/20$** •1 0·85 •2 $17/20$ 2 marks
2	**ans: 288 boys** •1 55% of 640 •2 352 girls *or boys 45% etc* •3 288 boys 3 marks
3	**ans: Geography** •1 History 76% •2 Geography 80% •3 Geography better 3 marks
4a	**ans: £2·88** •1 24 x 62p = £14·88 •2 Profit £14·88 – £12 = £2·88 2 marks
4b	**ans: 24%** •1 $288/1200$ •2 $288/1200$ x 100 •3 24% 3 marks
5	**ans: £13498·37** •1 yr1 Interest = £480 •2 End Yr 1 = £12480 •3 End Yr 2 = £12979·20 •4 End Yr 3 = £13498·37 4 marks
6	**ans: £6426** •1 yr1 Loss = £2100 •2 End Yr 1 = £8400 •3 End Yr 2 = £7560 •4 End Yr 3 = £6426 4 marks
7	**ans: £150000** •1 108% = £16200 •2 1% = £1500 •3 100% = £150000 3 marks
8	**ans: 800 ml** •1 80% = 640 ml •2 1% = 8 ml •3 100% = 800 ml 3 marks
9a	**ans: 38000** 1 mark
9b	**ans: 0·00470** 1 mark

MARK OUT OF 29

RECORD as a %

TEST 2 PYTHAGORAS / PERCENTAGES

Qu	Marking Scheme Give 1 mark for each •
1a	**ans: 9·43 (cm)** •1 $x^2 = 8^2 + 5^2$ •2 $x^2 = 89$ •3 $x = 9{\cdot}43$ 3 marks
1b	**ans: 25·3 (mm)** •1 $x^2 = 37^2 - 27^2$ •2 $x^2 = 640$ •3 $x = 25{\cdot}3$ 3 marks
2a	**ans: 15 cm** •1 use 20 •2 $h^2 = 25^2 - 20^2$ •3 $h^2 = 225$ •4 $h = 15$ 4 marks
2b	**ans: 300 (sq cm)** •1 A = 0·5 x 20 x 15 •2 300 2 marks
3	**ans: 206 (cm)** •1 mention of 22 mm and 27 mm •2 $x^2 = 22^2 + 27^2$ •3 $x = 34{\cdot}8$ •4 Total 206 4 marks
	 MARK OUT OF 33 RECORD as a %

Qu	Marking Scheme Give 1 mark for each •
4	**ans: 12·53 (exactly to 2 dec pl)** •1 Diagram •2 $PQ^2 = 11^2 + 6^2$ •3 PQ = 12·53 3 marks
5	**ans: Proof** •1 $LM^2 = 900$ $MN^2 = 156{\cdot}25$ $LN^2 = 1056{\cdot}25$ •2 $LM^2 + MN^2 = 900 + 156{\cdot}25$ $= 1056{\cdot}25 = LN^2$ •3 By Converse of Pythag ..... 3 marks
6	**ans: £684·70** •1 yr1 Interest = £27 •2 End Yr 1 = £627 •3 End Yr 2 = £655·215 •4 End Yr 3 = £684·70 4 marks
7	**ans: 20%** •1 15 x £1·20 = £18 •2 Profit = £18 – £15 = £3 •3 $^3/_{15}$ x 100 •4 20% 4 marks
8	**ans: 120 (cm)** •1 115% = 138 cm •2 1% = 1·2 cm •3 100% = 120 cm 3 marks

TEST 3 TIME, DISTANCE & SPEED

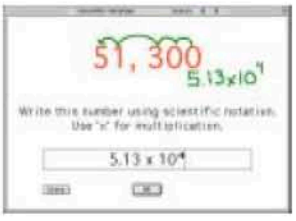
Qu	Marking Scheme Give 1 mark for each •
1a	**ans: 0·25** **1 mark**
1b	**ans: 0·7** **1 mark**
2a	**ans: 4 Hours 12 Minutes** **1 mark**
2b	**ans: 1 Hour 54 Minutes** **1 mark**
3	**ans: 18 km/hr** •1 Attempts a correct method •2 18 km/hr **2 marks**
4	**ans: 450 km** •1 180 x 2·5 •2 450 km **2 marks**
5	**ans: 2·5 m/sec** •1 $100/40$ •2 2·5 •3 correct units m/sec **3 marks**
6	**ans: 3 Hours 30 Minutes** •1 $238/68$ •2 3·5 hours •3 3 Hours 30 Minutes **3 marks**
7	**ans: 35 miles** •1 20 x 1·75 •2 35 miles **2 marks**
8	**ans: 1 Hour 24 Minutes** •1 $126/90$ •2 1·4 hours •3 1 Hour 24 Minutes **3 marks**
9	**ans: 18 km/hr** •1 4 hours 15 minutes •2 $76·5/4·25$ •3 18 •4 correct units km/hr **4 marks**
10a	**ans: 32 km/hr** **1 mark**
10b	**ans: 9.30 am** **1 mark**
10c	**ans: 8 km** **1 mark**

MARK OUT OF 26

RECORD as a %

TEST 4 SCIENTIFIC NOTATION

Qu	Marking Scheme Give 1 mark for each •
1	**ans:** **as follows :-** •1 6·54 •2 x 10^{5} •3 1·725 •4 x 10^{1} •5 6·1 •6 x 10^{-3} •7 9·2 •8 x 10^{-7} 8 marks
2a	**ans:** **as follows :-** •1 8 500 000 •2 8·5 •3 x 10^{6} 3 marks
2b	**ans:** **as follows :-** •1 235 000 000 •2 2·35 •3 x 10^{8} 3 marks
3a	**ans: 3280** 1 mark
3b	**ans: 400100000** 1 mark
3c	**ans: 0·051** 1 mark
3d	**ans: 0·0000006** 1 mark
4	**ans: £9225000** 1 mark

Qu	Marking Scheme Give 1 mark for each •
5	**ans: 6·066 x 10^{7}** •1 6·066 •2 x 10^{7} 2 marks
6	**ans: 7·5 x 10^{-10}** •1 7·5 •2 x 10^{-10} 2 marks
7a	**ans: 1·955 x 10^{9}** 1 mark
7b	**ans: 4·5 x 10^{-1}** 1 mark
8	**ans: 5 x 10^{2}** •1 shows DIVISION Dist ÷ Speed •2 5 x 10^{2} Must be in Sci Not 2 marks
9	**ans: 5·2704 x 10^{9}** •1 shows Multiplication by 60 by 24 **by 366** Leap Yr •2 5·2704 x 10^{9} Must be in Sci Not 2 marks
	 **MARK OUT OF 29** **RECORD as a %**

TEST 5 THE CIRCLE

Qu	Marking Scheme Give 1 mark for each •
1a	**ans: 37·7 cm** •1 $C = \pi d$ •2 3·14 x 13 — Incorrect ROUNDING loses 1 mark OVERALL NOT each time •3 37·7 cm **3 marks**
1b	**ans: 59·7 cm** •1 $C = \pi d$ = 3·14 x **19** •2 59·7 cm **2 marks**
2	**ans: 13·5 cm** •1 $C = \pi d$ = 3·14 x 5·25 •2 half of 16·458 cm = 8·229 cm •3 knows to add on diameter •4 13·5 cm **4 marks**
3	**ans: 27·5 cm** •1 $D = C/\pi$ •2 $D = 173/3{\cdot}14 = 55{\cdot}0955....$ •3 half to get 27·5 cm **3 marks**
4	**ans: 22700 sq cm** •1 $A = \pi r^2$ •2 3·14 x 85 x 85 •3 22700 •4 sq cm **4 marks**
5	**ans: 31·5** •1 $A = 3{\cdot}14 \times 4{\cdot}2 \times 4{\cdot}2$ •2 55·389 •3 55·389 ÷ 4 = 13·847 •4 $A = 4{\cdot}2 \times 4{\cdot}2 = 17{\cdot}64$ •5 Total = 31·5 — Ignore units **5 marks**
6a	**ans: Proof** •1 diameter 20 cm •2 2 x 80, 5 x 110 •3 $2C = 2\pi d$ = 2 x 3·14 x 20 = 125·6 •4 total rounded to 840 cm = 8·4 m **4 marks**
6b	**ans: £129·60** •1 8·4 x £6·50 = £54·60 — Accept using 9m £133·50 •2 Plus £75 = £129·60 **2 marks**
7	**ans: 126 cm** •1 Starts to find radius from area •2 Finds radius = 20 cm •3 $C = \pi d$ = 3·14 x **40** •4 126 cm **4 marks**

MARK OUT OF 31

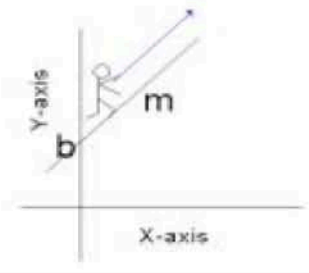
RECORD as a %

TEST 6 GRADIENTS & LINES

Qu	Marking Scheme Give 1 mark for each •
1	**ans:** $^2/_3$ •1 $^{600}/_{900}$ •2 $^2/_3$ **2 marks**
2	**ans: 1·5 m** •1 Set Up eg $^?/_2 = {}^3/_4$ •2 1·5 **2 marks**
3a	**ans: –2** •1 $^{12}/_{-6}$ •2 –2 **2 marks**
3b	**ans: grad = 0** **1 mark**
4i	**ans: grad –2, pt (0,0)** •1 grad –2 •2 (0,0) **2 marks**
4ii	**ans: grad $^1/_2$, pt (0,–1)** •1 grad $^1/_2$ •2 (0,–1) **2 marks**
5a	**ans: grad –5** **1 mark**
5b	**ans: $y = -5x - 7$** •1 $y = -5x$ •2 $y = -5x - 7$ **2 marks**
6a	**ans: grad 4** •1 Changes formula to $y = 4x - .....$ •2 grad = 4 **2 marks**
6b	**ans: pt (0,–5)** •1 Formula shows $y = 4x - 5$ •2 (0,–5) **2 marks**
7	**ans: $y = {}^1/_2x + 1$** •1 grad = $^6/_{12}$ •2 grad = $^1/_2$ •3 uses $y = {}^1/_2x + c$ •4 finds $c = 1$ •5 $y = {}^1/_2x + 1$ **5 marks**
8	**ans: $k = -1$** •1 Attempts to find grad •2 Set up eg $\frac{k-2}{6} = \frac{-1}{2}$ •3 finds $k = -1$ **3 marks**

MARK OUT OF 26

RECORD as a %



TEST 7 INTEGERS

Qu	Marking Scheme Give 1 mark for each •
	In the formal examinations, we will look to give marks for plugging in / setting down etc. As this is an end of chapter test and examples are alike we will give 1 MARK per answer.
1	•a 10 •b –51 •c 5 •d $-11x$ •e $7a - 3b$ •f $-10a - 3b$ •g 6 •h 1 •i $22p$ •j 0 •k $-20x^2$ •l $18w$ •m $6a$ •n $-21g$ •o 0 **15 marks**
2	•a 3 •b 5 •c 4 •d –11 •e 17 •f 3 •g 1 •h 9 **8 marks**
3	•a –45 •b 0 •c $-24x$ •d $10a^2$ •e –5 •f $-5y$ •g –7 •h –27 •i –28 •j –8 •k 200 •l 6 •m 60 •n 4 •o $15a^2$ •p 36 •q –27 •r 9 **18 marks**

Qu	Marking Scheme Give 1 mark for each •
4	•a 0 •b –1 •c 25 •d –12 •e 17 •f –5 •g 39 •h 128 •i 49 **9 marks**
	MARK OUT OF 50 RECORD as a %

TEST 8 VOLUMES

Qu	Marking Scheme Give 1 mark for each •
	3·14 has been used for π in this marking scheme. Watch for pupils using π button
1	**ans: 33 sq cm** •1 A = 0·5 x D1 x D2 •2 A = 0·5 x 6 x 11 •3 A = 33 **3 marks** Incorrect use of UNITS loses 1 mark OVERALL NOT each time
2	**ans: 12 Litres** •1 V = L x B x H •2 V = 40 x 20 x 15 = 12000 cu cm •3 12 Litres **3 marks**
3	**ans: 396 sq cm** •1 Knows to use areas of 6 sides •2 2 x 6 x 12, 2 x 6 x 7, 2 x 7 x 12 •3 396 **3 marks** Volume ? NO MARKS
4a	**ans: 1584 cu cm** •1 A of triangle = 0·5 x 8 x 18 •2 A of triangle = 72 •3 Prism = 72 x 22 = 1584 **3 marks**
4b	**ans: 900 cu cm** •1 $V = \frac{1}{3}Ah$ •2 V = 9 x 10 x 30 ÷ 3 •3 900 **3 marks**
4c	**ans: 1282 ..... cu cm** •1 $V = \frac{1}{3}\pi r^2 h$ watch π •2 uses 7 cm for radius •3 V = 3·14 x 7 x 7 x 25 ÷ 3 •4 1282 **4 marks**
5a	**ans: 28260 cu cm** •1 $V = \pi r^2 h$ watch π •2 uses 15 cm for radius •3 V = 3·14 x 15 x 15 x 40 •4 28260 **4 marks**
5b	**ans: 113 cups** •1 28260 cu cm = 28·25 litres •2 28·25 x 4 = 113 **2 marks**
6	**ans: 1·13 cm** •1 Vol cube = 8 cu cm •2 set up eg $8 = \pi r^2 h$ watch π •3 uses 1·5 cm for radius •4 1·13 **4 marks**
7a	**ans: 16746·666 (ignore rounding)** •1 $V = \frac{4}{3}\pi r^3$ watch π •2 V = 3·14 x 20 x 20 x 20 x 4 ÷ 3 •3 33493.... •4 halved gives 16746·666 **4 marks**
7b	**ans: 16 litres** **1 mark**

CONTINUED

TEST 8 VOLUMES (continued)

3·14 has been used for π in this marking scheme. Watch for pupils using π button

Qu	Marking Scheme Give 1 mark for each •		
8a	**ans: 706· ..... sq cm** •1 $A = \pi r^2$ •2 A = 3·14 x 15 x 15 no extra marks for radius this time •3 706· ..... ignore rounding **3 marks**		watch π Incorrect use of UNITS loses 1 mark OVERALL NOT each time
8b	**ans: 7536 sq cm** •1 $CSA = 2\pi rh$ •2 CSA = 2 x 3·14 x 15 x 80 •3 7536 **3 marks**		watch π
8c	**ans: 8949 sq cm** •1 Total = 7536 + 2 of 706·.... •2 7536 ..... **2 marks**		watch π
	MARK OUT OF 42 RECORD as a %		

TEST 9 ALGEBRA

Qu	Marking Scheme Give 1 mark for each •
1a	**ans:** $p^2 - q^2$ •1 p^2 •2 $-q^2$ **2 marks**
1b	**ans:** $10m^2$ **1 mark**
1c	**ans:** $36k^2$ •1 $9k^2$ •2 $36k^2$ **2 marks**
1d	**ans:** $18p^3q^2$ •1 $18p^3$ •2 q^2 **2 marks**
1e	**ans:** $3x$ **1 mark**
1f	**ans:** $7g$ •1 $7g$ •2 NO h **2 marks**
2a	**ans:** $4a + 1$ •1 $4a + 8$ •2 $4a + 1$ **2 marks**
2b	**ans:** $15 - 5c$ •1 $15 + 3c$ •2 $15 - 5c$ **2 marks**
2c	**ans:** $8 - 3x$ •1 $-3x + 3$ •2 $8 - 3x$ **2 marks**
2d	**ans:** $8m + 10$ •1 $6m + 12$ •2 $2m - 2$ •3 $8m + 10$ **3 marks**
2e	**ans:** $8m + 10$ •1 $-3 + 6k$ •2 $13k - 3$ **2 marks**
2f	**ans:** $w^2 - 8w + 3$ •1 $w^2 - 2w$ •2 $-6w + 3$ •3 $w^2 - 8w + 3$ **3 marks**
3a	**ans:** $e^2 + 5e - 14$ •1 e^2 ..... $- 14$ •2 $+ 5e$ **2 marks**
3b	**ans:** $8x^2 + 22x + 15$ •1 $8x^2$ ..... $+ 15$ •2 $+ 22x$ **2 marks**
3c	**ans:** $10 - 29a + 10a^2$ •1 10..... $+ 10a^2$ •2 $29a$ **2 marks**
3d	**ans:** $9p^2 - 6p + 1$ •1 $9p^2$ ..... $+ 1$ •2 $- 6p$ **2 marks**
3e	**ans:** $k^3 - 3k^2 + 3k - 1$ •1 uses $(k - 1)^2$ •2 $(k^2 - 2k + 1)(k - 1)$ •3 $k^3 - 3k^2$ •4 $+ 3k - 1$

continued

Qu	Marking Scheme Give 1 mark for each •
3f	**ans:** $n^4 + 6n^2 + 9$ •1 n^4 •2 $+ 6n^2$ •3 $+ 9$ 3 marks
3g	**ans:** $x^2 - 16x + 4$ •1 $6x^2 - 7x + 2$ •2 $-(5x^2 + 9x - 2)$ •3 $x^2 - 16x$ •4 $+ 4$ 4 marks
3h	**ans:** $10x^3 - 3x^2 - 5x + 2$ •1 $10x^3 + 2x^2 - 4x$ •2 $-5x^2 - x + 2$ •3 $10x^3 - 3x^2 - 5x + 2$ 3 marks
4a	**ans:** $6(3x - 2y)$ •1 $6(\ldots\ldots)$ •2 $\ldots\ldots(3x - 2y)$ 2 marks
4b	**ans:** $2b(a - 5h)$ •1 $2b(\ldots\ldots)$ •2 $\ldots\ldots(a - 5h)$ 2 marks
4c	**ans:** $a^2(a - 1)$ •1 $a^2(\ldots\ldots)$ •2 $\ldots\ldots(a - 1)$ 2 marks
4d	**ans:** $(p - 8)(p + 8)$ •1 $(p - 8)$ •2 $(p + 8)$ 2 marks
4e	**ans:** $7(q - 3)(q + 3)$ •1 $7(\ldots\ldots)(\ldots\ldots)$ •2 $7(q - 3)(q + 3)$ 2 marks

MARK OUT OF 78

RECORD as a %

Qu	Marking Scheme Give 1 mark for each •
4f	**ans:** $(x - 3)(x + 1)$ •1 $(x - 3)$ •2 $(x + 1)$ 2 marks
4g	**ans:** $(2y - 3)(2y - 3)$ •1 $(2y - 3)$ •2 $(2y - 3)$ again 2 marks
4h	**ans:** $(2p + q)(p + 3q)$ •1 $(2p + q)$ •2 $(p + 3q)$ 2 marks
4i	**ans:** $8m^2n(m - 4)$ •1 $8m^2n(\ldots\ldots)$ •2 $\ldots\ldots(m - 4)$ 2 marks
4j	**ans:** $5m(n - p)(n + p)$ •1 $5m(\ldots\ldots)(\ldots\ldots)$ •2 $5m(n - p)(\ldots\ldots)$ •3 $5m(n - p)(n + p)$ 3 marks
4k	**ans:** $(x^2 - 1)(x^2 - 1)$ •1 $(x^2 - 1)$ •2 $(x^2 - 1)$ again 2 marks
5a	**ans:** $2x + 3$ 1 mark
5b	**ans:** $x + 1$ 1 mark
5c	**ans:** $2x^2 + 5x + 3$ •1 $(2x + 3)(x + 1)$ •2 Answer 2 marks
5d	**ans:** $12x + 32$ •1 $(2x + 7)(x + 5)$ •2 $2x^2 + 17x + 35$ •3 $(2x^2 + 5x + 3) - (2x^2 + 17x + 35)$ •4 Answer 4 marks

TEST 10 THE CIRCLE (2)

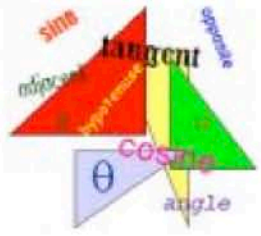
Qu	Marking Scheme Give 1 mark for each •
1	**ans: 16 cm** •1 $C = \pi d$ •2 $C = 3{\cdot}14 \times 16 = 50{\cdot}24$ •3 $^{115}/_{360}$ x ..... •4 16 cm 4 marks
2	**ans: 3·89 (sq m)** •1 $A = \pi r^2$ •2 $= 3{\cdot}14 \times 1{\cdot}2 \times 1{\cdot}2 = 4{\cdot}52$.... •3 $^{310}/_{360}$ x ..... •4 3·89 4 marks
3	**ans: 120° approx.** •1 $C = \pi d$ $= 3{\cdot}14 \times 150 = 471$ •2 $^{x}/_{360} = {}^{157}/_{471}$ •3 120° approx. 3 marks
4a	**ans: 314 (sq cm)** •1 $A = \pi r^2 = 3{\cdot}14 \times 20 \times 20 = 1256$ •2 $1256 \div 4 = 314$ 2 marks
4b	**ans: 200 (sq cm)** •1 $A = 0{\cdot}5 \times 20 \times 20$ •2 200 (sq cm) 2 marks
4c	**ans: 114 (sq cm)** 1 mark

Qu	Marking Scheme Give 1 mark for each •
5	**ans: 65°** •1 $\angle KNT = 90° - 65° = 25°$ •2 $\angle KTN = 25°$ •3 $\angle NTB = 65°$ 3 marks
6	**ans: 4·4 (m)** •1 $PB^2 = 15{\cdot}9^2 - 15^2$ Pythagoras ! •2 PB = 5·27 •3 Sarah = 20·27 •4 4·4 (approx.) further 4 marks
7a	**ans: 25 (cm)** •1 uses 15 cm in Pythagoras •2 $r^2 = 20^2 + 15^2$ Pythagoras Plus ! •3 r = 25 3 marks
7b	**ans: 100 (cm)** •1 knows to add the radius just found •2 55 + 20 + 25 •3 100 3 marks
	MARK OUT OF 29 RECORD as a % *Dinna worry aboot UNITS in this test !*

TEST 11 RAT TRIGONOMETRY

Qu	Marking Scheme Give 1 mark for each •
1a	**ans: 8·5 cm** •1 $\cos 32° = {}^{x}/_{10}$ •2 $x = 10 \cos 32°$ •3 8·5 cm **3 marks** Incorrect use of ROUNDING loses 1 mark OVERALL NOT each time *uses sin or tan 0 marks*
1b	**ans: 26·6°** •1 $\tan y° = {}^{6}/_{12}$ •2 **26·6°** **2 marks**
1c	**ans: 9·8 cm** •1 Uses *Sin* •2 $\sin 55° = {}^{8}/_{z}$ •4 9·8 cm **4 marks**
2	**ans: 5·1 m** •1 $\sin 72·5° = {}^{h}/_{5·3}$ •2 $x = 5·3 \sin 72·5°$ •3 5·1 m **3 marks**
3	**ans: 71·8°** •1 Uses 20·3 cm •2 $\cos B = {}^{20·3}/_{65}$ •3 71·8° **3 marks**

Qu	Marking Scheme Give 1 mark for each •
4	**ans: 158° (approx)** •1 $\tan x° = {}^{38}/_{15}$ •2 $x = 68·5°$ •3 Bearing = 90 + 68·5 = 158°..... **3 marks**
5a	**ans: 24 cm** **1 mark**
5b	**ans: 20·1 cm** •1 Notices PS = RQ •2 $\tan 50° = {}^{24}/_{RQ}$ •3 $RQ = {}^{24}/_{\tan 50°}$ •4 20·1 cm **4 marks**
	MARK OUT OF 23 **RECORD as a %**



TEST 12 EQUATIONS / INEQUALITIES

Qu	Marking Scheme Give 1 mark for each •
1a	**ans: $x = -1$** 1 mark
1b	**ans: $y = 7\frac{1}{2}$** 1 mark
1c	**ans: $a = 4\frac{1}{3}$** •1 $3a = 18 - 5$ •2 $3a = 13$ •3 $a = 4\frac{1}{3}$ 3 marks
1d	**ans: $g = 3$** •1 $12g - 3g = ...$ •2 $..... = 26 + 1$ •3 $9g = 27$ •4 $g = 3$ 4 marks
1e	**ans: $k = 7$** •1 $16k - 8$ •2 $16k - 11k = ...$ •3 $..... = 27 + 8$ •4 $5k = 35$ •5 $k = 7$ 5 marks
1f	**ans: $u = -1$** •1 $15u + 5 - 2u + 6 = 2u$ •2 $15u - 2u - 2u = -5 - 6$ •3 $11u = -11$ •4 $u = -1$ 4 marks

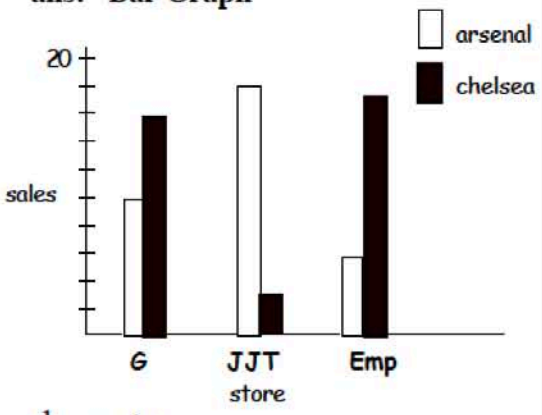
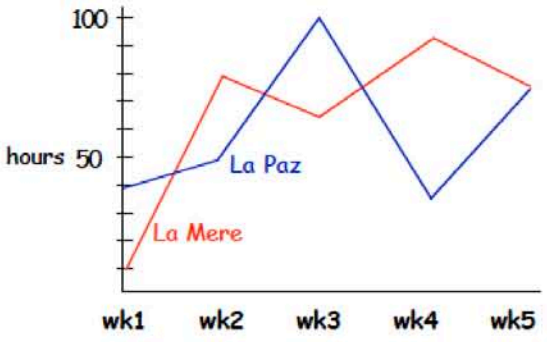
Qu	Marking Scheme Give 1 mark for each •
2a	**ans: $x = \frac{1}{2}$** •1 $4x^2 + 20x .....$ •2 $4x^2 - 4x^2 + 20x = 10$ •3 $20x = 10$ •4 $x = \frac{1}{2}$ 4 marks
2b	**ans: $x = 1$** •1 $x^2 - 6x + 9 .....$ •2 $x^2 + 2x + 1$ •3 $-6x - 2x = 1 - 9$ •4 $-8x = -8$ •5 **$x = 1$** 5 marks
3a	**ans:** $(x + 9)(x - 1) = x(x + 9)$ 1 mark
3b	**ans: 4·5 by 10·5, 3·5 by 13·5** •1 $x^2 + 8x - 9 = x^2 + 6x$ •2 $8x - 6x = 9$ •3 $2x = 9$ so $x = 4{\cdot}5$ •4 4·5 by 10·5 •5 3·5 by 13·5 5 marks
4a	**ans: $x = 10$** •1 (x by 2) $x + 12 = 22$ •2 $x = 10$ 2 marks
4b	continued on the next page

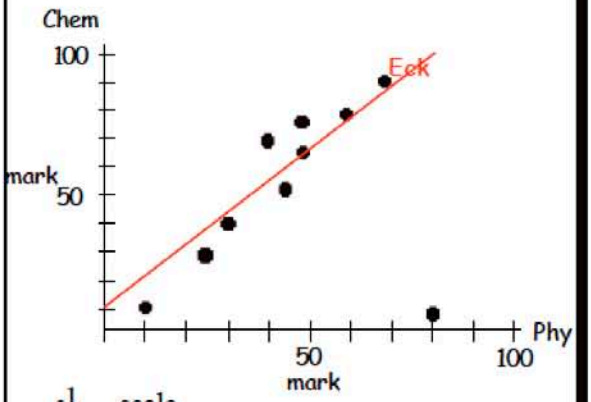
Qu	Marking Scheme Give 1 mark for each •
4b	**ans: $x = -45$** •1 (x by 15) $6x + 15 =$ ..... •2 ..... $= 5x - 30$ •3 $6x - 5x = -30 - 15$ •4 $x = -45$ **4 marks**
4c	**ans: $x = 17$** •1 (x by 6) $5x + 1 - 2x$ .... = ... •2 ..... $+ 8 = 60$ •3 $3x = 51$ •4 $x = 17$ **4 marks**
5a	**ans: $p \leq -5$** **1 mark**
5b	**ans: $p < -4$** **1 mark**
5c	**ans: $p \geq -2$** •1 $3p \geq -15 + 9$ •2 $3p \geq -6$ •3 $p \geq -2$ **3 marks**
5d	**ans: $p > 30$** •1 $-p < -22 - 8$ •2 $p > 30$ **2 marks**
5e	**ans: $p \leq 2$** •1 $5p + p \leq 15 - 3$ •2 $6p \leq 12$ •3 $p \leq 2$ **3 marks**
5f	**ans: $p > 2$** •1 $-5p - 3p > 6 - 22$ •2 $-8p \leq -16$ •3 $p > 2$ **3 marks**
5g	**ans: $p \geq -10$** •1 $10 - 1 +$ ..... = ... •2 ..... $+ p \geq -1$ •3 $p \geq -10$ **3 marks**
5h	**ans: $p > 0$** •1 $4 - 4p +$ ..... < ..... •2 ..... + ... $< 8p + 4$ •3 $-12p \geq 4 - 4$ •4 $p > 0$ **4 marks**
6a	**ans: $h + 5$ $1{\cdot}5h + 4$** •1 $h + 5$ •2 $1{\cdot}5\,h + 4$ **2 marks**
6b	**ans: $1{\cdot}5h + 4 < h + 5$** •1 $1{\cdot}5h + 4 < h + 5$ •2 $h < 2$ **2 marks**
6c	**ans: *eg Better value if you play 2+ hrs*** **1 mark**

MARK OUT OF 68

RECORD as a %

TEST 13 GRAPHS / CHARTS / TABLES

Qu	Marking Scheme Give 1 mark for each •
1	**ans: Bar Graph**  •1 scale •2 correct heights •3 set up of bars for comparative graph •4 some indication of Arsenal & Chelsea •5 labels on graph **5 marks**
2a	**ans: Line Graph**  •1 scale •2 correct height of lines •3 set up of lines for comparative graph •4 some indication of La Paz & La Mere •5 labels on graph **5 marks**
2b	**ans: 2 occasions** **1 mark**

Qu	Marking Scheme Give 1 mark for each •
3a	**ans: Scatter Graph**  •1 scale •2 correct dots •3 dots have NAMES (or letters) •4 labels on graph **4 marks**
3b	**ans: +ve correlation** **1 mark**
3c	**ans: Fran** **1 mark**
3d	**ans: Line similar to one on graph above** **1 mark**
3e	**ans: 70** **1 mark**
4a	**ans: $^1/_5$** **1 mark**
4b	**ans: 40%** **1 mark**
4c	**ans: 60** •1 25% of 240 •2 60 **2 marks**

continued over

Qu	Marking Scheme Give 1 mark for each •		
5a	**ans: Stem & Leaf Diagram** worm | | fly 9 | 0 | 7 3 | 1 | 9 7 4 | 2 | 0 1 6 6 8 | 3 | 0 3 1 | 4 | 3 •1 set up correct with stem & leaf •2 correct plug ins (even not in order) •3 ordered •4 labels **4 marks**		 MARK OUT OF 34 RECORD as a %
5b	**ans: 28** **1 mark**		
5c	**ans: 26** **1 mark**		
5d	**ans: 3** **1 mark**		
6a	**ans: 17** **1 mark**		
6b	**ans: 28** **1 mark**		
6c	**ans: 1 year** **1 mark**		
6d	**ans: 4 years** **1 mark**		

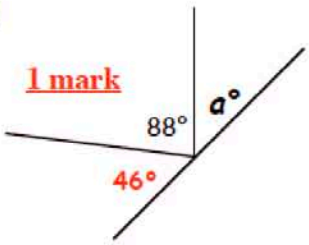
TEST 14 ANGLE PROPERTIES

Marking Scheme
Give 1 mark for each •

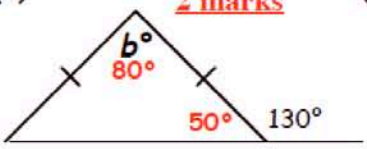
Note :- there is more than 1 way of obtaining the answer

1.

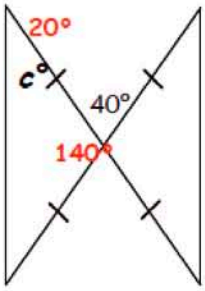
(a) 1 mark



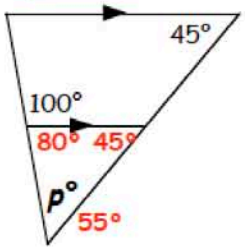
(b) 2 marks



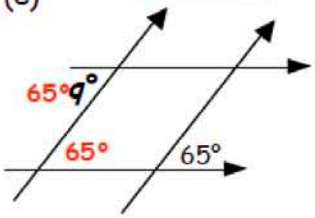
(c) 2 marks



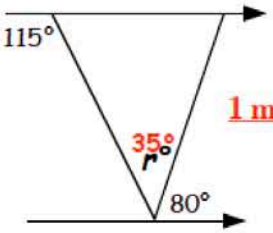
(d) 3 marks



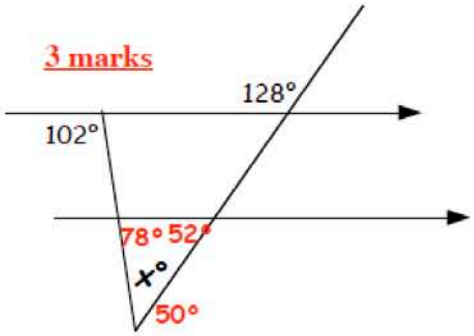
(e) 2 marks



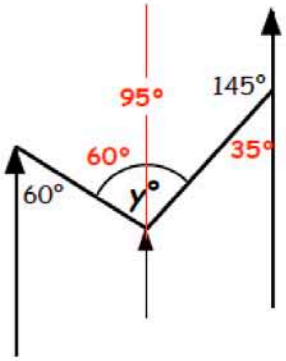
(f) 1 mark



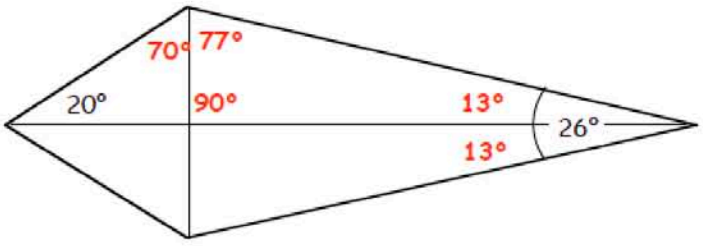
(g) 3 marks



(h) 3 marks



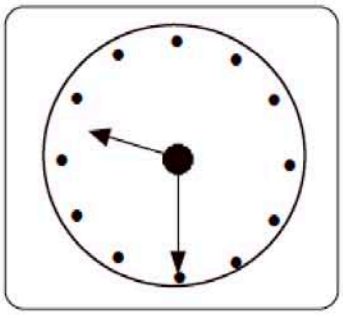
2.



- •1 4 @ 90°
- •2 2 @ 13°
- •3 2 @ 77°
- •4 2 @ 70°
- •5 1 @ 20°

5 marks

3.



- •1 90° + 15°
- •2 105°

2 marks

MARK OUT OF 24

RECORD as a %

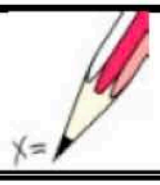
TEST 15 SIMULTANEOUS EQUATIONS

Qu	Marking Scheme Give 1 mark for each •
1	**ans: Diagram** •1 coords chosen •2 line sloping down •3 passing thro' (0,5) 3 marks
2	**ans: (2,3)** •1 points chosen for both lines •2 line sloping up thro' (0,2) •3 line sloping down thro' (0,6) •4 intersection at (2,3) 4 marks
3a	**ans: (1,2)** •1 adds to lose x's •2 $y = 2$ •3 plugs in to get $x = 1$ 3 marks
3b	**ans: (–1,3)** •1 multiplies to lose y's (or x's) •2 shows solving •3 $x = -1$ •4 plugs in to get $y = 3$ 4 marks
3c	**ans: (2,–4)** •1 multiplies one equation by a number •2 multiplies other equation by a number (or vice versa) •3 shows solving •4 $x = 2$ •5 plugs in to get $y = -4$ 5 marks

Qu	Marking Scheme Give 1 mark for each •
4	**ans: (4,1)** •1 rearranges to $4x + y = 17$ •2 rearranges to $3x + y = 13$ •3 $x = 4$ •4 plugs in to get $y = 1$ 4 marks
5	**ans: £1·50** •1 sets up 2 equations $3x + 2y = 7$ & $4x + 2y = 8{\cdot}5$ •2 shows solving •3 £1·50 3 marks
6a	**ans: $5x + 3y = 500$ & $3x + 2y = 210$** •1 sets up 2 equations 1 mark
6b	**ans: £480** •1 multiplies both equations by numbers •2 shows solving •3 $x = 70$ •4 $y = 50$ •5 $4x + 4y = 480$ 5 marks
6c	**ans: £580** •1 2 adults for 2 nights £280 •2 6 children paying for only 1 night £300 •3 total = £580 3 marks

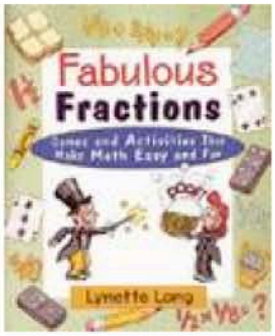
MARK OUT OF 35

RECORD as a %



TEST 16 FRACTIONS

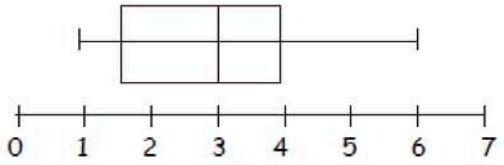
Qu	Marking Scheme Give 1 mark for each •
1a	**ans:** $5\frac{2}{3}$ •1 answer
1b	**ans:** $7\frac{1}{4}$ •1 answer **2 marks**
2	**ans:** $\frac{47}{7}$ •1 answer **1 mark**
3	**ans: 23** •1 answer **1 mark**
4a	**ans:** $\frac{7}{9}$ •1 answer
4b	**ans:** $3\frac{7}{12}$ •2 to twelfths •3 answer
4c	**ans:** $9\frac{1}{3}$ •4 to sixths •5 $8\frac{8}{6}$ •6 answer
4d	**ans:** $\frac{5}{11}$ •7 answer
4e	**ans:** $3\frac{7}{15}$ •8 to fifteenths •9 answer
4f	**ans:** $4\frac{3}{14}$ •10 to fourteenths •11 $4\frac{21}{14} - \frac{8}{14}$ •12 answer **12 marks**
5a	**ans:** $\frac{9}{20}$ •1 answer
5b	**ans:** $3\frac{1}{2}$ •2 to mixed nos. •3 answer
5c	**ans:** $1\frac{1}{4}$ •4 to multiplication & back one changed •5 answer
5d	**ans:** $\frac{5}{11}$ •6 to mixed nos. •7 to multiplication & back one changed •8 answer **8 marks**
6	**ans:** $12\frac{3}{20}$ •1 adding •2 to twentiieths •3 $11\frac{23}{20}$ •4 answer **4 marks**
	Continued

Qu	Marking Scheme Give 1 mark for each •		
7	**ans:** $8\frac{1}{8}$ •1 multiplies •2 working •3 answer 3 marks		
8	**ans:** $\frac{3}{4}$ •1 subtracts to get $5\frac{1}{4}$ •2 divides by 7 •3 multiplies by $\frac{1}{7}$ •4 answer 4 marks		
9	**ans: 48** •1 200 •2 multiplies by $\frac{3}{10}$ •3 60 •4 answer 4 marks		
	MARK OUT OF 39 RECORD as a %		

TEST 17 STATISTICAL ANALYSIS

Qu	Marking Scheme Give 1 mark for each •
1a	**ans: 7** •1 answer
1b	**ans: 11** •2 answer
1c	**ans: 12·5** •3 arrange in order •4 answer
1d	**ans: 12·6 (or 12·58.....)** •5 total 151 •6 151 ÷ 12 •7 answer 7 marks
2	**ans: 1·7 (m)** •1 1·65 x 4 = 6·6 •2 1·67 x 6 = 10·02 •3 10·2 – 6·6 = 3·42 •4 3·42 – 1·72 = answer 4 marks
3a	**ans: 3 (NOT 11 !)** •1 answer 1 mark
3b	**ans: 3·9** •1 *fx* column with 2 33 28 15 24 •2 total 102 ÷ 26 •3 total 26 •4 102 ÷ 26 = answer 4 marks
4a	**ans: table** •1 freq of 2 3 4 2 2 2 1 = 16 •2 Cum freq of 2 5 9 11 13 15 16 2 marks

Qu	Marking Scheme Give 1 mark for each •
4b	**ans: 72** •1 answer 1 mark
4c	**ans: $11/16$** •1 11 •2 answer 2 marks
5ai	**ans: 27·5** •1 answer 1 mark
5aii	**ans: 13** •1 answer 1 mark
5aiii	**ans: 35** •1 answer 1 mark
5b	**ans: 11** •1 knowing formula for SIQR •2 answer 2 marks
5c	**ans: WhiteCabs with reason** •1 answer 1 mark
6a	**ans: median 3 $Q_1 = 1·5$ $Q_3 = 4$** •1 arrange numbers in order •2 median •3 lower quartile •4 upper quartile 4 marks
	Continued

Qu	Marking Scheme Give 1 mark for each •		
6b	**ans:**  •1 range 1 - 6 •2 shows Q_1 Q_2 Q_3 •3 Boxplot ! nothing else **3 marks**		
6c	**ans: 2 relevant comments eg .....** •1 S2 tighter lower range •2 S2 lower median lower SIQR **2 marks**		
7a	**ans: mean = 73 SD = 10·5** •1 mean 73 •2 $X - \bar{X}$ •3 $(X - \bar{X})^2$ •4 ÷ 5 **NOT 6** •5 answer **5 marks**		$\bar{X}$ | $X - \bar{X}$ | $(X - \bar{X})^2$ 70 | -3 | 9 66 | -7 | 49 75 | +2 | 4 89 | +16 | 256 59 | -14 | 196 79 | +6 | 36 550 $\sqrt{\frac{550}{5}} = 10{\cdot}5$
7b	**ans: TWO comparisons e.g. .....** •1 same mean 73p •2 local prices more spread out. **2 marks**		
			MARK OUT OF 43 **RECORD as a %**

TEST 18 FURTHER TRIGONOMETRY

Qu 1

ans: £19680

•1 $0{\cdot}5 \times 120 \times 82\sin 30°$

•2 2460 sq m

•3 answer

3 marks

Qu 2

ans: 234 (sq cm)

•1 missing angle = 60°

•2 $0{\cdot}5 \times 120 \times 82\sin 60°$

•3 answer

3 marks

Qu 3

ans: 110°

•1 $0{\cdot}5 \times 40 \times 35\sin X° = 657$

•2 $\sin X° = {}^{657}/_{700}$

•3 $X = 70$

•4 $X = 110$ OBTUSE

4 marks

Qu 4

ans: 18°

•1 uses sine rule

•2 $\dfrac{25}{\sin C} = \dfrac{72}{\sin 117°}$

•3 $\sin C = \dfrac{25\sin 117°}{72}$

•4 answer

4 marks

Qu 5a

ans: Proof

•1 Uses 70° (Z shape)

•2 Uses 180° – 155° = 25°

•3 Adds to get 95°

3 marks

MARK OUT OF 34

RECORD as a %

Qu 5b

ans: 124 (km)

•1 uses sine rule

•2 $\dfrac{t}{\sin 95°} = \dfrac{80}{\sin 40°}$

•3 $t = \dfrac{80\sin 95°}{\sin 40°}$

•4 answer

4 marks

Qu 6

ans: 32·3 (miles)

•1 uses cosine rule

•2 $35^2 + 50^2 - 2 \times 35 \times 50\cos 40°$

•3 square roots

•4 answer

4 marks

Qu 7

ans: 32·4°

•1 uses cosine rule

•2 $CosA = \dfrac{8{\cdot}5^2 + 7{\cdot}8^2 - 4{\cdot}6^2}{2 \times 8{\cdot}5 \times 7{\cdot}8}$

•3 Inv Cos 0·844

•4 answer

4 marks

Qu 8

ans: 23·3 (m)

•1 $\dfrac{x}{\sin 53°} = \dfrac{30}{\sin 65°}$

•2 other side = 26·4 m

•3 Uses *SOHCAHTOA*

•4 $\sin 62° = \dfrac{h}{26{\cdot}4}$

•5 answer

5 marks

Can be done using other triangle

TEST 19 PATTERNS

Qu	Marking Scheme Give 1 mark for each •
1a	**ans: 7 9 11 13 in table** •1 2 correct •2 next 2 correct 2 marks
1b	**ans: N = 2L – 1** •1 2L •2 –1 •3 answer as equation 3 marks
1c	**ans: No ! with reason** •1 some working AND No ! •2 reason - eg 2L –1 is odd, 90 is even 2 marks
1d	**ans: 63 (metres)** •1 125 mentioned •2 2L – 1 = 125 •3 L = 63 metres 3 marks
2a	**ans:** $\frac{10 \times 11 \times 21}{6}$ •1 answer 1 mark
2b	**ans:** $\frac{n \times n+1 \times n(n+1)}{6}$ •1 n **x** $n+1$ bit •2 answer 2 marks
2c	**ans:** $\frac{n \times n+1 \times n(n+1)}{6} - \frac{10 \times 11 \times 21}{6}$ •1 answer 1 mark **14 Marks**

TEST 20 ALGEBRA

Qu	Marking Scheme Give 1 mark for each •
1a	ans: pq •1 answer 1 mark
1b	ans: $\frac{1}{a-5}$ •1 answer 1 mark
1c	ans: $\frac{2}{3m(m+n)}$ •1 $2/3$ •2 answer 2 marks
2a	ans: 6 •1 $6(x+3)$ •2 answer 2 marks
2b	ans: $\frac{2}{w+6}$ •1 $2(w-6)$ •2 $(w+6)(w-6)$ •3 answer 3 marks
2c	ans: $\frac{x-4}{4}$ •1 $(x-4)(x-2)$ •2 $4(x-2)$ •3 answer 3 marks

Qu	Marking Scheme Give 1 mark for each •
2d	ans: $\frac{p-q}{p+4q}$ lose 1 mark for further cancelling •1 $(p+4q)(p-q)$ •2 answer 2 marks
3a	ans: $\frac{b+2a}{ab}$ •1 $b+2a$ •2 ab 2 marks
3b	ans: $\frac{2g+2}{g^2}$ •1 denominator g^2 •2 $3g+2-g$ •3 answer 3 marks
3c	ans: $\frac{x+3}{20}$ •1 denominator 20 •2 $5(x-1)-4(x-2)$ •3 $5x-5-4x+8$ •4 answer 4 marks
4a	ans: $\frac{3}{2}$ •1 numerator 3 •2 denominator 2 2 marks

TEST 20 ALGEBRA (contd)

Qu	Marking Scheme Give 1 mark for each •
4b	ans: $\frac{1}{3y}$ •1 change to multiply •2 numerator 1 •3 denominator $3y$ 3 marks
4c	ans: $\frac{3}{2x}$ •1 numerator 3 •2 denominator 2.... •3 denominator $2x$ 3 marks
4d	ans: $\frac{5n}{3m^2}$ •1 numerator $5n$ •2 denominator 3.... •3 denominator $3m^2$ 3 marks
5a	ans: $x = c + a$ •1 answer 1 mark
5b	ans: $x = \frac{g-y}{2}$ •1 $2x =$ ..... •2 ..... $= g - y$ •3 answer 3 marks
5c	ans: $x = \frac{k-mh}{m}$ lose 1 mark for further cancelling •1 $mx + mh$ •2 $mx = k - mh$ •3 answer 2 marks

Qu	Marking Scheme Give 1 mark for each •
5d	ans: $x = z - py$ •1 knows to cross multiply •2 $py = z - x$ •3 answer 3 marks
5e	ans: $x = \frac{5}{W-a}$ •1 $W - a = \frac{5}{x}$ •2 $x(W-a) = 5$ •3 answer 3 marks
6a	ans: x *by 1/8 or equiv* •1 $p = \frac{6}{(2q)^3}$ some working must be shown •2 $p = \frac{6}{8q^3}$ •3 answer 3 marks
6b	ans: x *by 8* •1 $p = \frac{6}{(0{\cdot}5q)^3}$ •2 $p = \frac{6}{\frac{1}{8}q^3}$ •3 answer 3 marks

MARK OUT OF 53

RECORD as a %

TEST 21 MONEY

Qu	Marking Scheme Give 1 mark for each •
1a	**ans: £325·50** If the ZERO is missed out, even just once - take 1 mark off overall •1 £16926 ÷ 52 •2 answer 2 marks
1b	**ans: £2484** •1 29808 ÷ 12 •2 answer 2 marks
2	**ans: £525·75** •1 6·5 x 10·80 x 5 •2 £351 •3 5 x 1·5 x 10·80 •4 £81 •5 7·5% of £1250 = £93·75 •6 Total = £525·75 6 marks
3	**ans: 3%** •1 Commission £435 •2 $^{435}/_{14500}$ x 100 •3 answer 3 marks
4	**ans: £12665·60** •1 £202 •2 £6463·60 •3 £6000 •4 answer 4 marks
5	**ans: £17422·90** •1 VAT = £2948·75 •2 £19798·75

Qu	Marking Scheme Give 1 mark for each •
5	•3 Discount = £2375·85 •4 answer 4 marks **21 MARKS**

TEST 22 MONEY (2)

1	**ans: Makro Correct** **£998·80 below £1000** •1 117·5% = £1173·59 •2 1% = £9·98(8) •3 100% = £998·80 •4 answer 4 marks
2	**ans: £42·50** •1 Deposit £85 •2 £765 left to pay •3 £765 ÷ 18 •4 answer 4 marks
3	**ans: £85·65** •1 24·5 **x** £2·10 •2 £51·45 •3 3·8 **x** £9 = £34·20 •4 answer 4 marks
4	**ans: £670·24 Euros** •1 472 **x** £1·42 •2 answer 2 marks
5	**ans: $86** •1 Rupees = £600 •2 Total £ = £1420 •3 = $2414 •4 answer 4 marks **18 MARKS**

TEST 23 FUNCTIONS AND GRAPHS

Qu	Marking Scheme Give 1 mark for each •
1a	**ans: 23**
	•1 answer
1b	**ans: –1**
	•1 answer
1c	**ans: 100**
	•1 $3\sqrt{x} + 8 = 38$
	•2 $3\sqrt{x} = 30$
	•3 $\sqrt{x} = 10$
	•4 $x = 100$
	6 marks
2	**ans: $32w^2$ +1 –1**
	•1 $32w^2$
	•2 +1
	•3 –1
	3 marks
3a	**ans: 5, 0, –3, –4, –3, 0, 5**
	•1 3 correct
	•2 rest correct
	2 marks
3b	**ans: V Parabola**
	•1 correct shape thro' points
	•2 neatness
	2 marks
3c	**ans: –1, 3**
	•1 –1
	•2 3
	2 marks
3d	**ans: $x = 1$**
	•1 x = ...
	•2 answer
	2 marks
3e	**ans: (1,–4)**
	•1 1
	•2 –4 **19 MARKS**

TEST 24 SIMILAR FIGURES

Qu	Marking Scheme Give 1 mark for each •
1	**ans: 24 cm** •1 S.F. = $^{20}/_{30}$ •2 $^{20}/_{30}$ **x** 36 •3 answer 3 marks
2a	**ans: Proof** •1 Proof with F shapes and common angle mentioned. •2 "Equiangular" and so similar 2 marks
2b	**ans: x = 12** •1 S.F. = 1·5 •2 x = 1·5 **x** 8 •3 answer 3 marks
3	**ans: y = 4·8** •1 S.F. = 1·4 •2 large side 1·4 **x** 12 = 16·8 •3 answer 3 marks
4	**ans: 25p** •1 S.F. length = 0·5 •2 S.F. volume = 0·5 **x** 0·5 **x** 0·5 •3 0·125 **x** £2 •4 answer 4 marks
5	**ans: 15 cm** •1 S.F. area = $^{45}/_{80}$ •2 S.F. length = 0·75 •3 0·75 **x** 20 cm •4 answer 4 marks **19 MARKS**

TEST 25 QUADRATIC FUNCTIONS (1)

Qu	Marking Scheme Give 1 mark for each •
1a	**ans: –5 1** •1 $x = -5$ •2 $x = 1$ 2 marks
1b	**ans: $x = -2$** •1 answer must have $x =$ .... 1 mark
1c	**ans: (–2, –9)** •1 –2 •2 –9 2 marks
2a	**ans: 0 1** •1 $x = 0$ •2 $x = 1$ 2 marks
2b	**ans: 4 –1** •1 $x = 4$ •2 $x = -1$ 2 marks
2c	**ans: $1\frac{1}{2}$ $-\frac{1}{3}$** •1 $x = 1\frac{1}{2}$ •2 $x = -\frac{1}{3}$ 2 marks
3a	**ans: 0 7** •1 x..... •2 .....$(x - 7)$ •3 $x = 0$ •4 $x = 7$ 4 marks
3b	**ans: 0 4** •1 $5x$..... •2 .....$(x - 4)$ •3 $x = 0$ •4 $x = 4$ 4 marks
3c	**ans: 10 –10** •1 $(x + 10)$..... •2 .....$(x - 10)$ •3 $x = 10$ •4 $x = -10$ 4 marks
3d	**ans: 0 9** •1 $2x$..... •2 .....$(x - 9)$ •3 $x = 0$ •4 $x = 9$ 4 marks
3e	**ans: 5 1** •1 $(x - 5)$..... •2 .....$(x - 1)$ •3 $x = 5$ •4 $x = 1$ 4 marks
3f	**ans: $\frac{1}{2}$ –3** •1 $(2x - 1)$..... •2 .....$(x + 3)$ •3 $x = \frac{1}{2}$ •4 $x = -3$ 4 marks

CONTINUED

TEST 25 QUADRATIC FUNCTIONS (1) (continued)

Qu	Marking Scheme Give 1 mark for each •
4a	**ans:** (3,0) (–1,0) •1 $(x - 3)$..... •2 .....$(x + 1)$ •3 $x = 3$ •4 $x = -1$ •5 answer 5 marks
4b	**ans:** C(0,–3) •1 the 0 •2 the –3 2 marks
4c	**ans:** Drawing •1 V Parabola •2 going through correct A, B and C 2 marks
4d	**ans:** $x = 1$ •1 answer must have $x =$ ....
4e	**ans:** C(1,–4) •1 the 1 •2 the –4 2 marks
4f	**ans:** Umbrella Parabola + 1 more •1 Umbrella Parabola •2 e.g. Max TP (1,4) 2 marks

Qu	Marking Scheme Give 1 mark for each •
5	**ans:** (7,11) (–1,–5) •1 $x^2 - 4x - 10 = 2x - 3$ •2 $x^2 - 6x - 7 = 0$ •3 $(x - 7)$..... •4 .....$(x + 1)$ •5 $x = 7$ AND $x = -1$ •6 (7,11) AND (–1,–5) 6 marks

54 MARKS

TEST 26 TRIG GRAPHS

Qu	Marking Scheme Give 1 mark for each •
1a	ans: $(y =)\ 3\sin x°$ •1 the sin •2 the 3 2 marks
1b	ans: $(y =)\ 8\cos x°$ •1 the cos •2 the 8 2 marks
1c	ans: $(y =)\ 5\cos 6x°$ •1 the cos •2 the 5 •3 the 6 3 marks
1d	ans: $(y =)\ 4\sin 2x°$ •1 the sin •2 the 4 •3 the 2 3 marks
1e	ans: $(y =)\ 3\sin x° + 3$ •1 the sin •2 the 3 •3 the + 3 3 marks
1f	ans: $(y =)\ 6\cos x° + 7$ •1 the cos •2 the 6 •3 the + 7 3 marks
1g	ans: $(y =)\ 5\cos 2x° + 3$ •1 the cos •2 the 5 •3 the 2 •4 the + 3 4 marks
1h	ans: $(y =)\ 2\sin 4x° + 1$ •1 the sin •2 the 2 •3 the 4 •4 the + 1 4 marks
2	ans: Graph •1 the sin curve •2 5 and –5 •3 3 cycles •4 some points shown 4 marks
3a	ans: 2·15 ml •1 answer 1 mark
3b	ans: 1·4 •1 3·2 – 1·8 •2 1·4 2 marks

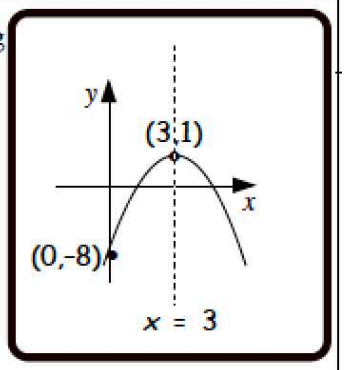
31 MARKS

TEST 27 SURDS & INDICES

Qu	Marking Scheme Give 1 mark for each •
1a	ans: $6\sqrt{7}$ •1 answer 1 mark
1b	ans: $6\sqrt{7}$ •1 $\sqrt{(100 \times 5)}$ or equiv. •2 $10\sqrt{5}$ 2 marks
1c	ans: $6\sqrt{7}$ •1 $\sqrt{24}$ or equiv. •2 $\sqrt{(4 \times 6)}$ or equiv. •3 $2\sqrt{6}$ 3 marks
1d	ans: $2 + 7\sqrt{3} - 12$ •1 the 2 •2 the $+ 7\sqrt{3}$ •3 the $- 12$ 3 marks
1e	ans: $a - b$ •1 the a •2 ..... $+ \sqrt{ab} - \sqrt{ab}$ ..... •3 the $- b$ 3 marks
1f	ans: $2\sqrt{2}$ •1 $\sqrt{(9 \times 2)}$ •2 $3\sqrt{2}$ •3 $3\sqrt{2} - \sqrt{2}$ = answer 3 marks
2a	ans: $6y^5$ •1 the 6 •2 the y^5 2 marks
2b	ans: $1/p^3$ •1 answer 1 mark
2c	ans: $1/a^4$ •1 a^{-4} •2 answer 2 marks

Qu	Marking Scheme Give 1 mark for each •
3a	ans: $6\sqrt{3}$ •1 $3\sqrt{12}$ •2 $3\sqrt{(4 \times 3)}$ •3 answer 3 marks
3b	ans: 8 •1 $4^{3/2}$ •2 answer 2 marks
4a	ans: y^7 •1 y^5/y^{-2} •2 answer 2 marks
4b	ans: b •1 b^2/b •2 answer 2 marks
4c	ans: x^{14} •1 x^8/x^{-6} •2 answer 2 marks
5	ans: $a + 1$ •1 a •2 a^0 •3 $a + 1$ 3 marks
6	ans: $\sqrt{2}/4$ •1 $1/\sqrt{8}$ or equiv •2 $1/2\sqrt{2}$ •3 $\times \sqrt{2}/\sqrt{2}$ •4 $\sqrt{2}/4$ 4 marks

TEST 28 QUADRATIC FUNCTIONS (2)

Qu	Marking Scheme Give 1 mark for each •
1a	ans: MINIMUM •1 answer 1 mark
1b	ans: (–3,–5) •1 –3 •2 –5 2 marks
1c	ans: $x = -3$ •1 answer (accept nothing else) 2 marks
1d	ans: (0,4) •1 0 •2 4 2 marks
2a/b	ans: Drawing  •1 Parabola Umbrella Shape •2 Max TP (3,1) •3 (0,–8) •4 Line of Symmetry drawn •5 $x = 3$ stated 5 marks
3	ans: $k = -2$ •1 Sub. $x = -3$ into equation •2 $-18 = 9k$ •3 answer 3 marks

Qu	Marking Scheme Give 1 mark for each •
4	ans: 1·85 or –1·35 to 2 dec pl •1 Uses quadratic formula $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ •2 correct substitution $\frac{1 \pm \sqrt{1 + 40}}{4}$ •3 1·85 •4 –1·35 **20 MARKS** •5 Rounded both answers correctly 5 marks

TEST 29 TRIG EQUATIONS

Qu	Marking Scheme Give 1 mark for each •
1a	**ans: 48·5° & 131·5° (accept 132°)** •1 answer Quad 1 •2 answer Quad 2
1b	**ans: 158° & 202° (accept 201·9°)** •1 answer Quad 2 •2 answer Quad 3
1c	**ans: 84° & 264°** •1 answer Quad 1 •2 answer Quad 3
1d	**ans: 60° & 300°** •1 $6\cos x° = 3$ •2 $\cos x° = 0{\cdot}5$ •3 answer Quad 1 •4 answer Quad 4
1e	**ans: 194·5° & 345·5° (195° & 346°)** •1 $4\sin x° = -1$ •2 $\sin x° = -0{\cdot}25$ •3 answer Quad 3 •4 answer Quad 4
1f	**ans: 167° & 347°(go easy on rounding)** •1 $5\tan x° + 2 = 0{\cdot}839$ •2 $5\tan x° = -1{\cdot}16$ •3 $\tan x° = -0{\cdot}232$ •4 answer Quad 2 •5 answer Quad 4 19 marks
2	**ans: 30° 150° 210° 330** **390° 510° 570° 690°** •1 $\sin x° = \pm 0{\cdot}5$ •2 for answers 30 150 210 330 •3 for answers 390 510 570 690 3 marks
3	**ans: A(104°,–3) B(256°, –3)** •1 $4\cos x° - 2 = -3$ •2 $\cos x° = -0{\cdot}25$ •3 answer Quad 2 •4 answer Quad 3 •5 Coordinates (right way round !) 5 marks
4	**ans: 101·9° (102°)** •1 attempts to use Cos rule for finding angle •2 $\cos Q = \frac{200^2 + 130^2 - 260^2}{2 \times 200 \times 130}$ •3 Angle Q = 78·1° •4 Obtuse Angle Q = 101·9° 4 marks
5a	**ans: $^3/_5$** •1 uses formula or otherwise •2 answer is positive •3 answer
5b	**ans: $-^3/_4$** •1 uses formula or otherwise •2 answer is negative •3 answer 6 marks

37 MARKS