Year 10 Higher

Response to EOY Exam

Complete at least 3 topics over the holidays

Contents

Real-Life Money Questions

1) Lance goes on holiday to France.
The exchange rate is £1 = 1.40 Euros.

He changes £350 into Euros.

a) How many Euros should he get?

In France, Lance buys a digital camera for 126 Euros.

b) Work out the cost of the camera in pounds.

2) Whilst on holiday in Spain, Gemma bought a pair of sunglasses for 77 Euros.
In England, an identical pair of sunglasses costs £59.99.
The exchange rate is £1 = 1.40 Euros.

In which country were the glasses the cheapest, and by how much?
Show all your working.

3) Luke buys a pair of trainers in Switzerland.
He can pay either 86 Swiss Francs or 56 Euros.
The exchange rates are:
£1 = 2.10 Swiss Francs
£1 = 1.40 Euros

Which currency should he choose to get the best price, and how much would he save?
Give your answer in pounds (£).

4) The total cost of 5 kg of potatoes and 2 kg of carrots is £4.88.
3 kg of potatoes cost £1.98.

Work out the cost of 1 kg of carrots.

5) The cost of 4 kg of bananas is £5.80.
The total cost of 3 kg of bananas and 1.5 kg of pears is £5.61.

Work out the cost of 1 kg of pears.

Compound Interest/Depreciation

1) Henry places £6000 in an account which pays 4.6% compound interest each year.
Calculate the amount in his account after 2 years.

2) Sarah puts £8600 in a bank. The bank pays compound interest of 3.8% per year.
Calculate the amount Sarah has in her account after 4 years.

3) Mary deposits £10000 in an account which pays 5.6% compound interest per year.
How much will Mary have in her account after 5 years?

4) Susan places £7900 in an account which pays 2.4% compound interest per year.
How much interest does she earn in 3 years?

5) Harry puts money into an account which pays 6% compound interest per year.
If he puts £23000 in the account for 5 years how much interest will he earn altogether?

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6) Laura buys a new car for £14600.
The annual rate of depreciation is 23%.
How much is the car worth after 3 years?

7) The rate of depreciation of a particular brand of computer is 65% per year. If the cost of the computer when new is £650 how much is it worth after 2 years?

8) Sharon pays £3500 for a secondhand car.
The annual rate of depreciation of the car is 24%
How much will it be worth four years after she has bought it?

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9) Dave places £17000 in an account which pays 4% compound interest per year.
How many years will it take before he has £19122.68 in the bank?

10) A new motorbike costs £8900.
The annual rate of depreciation is 18% per year.
After how many years will it be worth £2705.66?

Reverse Percentages

1) In a sale, normal prices are reduced by 20%.
The sale price of a shirt is £26

Calculate the normal price of the shirt.

2) A car dealer offers a discount of 15% off the normal price of a car for cash.
Emma pays £6120 cash for a car.

Calculate the normal price of the car.

3) In a sale, normal prices are reduced by 13%.
The sale price of a DVD recorder is £108.75

Calculate the normal price of the DVD recorder.

4) A salesman gets a basic wage of £160 per week plus a commision of 30% of the sales he makes that week.
In one week his total wage was £640

Work out the value of the sales he made that week.

5) Jason opened an account at MathsWatch Bank.
MathsWatch Bank's interest rate was 4%.
After one year, the bank paid him interest.
The total amount in his account was then £1976

Work out the amount with which Jason opened his account

6) Jonathan's weekly pay this year is £960.
This is 20% more than his weekly pay last year.

Tess says "This means Jonathan's weekly pay last year was £768".
Tess is wrong.

a) Explain why

b) Work out Jonathan's weekly pay last year.

7) The price of all rail season tickets to London increased by 4%.

a) The price of a rail season ticket from Oxford to London increased by £122.40
Work out the price before this increase.

b) After the increase, the price of a rail season ticket from Newport to London was £2932.80
Work out the price before this increase.

Hard Calculator Questions

1) Find the value of the following:
(write down all the figures on your calculator display)

a) $(0.3 + 2.8)^2$ b) $2.7^2 + 3.9^2$ c) $4.5^2 - \sqrt{53}$ d) $6 \times \sqrt{(37 \div 4)}$

2) Find the value of the following:
(write your answers correct to 1 decimal place)

a) $5.6^3 + 11.2$ b) $87.4 \div (\sqrt{39} + 3)$ c) $\dfrac{\sqrt{3412}}{4.3^2}$ d) $\dfrac{15^2 - 12^2}{\sqrt{9.6 - 3.87}}$

3) Work out

$\sqrt{16.75} + 1.53^2$

a) Write down all the figures on your calculator display.

b) Write your answer to part (a) correct to 1 decimal place.

4) Work out

$(2.4 \times 1.9)^2 \times 2.03$

Write down all the figures on your calculator display.

5) Use your calculator to work out the value of

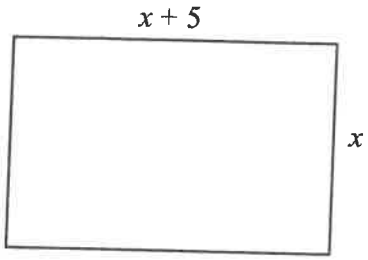
$$\frac{7.34 \times 4.71}{5.63 + 11.89}$$

a) Write down all the figures on your calculator display.

b) Write your answer to part (a) to an appropriate degree of accuracy.

Forming Equations

1) The width of a rectangle is x centimetres.
The length of the rectangle is $(x + 5)$ centimetres.



a) Find an expression, in terms of x, for the perimeter of the rectangle.
Give your answer in its simplest form.

The perimeter of the rectangle is 38 centimetres.

b) Work out the length of the rectangle.

2)

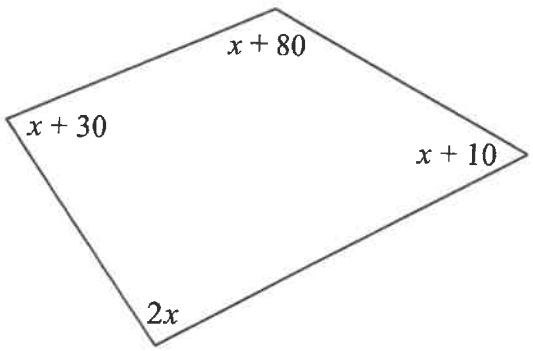


*Diagram **NOT** accurately drawn*

The sizes of the angles, in degrees, of the quadrilateral are

$x + 10$
$2x$
$x + 80$
$x + 30$

a) Use this information to write down an equation in terms of x.

b) Use your answer to part (a) to work out the size of the smallest angle of the quadrilateral.

3) Sarah buys 6 cups and 6 mugs

A cup costs £x

A mug costs £$(x + 3)$

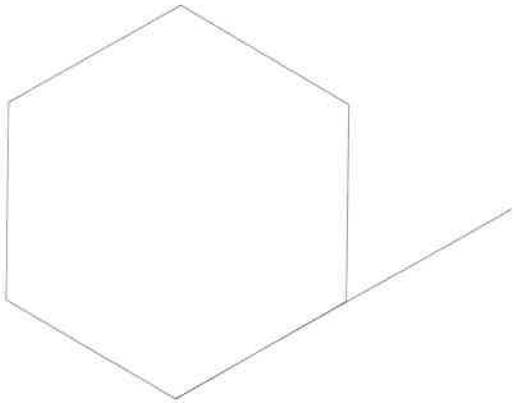
a) Write down an expression, in terms of x, for the total cost, in pounds, of 6 cups and 6 mugs.

b) If the total cost of 6 cups and 6 mugs is £48, write an equation in terms of x.

c) Solve your equation to find the cost of a cup and the cost of a mug.

Angles of Regular Polygons

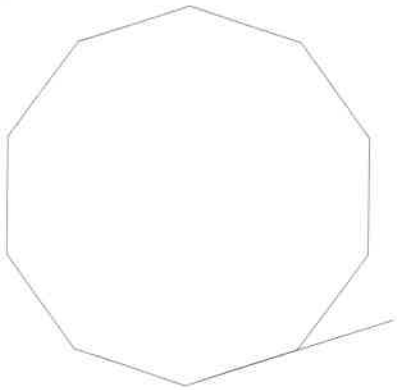
1)



a) Work out the size of an **exterior** angle of a regular hexagon.

b) Work out the size of an **interior** angle of a regular hexagon.

2)



a) Name the regular polygon, above.

b) Work out the size of an **exterior** angle and of an **interior** angle for this polygon.

3) The size of each **exterior** angle of a regular polygon is 90°.
Work out the number of sides of the regular polygon.

4) The size of each **exterior** angle of a regular polygon is 40°.
Work out the number of sides of the regular polygon.

5) The size of each **interior** angle of a regular polygon is 120°.
Work out the number of sides of the regular polygon.

6) The size of each **interior** angle of a regular polygon is 150°.
Work out the number of sides of the regular polygon.

Compound Measures

1) Jane runs 200 metres in 21.4 seconds.

Work out Jane's average speed in metres per second.
Give your answer correct to 1 decimal place.

2) A car travels at a steady speed and takes five hours to travel 310 miles.

Work out the average speed of the car in miles per hour.

3) A plane flies 1440 miles at a speed of 240 mph.

How long does it take?

4) A marathon runner runs at 7.6 mph for three and a half hours.

How many miles has he run?

5) A car takes 15 minutes to travel 24 miles.

Find its speed in **mph**.

6) A cyclist takes 10 minutes to travel 2.4 miles.

Calculate the average speed in mph.

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7) An ice hockey puck has a volume of 113 cm^3.

It is made out of rubber with a density of 1.5 grams per cm^3.

Work out the mass of the ice hockey puck.

8) An apple has a mass of 160 g and a volume of 100 cm^3.

Find its density in g/cm^3.

9) A steel ball has a volume of 1500 cm^3.

The density of the ball is 95 g/cm^3.

Find the mass of the ball in kg.

10) The mass of a bar of chocolate is 1800 g.

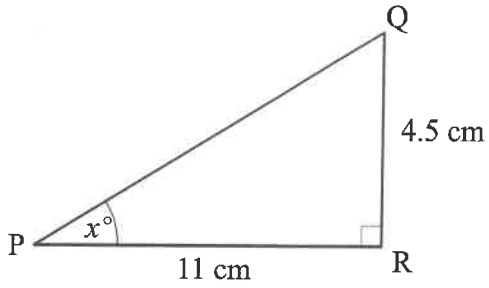
The density of the chocolate is 9 g/cm^3.

What is the volume of the bar of chocolate?

Trigonometry

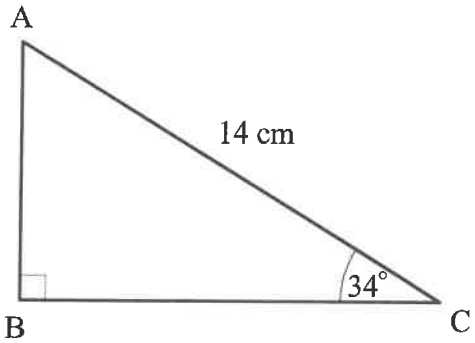
1) PQR is a right-angled triangle.
PR = 11 cm.
QR = 4.5 cm
Angle PRQ = 90°

Work out the value of x.
Give your answer correct to 1 decimal place.



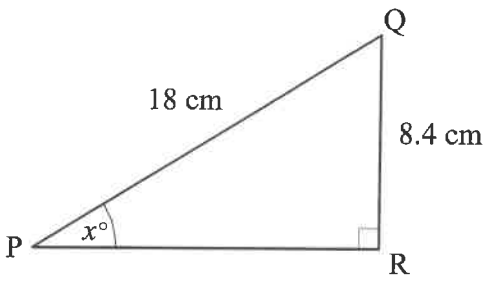
2) AC = 14 cm.
Angle ABC = 90°
Angle ACB = 34°

Calculate the length of BC.
Give your answer correct to
3 significant figures.



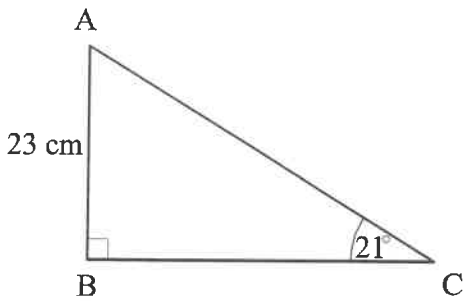
3) PQR is a right-angled triangle.
PQ = 18 cm.
QR = 8.4 cm
Angle PRQ = 90°

Work out the value of x.
Give your answer correct to 1 decimal place.



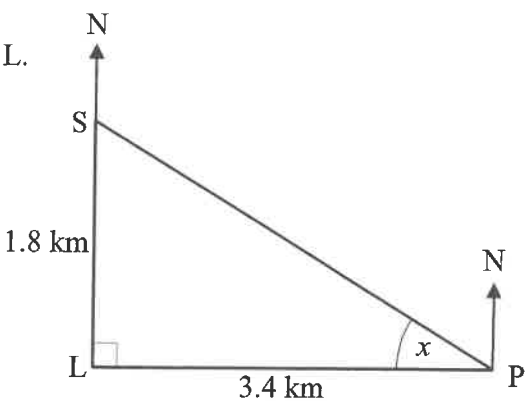
4) AB = 23 cm.
Angle ABC = 90°
Angle ACB = 21°

Calculate the length of AC.
Give your answer correct to
3 significant figures.



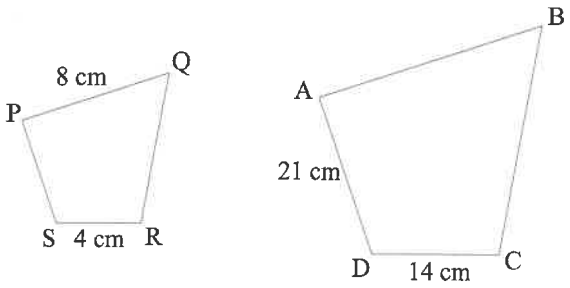
5) A lighthouse, L, is 3.4 km due West of a port, P.
A ship, S, is 1.8 km due North of the lighthouse, L.

Calculate the size of the angle marked x.
Give your answer correct to 3 significant figures.



Similar Shapes

1) The diagram shows two quadrilaterals that are mathematically **similar**.

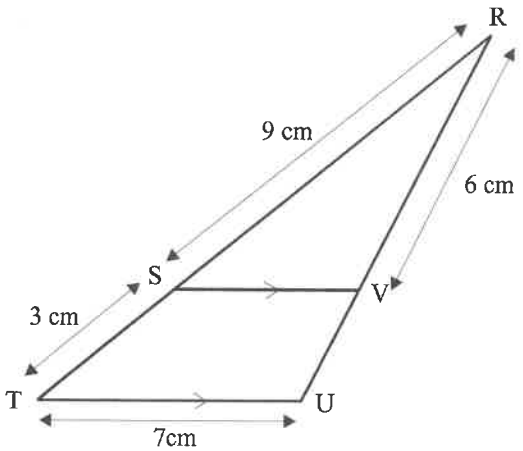


a) Calculate the length of AB

b) Calculate the length of PS

2) SV is parallel to TU.
RST and RVU are straight lines.
RS = 9 cm, ST = 3 cm, TU = 7 cm, RV = 6 cm

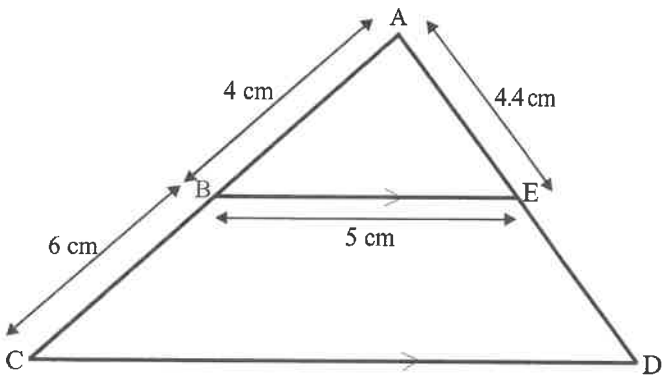
Calculate the length of VU.



3) BE is parallel to CD.
ABC and AED are straight lines.
AB = 4 cm, BC = 6 cm, BE = 5 cm, AE = 4.4 cm

a) Calculate the length of CD.

b) Calculate the length of ED.



Circle Theorems

1) In the diagram, A, B and C are points on the circumference of a circle, centre O.
PA and PB are tangents to the circle.
Angle ACB = 72°.

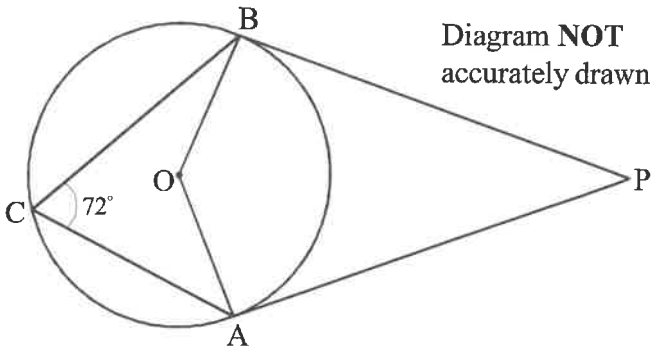


Diagram **NOT** accurately drawn

a) (i) Work out the size of angle AOB.

(ii) Give a reason for your answer.

b) Work out the size of angle APB.

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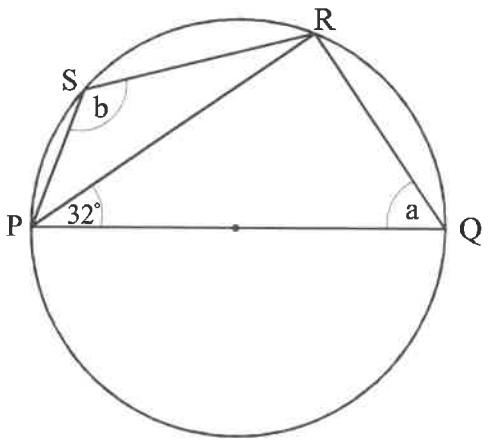
2) P, Q, R and S are points on the circle.
PQ is a diameter of the circle.
Angle RPQ = 32°.



a) (i) Work out the size of angle PQR.

(ii) Give reasons for your answer.

b) (i) Work out the size of angle PSR.

(ii) Give a reason for your answer.

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3) The diagram shows a circle, centre O.
AC is a diameter.
Angle BAC = 31°.
D is a point on AC such that angle BDA is a right angle.

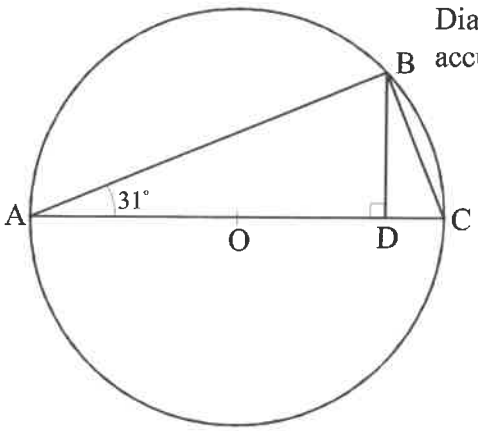

Diagram **NOT** accurately drawn

a) Work out the size of angle BCA.
Give reasons for your answer.

b) Calculate the size of angle DBC.

c) Calculate the size of angle BOA.

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4) A, B, C and D are four points on the circumference of a circle.
ABE and DCE are straight lines.
Angle BAC = 21°. Angle EBC = 58°.

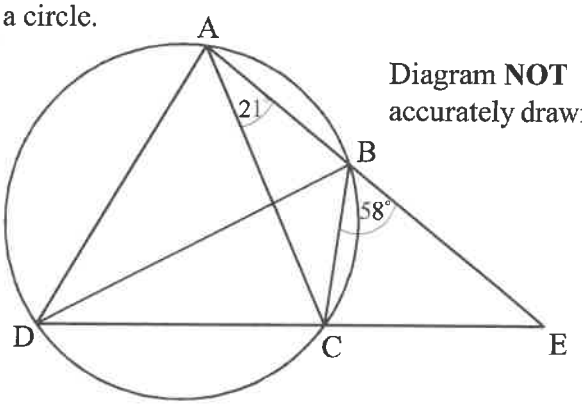

Diagram **NOT** accurately drawn

a) Find the size of angle ADC.

b) Find the size of angle ADB.

Angle CAD = 69°.

c) Is BD a diameter of the circle?
You must explain your answer.

Expanding Triple Brackets

Single

1) Expand $10x(11x^2 + 5)$

2) Expand $3x(3x^2 + 7)$

3) Expand $10x(2 + 11x^3)$

4) Expand $8x(5 - 7x)$

Double

1) $(x + 4)(x - 1)$

2) $(x + 1)(x + 1)$

3) $(x + 6)(x - 1)$

4) $(x + 1)(x + 3)$

Triple

1) $(x + 1)(x + 3)(x - 4)$

2) $(x + 1)(x + 2)(x + 6)$

3) $(x - 1)(x - 2)(x + 3)$

4) $(x - 1)(x - 2)(x - 6)$

5) $(x + 1)(x - 2)(x + 6)$

6) $(x - 2)(x + 3)(x + 2)$