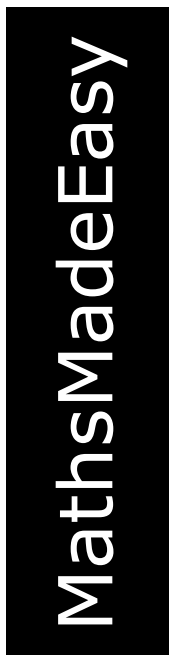


First Name	
Last Name	
Date	
Total Marks	/ 100 marks



GCSE Mathematics
Calculator
Higher Tier
Free Practice Set 4
1 hour 45 minutes



Answers at:

<http://www.mathsmadeeasy.co.uk/gcsemathspapers-free.htm>

Instructions

Write your name and other details in the boxes above.

Answer all the questions

Take π to be 3.142

Information

Marks are shown in brackets for each question (2)

Calculators may be used

Advice

Don't spend too long on one question

Show all your working in calculations for full marks

You will get marks for method even if your answer is incorrect

Leave a question until later if you cannot answer it

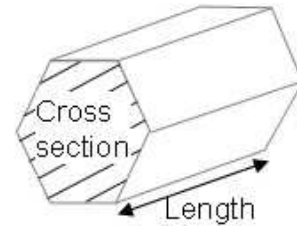
Materials needed for examination

Ruler marked in centimetres and millimetres,
protractor, compasses, pen, pencil, rubber
Tracing paper may be used

This paper is dedicated to my grandson, Henry George Dew, Born 19 April 2011

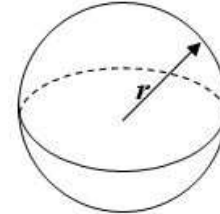
Formulae sheet — Higher tier

Volume of prism = area of cross-section \times length



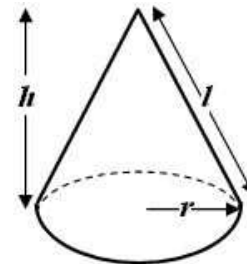
Volume of sphere = $\frac{4}{3} \pi r^3$

Surface area of sphere = $4\pi r^2$



Volume of cone = $\frac{1}{3} \pi r^2 h$

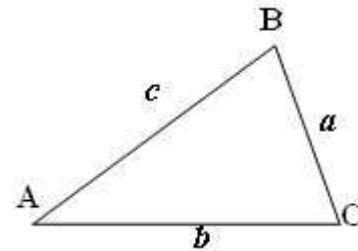
Curved surface area of cone = $\pi r l$



In any triangle ABC

Sine Rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine Rule: $a^2 = b^2 + c^2 - 2bc \cos A$



Area of a triangle = $\frac{1}{2} ab \sin C$

The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$, where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

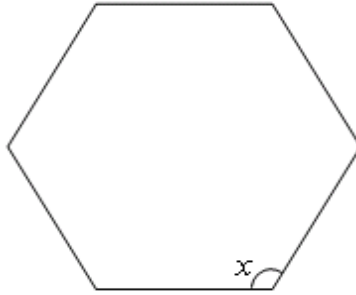
Authors Note

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The right of David Weeks to be identified as the author of this work has been asserted by him in accordance with the Copyright, Designs and Patents Act 1988.

1. a) Calculate the size of an interior angle x of the regular shape below.
Show all your working

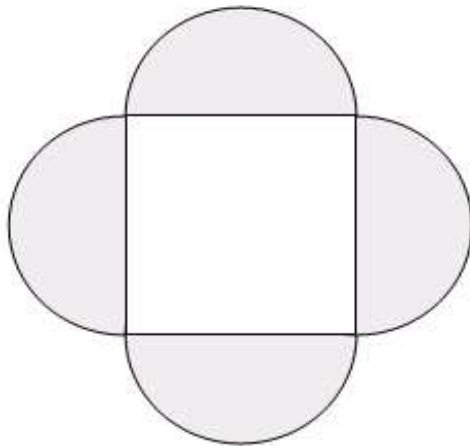


.....^o (2)

- b) The shape below is made by drawing semicircles on each of the sides of a square.

The perimeter of the square is 24 cm.

Calculate the shaded area.



.....cm² (4)

2. Joe made Spaghetti Bolognese for dinner.
Some of the ingredients he used are shown.
Some of the amounts are missing.

Calculate and write the missing amounts in the table

	For 6 people	For 9 people
mushrooms	150 gram	
minced beef		900 grams
spaghetti		1125 grams
chopped tomatoes	500 grams	

(3)

3. Stuart went to Australia
He exchanged some money at £1.00 for 1.52 Australian dollar

- a) What is £25 in Australian dollars.

A\$..... (2)

- b) What is 55 A\$ in £s

£..... (1)

4. Here is some information about the results of two tests.

	Test A	Test B
Number taking the test	80100	73250
Percentage getting top grade	22%	28%

How many more students gained top grade in Test B than in Test A?

..... (3)

5. a) Use your calculator to work out:

$$\frac{51.4 - 4.9}{6.05 \times 0.31}$$

Write down the figures on your calculator display.

You must give your answer as a decimal.

..... (2)

6. a) Make x the subject of the formula

$$y = 3x - 6$$

$$x = \dots\dots\dots (2)$$

- b) Find all the possible values of p if

$$-2 \leq p < 5$$

$$\dots\dots\dots (2)$$

- c) Solve $5x - 20 = 2x + 16$

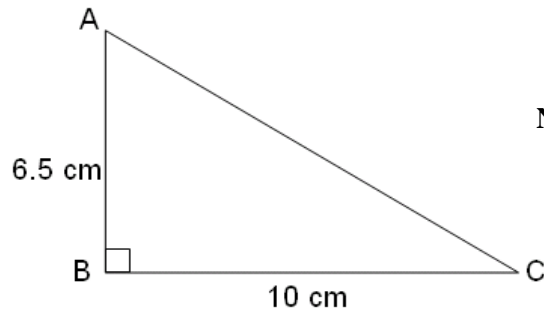
$$\dots\dots\dots (2)$$

- d) Make x the subject of the formula

$$y = 5x + yx - 7z$$

$$x = \dots\dots\dots (2)$$

7. Look at the right angled triangle below.



Not drawn accurately

a) Calculate the area of the triangle ABC.

.....cm² (2)

b) Work out the length of side AC to 2 decimal places

..... cm (3)

8. There are 120 coins in a money bag.

The table shows the probability for randomly picking different coins out of the bag

Coins	5p	10p	20p	50p	£1
Probability	0.2	0.1		0.35	0.05

a) What is the probability of picking a 20p coin

..... (1)

b) Calculate the total value of the money in the bag

£..... (3)

9. Look at this equation

$$x^3 - 5x = 30$$

The value for x is between 3 and 4

Use trial and improvement to find the value for x to one decimal place.

Show all your working. Use the table to help you.

x	x^3	$-5x$	=

$x = \dots\dots\dots$ (4)

10. a) Solve

$$3x + 4y = 18$$

$$10x - 4y = 8$$

$$x = \dots\dots\dots y = \dots\dots\dots$$

(2)

b) i) Expand and simplify $6(x^2 - 7x) + 2(3x - 21)$

$$\dots\dots\dots$$

(2)

ii) Hence solve $6(x^2 - 7x) + 2(3x - 21) = 0$

$$x = \dots\dots\dots \text{ and } \dots\dots\dots$$

(2)

c) Expand $(2x^2y^3)^4$

..... (2)

d) Factorise $y^2 - 1$

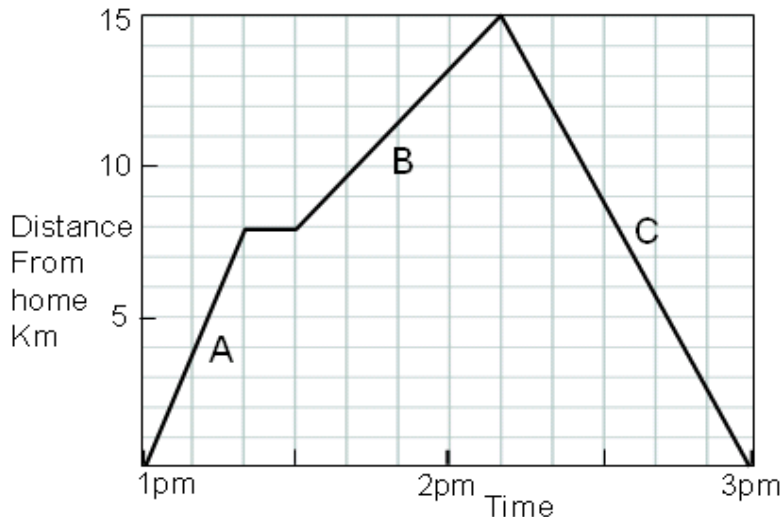
..... (2)

11. a) Sylvia paid £4000 for a car which depreciates by 15% each year.
Calculate what the car is worth at the end of two years.

£..... (2)

12. Chantelle went for a ride on her BMX bike.

The distance-time graph shows how far away from home she was at different times.



a) Chantelle stopped on her ride.

i) What was the time when she stopped.
Give your answer in terms of the 24 hour clock

..... (1)

ii) How long did she stop for?

..... (1)

b) Calculate her speed for the different parts of her ride labelled A , B and C

Akm/hr

Bkm/hr

Ckm/hr

(3)

13. A line has the equation

$$y = 2x - 1$$

What is the gradient of the line that is perpendicular to this line

..... (1)

14. a) What is 0.0053 in standard form.

..... (1)

b) What is 7.563×10^6 as an ordinary number

..... (1)

c) Light travels at a speed of 3×10^8 metres per second

Assuming that there are 365 days in a year calculate how far light travels in one year.
Give your answer in standard form in kilometres

km..... (4)

15. A flag pole P is 4.6 m West of a scout hut H
A camp fire F, is 7.5m North of the flag pole P.

a) Calculate the bearing of the scout hut from the camp fire to 2 significant figures.

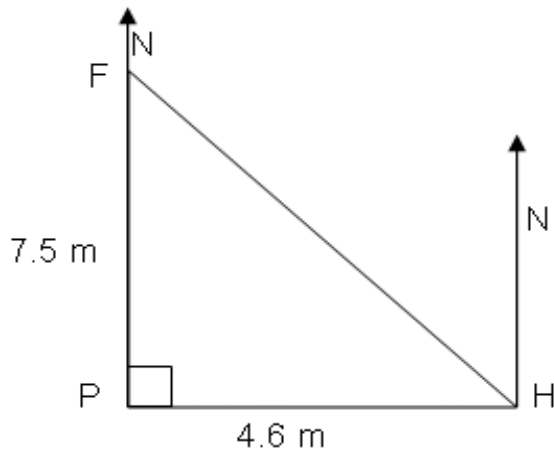


Diagram not drawn accurately

.....⁰ (3)

16.

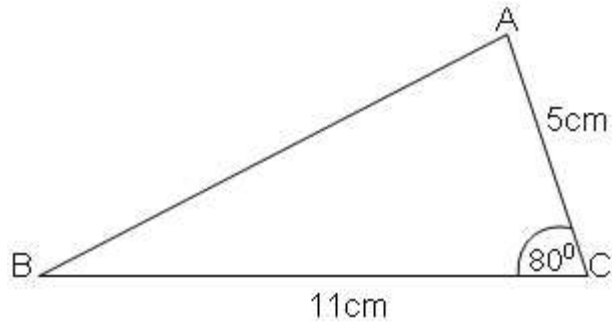


Diagram **NOT**
drawn accurately

ABC is a triangle.
 $BC = 11 \text{ cm}$
 $AC = 5 \text{ cm}$
Angle $ACB = 80^\circ$

Calculate the area of the triangle.
Give your answer correct to 3 significant figures.

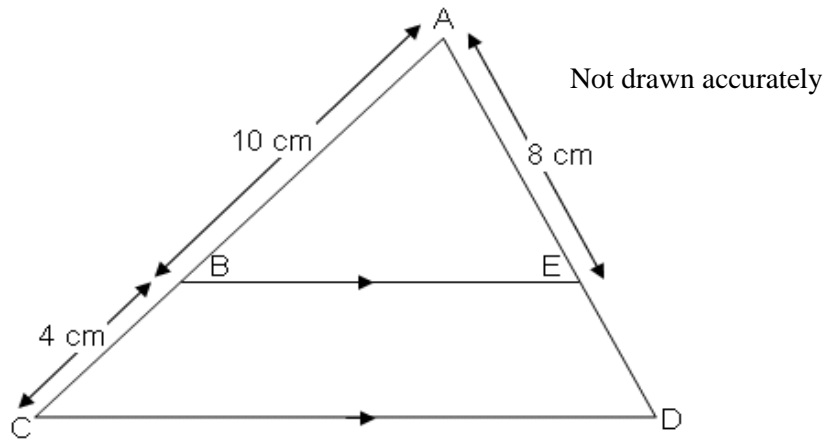
..... cm^2 (3)

17. Lewis Hamilton drove 378 kilometres in 2 hours 15 minutes.

Calculate his average speed in km/h.

.....km/h (2)

18.



CD is parallel to BE
AB = 10cm, BC = 4cm, AE=8cm

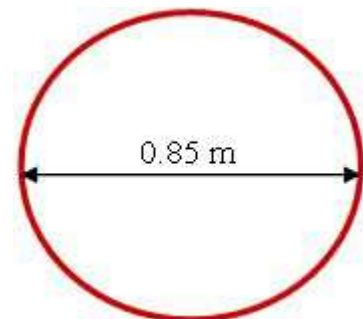
a) Calculate the length of ED

.....cm (2)

19. The diameter of a hula hoop is 0.85 m

a) Calculate the circumference of the Hula Hoop
Give your answer to 2 decimal places.

Diagram not drawn accurately



.....m (2)

20. There are 1200 pupils at St Georges Upper School.
The table shows information about the pupils.

Year	Boys	Girls
Year 7	187	200
Year 8	196	215
Year 9	195	207

Some students are carrying out a survey of pupils.
They use a stratified sample of 100 pupils.

- a) Calculate how many girls should be sampled

- b) Calculate the number of boys in year 8 to be sampled.

..... (2)

- c) How many more year 9 girls than year 9 boys are in the stratified sample

..... (2)

..... (2)

21. Gaynor carries bags of carrots in her van.



The van has a sign that says “maximum load 1200 kg.
Each bag of carrots weighs 30 kg.

Gaynor needs to keep within the safety weight limits of her van and she assumes that

1200kg is correct to the nearest 100kg
and 30kg is correct to 1 significant figure

a) What is the lower bound for the load of the van

.....

(1)

b) What is the upper bound for a bag of carrots.

.....

(1)

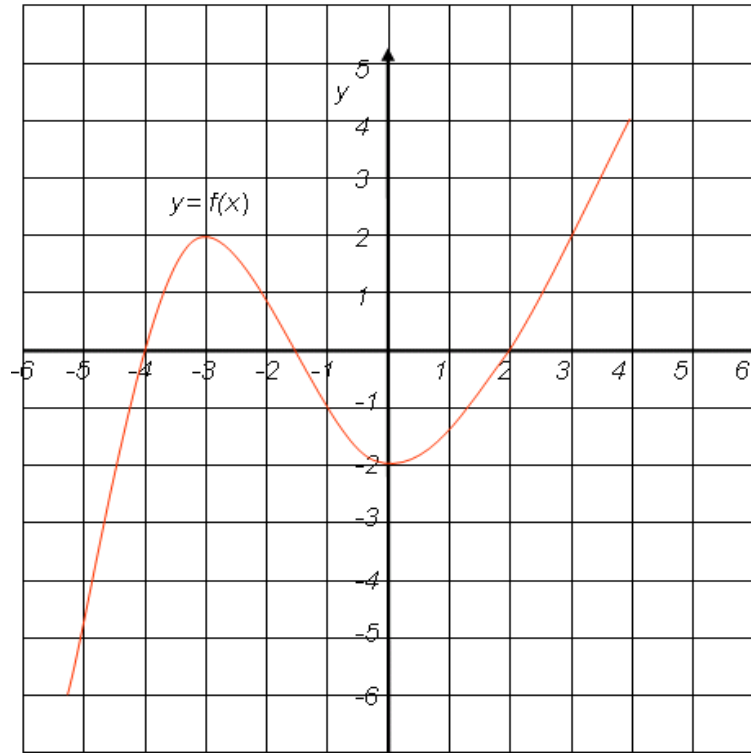
c) Hence calculate the greatest number of bags of potatoes that Gaynor can
safely put into her van if her assumptions are correct.

.....

(3)

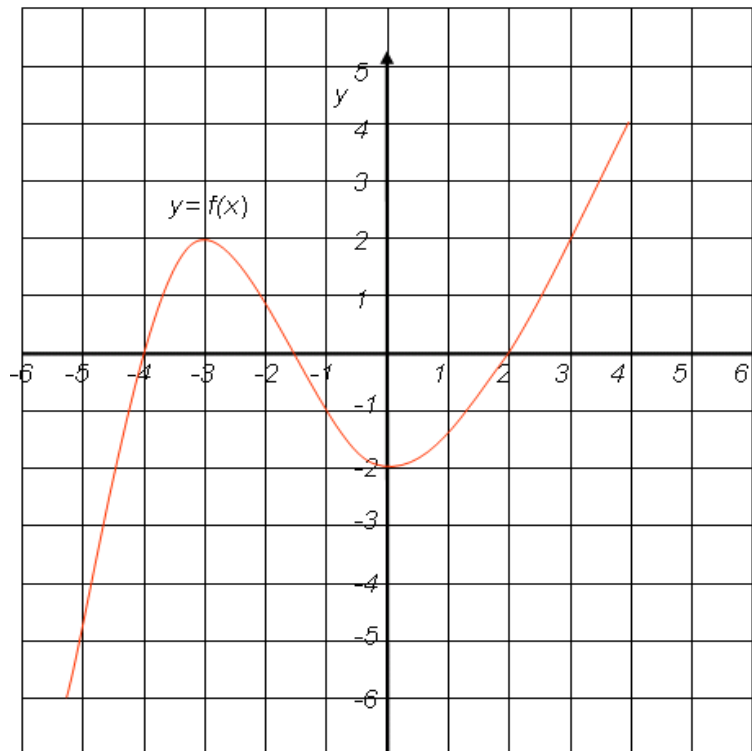
22. The graph of $y = f(x)$ is shown on the grids.

a) On this grid, sketch the graph of $y = f(2x)$



(2)

b) On this grid, sketch the graph of $y = -f(x)$



(2)

23.

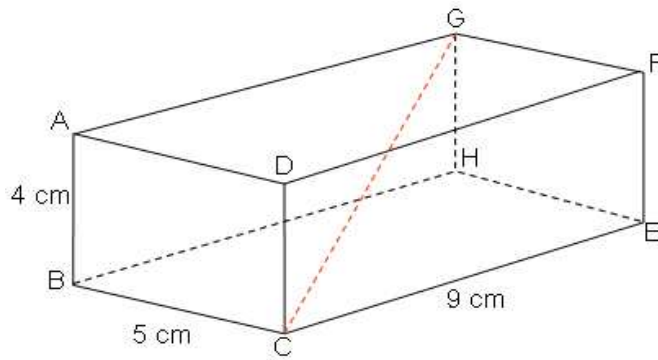


Diagram **NOT** accurately drawn

A cuboid ABCDEFGH is shown with

$$AB = 4 \text{ cm.}$$

$$BC = 5 \text{ cm.}$$

$$CE = 9 \text{ cm.}$$

- a) Calculate the length of CG.
Give your answer correct to 3 significant figures.

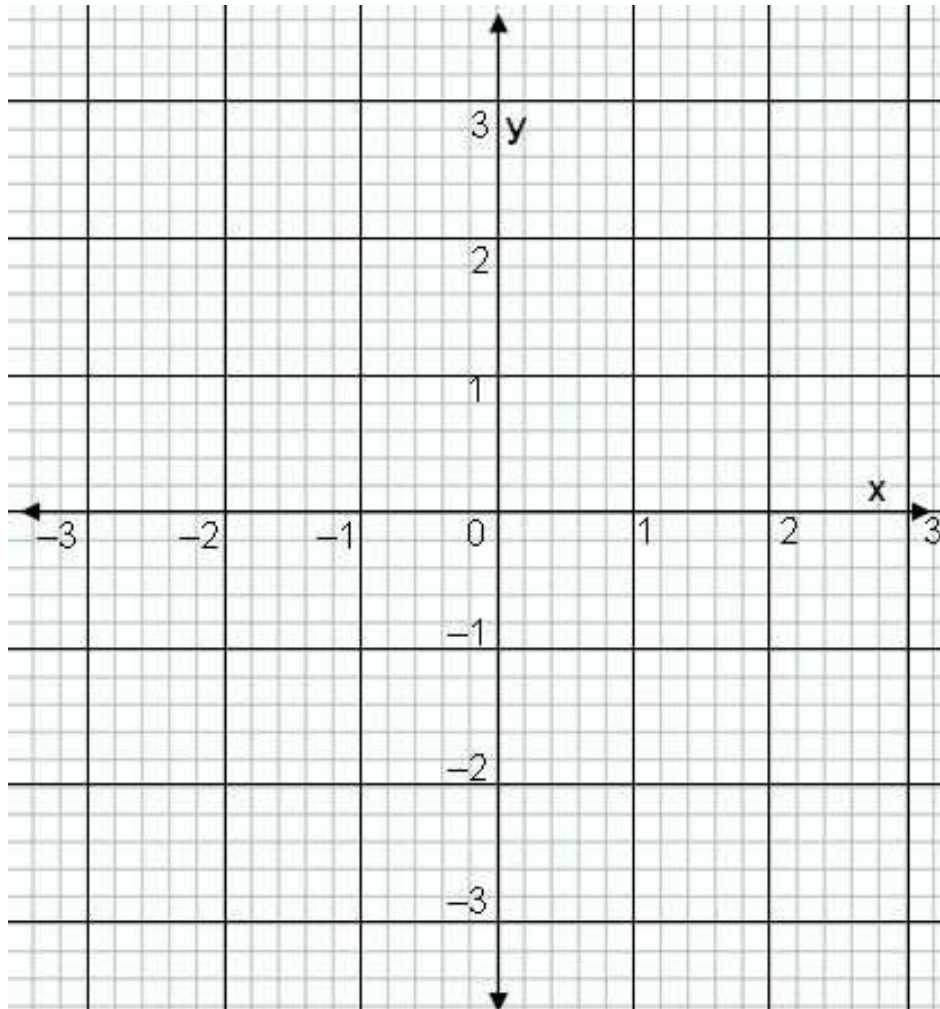
..... cm (3)

- b) Calculate the size of the angle between CG and the face BCEH.
Give your answer correct to 1 decimal place.

.....° (2)

24. Draw the graphs for these simultaneous equations and use them to find the solutions

$$x^2 + y^2 = 9$$
$$y = \frac{1}{2}x - 2$$



x..... and

y.....and

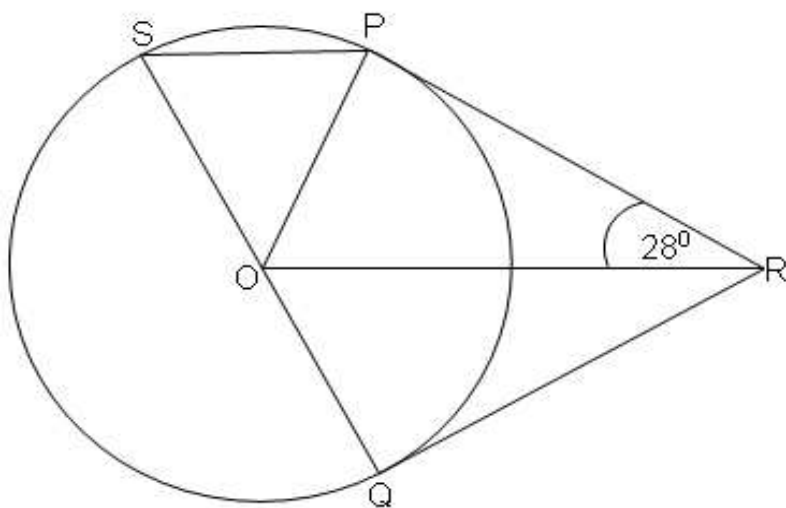
(3)

25. Two tangents meet a circle centre O at P and Q.

SQ is the diameter of the circle.

Angle ORP = 28°

Work out the value of angle SPO



Not drawn to scale

SPO⁰

Explain how you got your answer

.....

.....

(3)