

First Name	
Last Name	
Date	
Total Marks	/ 100 marks

MathsMadeEasy

GCSE Mathematics

Calculator Higher Tier

Free Practice Set 1

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

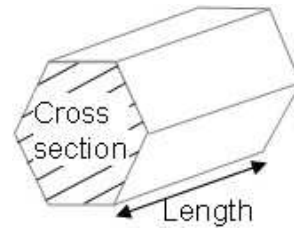
Don't spend too long on one question
Show all your working in calculations for full marks
You will get marks for method even if your answer is incorrect
Leave a question until later if you cannot answer it

Materials needed for examination

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

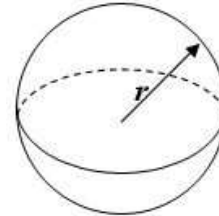
Formulae sheet — Higher tier

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



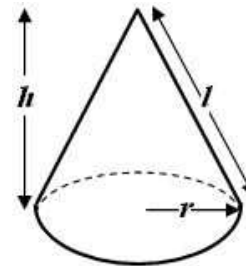
Volume of sphere = $\frac{4}{3} \pi r^3$

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



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

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

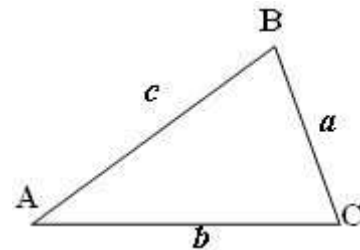


In any triangle ABC

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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Question	Type of question	Marks
1	Probability	3
2	Co-ordinates, area Δ	3
3	Algebra – simplify, expand, solve, quadratic	13
4	Conversion	3
5	Circle Theorem/ Pythagoras	5
6	Money Calculation	3
7	Compound interest	3
8	% sale price	3
9	Pie Chart	2
10	Using Calculator	3
11	Equation of line, perpendicular	4
12	Algebra - areas	4
13	Translation, enlargement	4
14	Trigonometry	3
15	% change	3
16	Indices	5
17	Standard Form	3
18	Simultaneous equations	4
19	Stratified sampling	3
20	Surds	3
21	Volume, surface area complex shape	5
22	Quadratic equation	3
23	Cosine/sine rule, area triangle	8
24	Bounds	3
25	Histogram	4

Answer ALL questions.
Write your answers in the spaces provided.

You must write down all stages in your working.

- 1.** Nadine used two five sided spinners for a game.
 He added the scores on both spinners to get a total score

- a)** Complete the table showing all the total score combinations.
 The first one has been done for you.

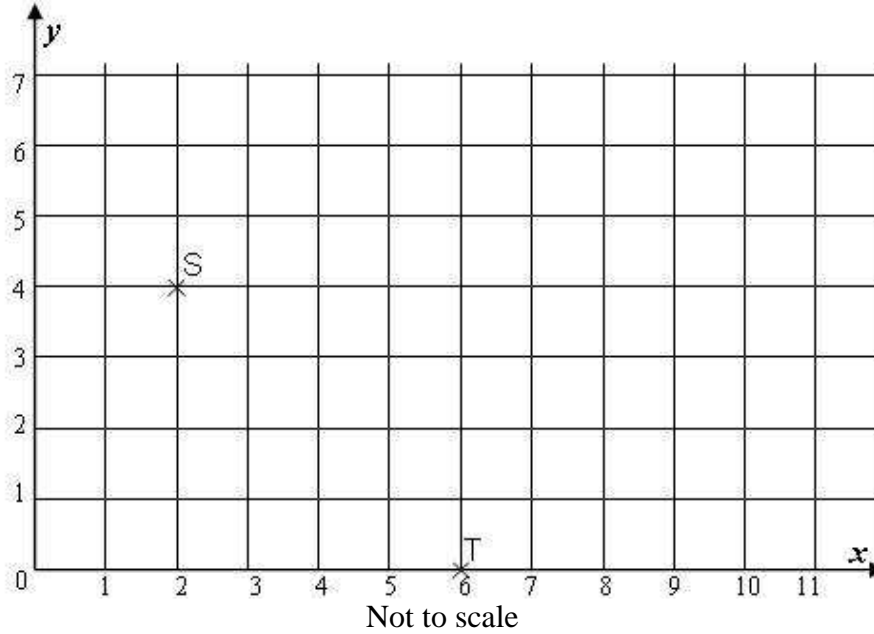
	1	2	3	4	5
1	2				
2					
3					
4					
5					

(1)

- b)** What is the probability of getting a total score of 7 or more from the spinners?

.....
(2)

2. Points S and T are shown on the centimetre square grid below



a) Mark with a cross and label the point U at the co-ordinates (10, 4) (1)

b) What is the area of the triangle made by connecting the points S, T and U?

.....cm²
(2)

3. a) Factorise $3t - 12$

.....
(1)

b) Expand $4z(z - 3)$

.....
(1)

c) Expand and Simplify $(y + 5)(y + 4)$

.....
(2)

d) Solve $5(4x - 4) = 5(2x + 9)$

.....
(2)

e) Make z the subject of the formula

$$2x = 4z + 3y$$

.....
(2)

f) Solve $3 - 2y = 1 + y$

$y =$
(2)

g) Simplify Fully

$$\frac{y^2 - 4}{y + 2} \times \frac{4}{y - 4}$$

.....
(3)

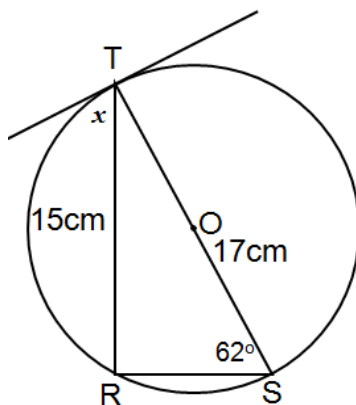
4. a) Jenny changed £200 into Australian dollars (Aus\$)
The exchange rate was £1 = Aus\$2.45
How many Australian dollars did she get

Aus\$.....
(2)

- b) What is 3 m^3 in cm^3 ?

..... cm^3
(1)

5. Three points R, S and T lie on the circumference of the circle centre O.
 A tangent meets the circle at T.
 TS is the diameter of the circle.
 Angle RST = 62°



TR = 15 cm and TS = 17cm

- a) Work out angle x°

.....⁰
 (2)

- b) Work out the length of side RS to 1 significant figure.

.....cm
 (3)

6. For her wedding, Laura bought 8 birdcages and 6 metres of material.
The total cost was £109.98.
Each birdcage cost £8.79.
Find the cost of each metre of material.



£.....
(3)

7. A bank pays 5.6% **compound** interest per year on an investment of £6000.
What is the value of your investment after two years?

£.....
(3)

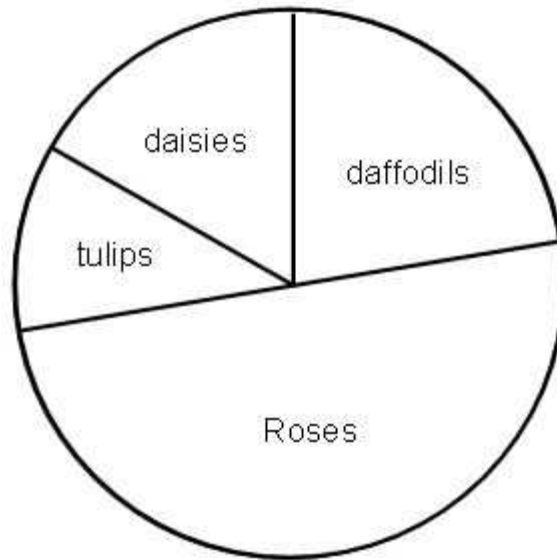
8. Jane paid £126 for a coat in a sale with 25% off the original price. How much was the coat originally?

Sale
25% off original price

.....
(3)

9. A survey of 90 people's favourite flowers for Valentine's Day is shown in the accurate pie chart

Diagram **accurately**
drawn



Use the pie chart to complete the table.

Favourite flower	Frequency	Angle
Roses	45	180°
Tulip		
Daffodil	20	
Daisy		
Total	90	

(2)

10. What is

a) $\sqrt{(4.5 + 7.8)}$ to 2 decimal places

.....
(1)

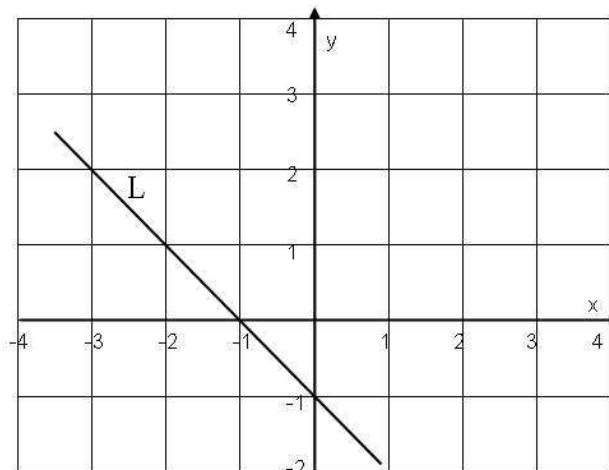
b) πr^2 when $r = 3.25$ to 1 decimal place

.....
(1)

c) $\frac{1}{0.25^2}$

..... (1)

11.



a) A line L is shown on the grid above.

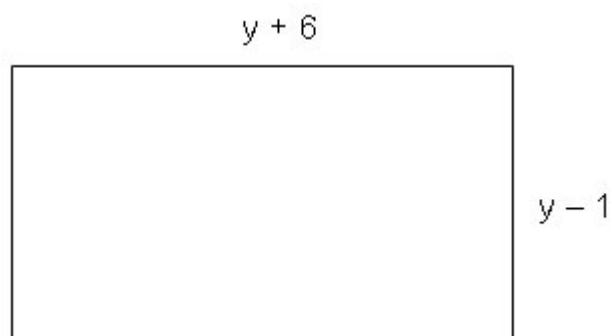
What is the equation of line L?

.....
(2)

b) What is the equation of a line that is perpendicular to L and passes through (0,2)

.....
(2)

12.



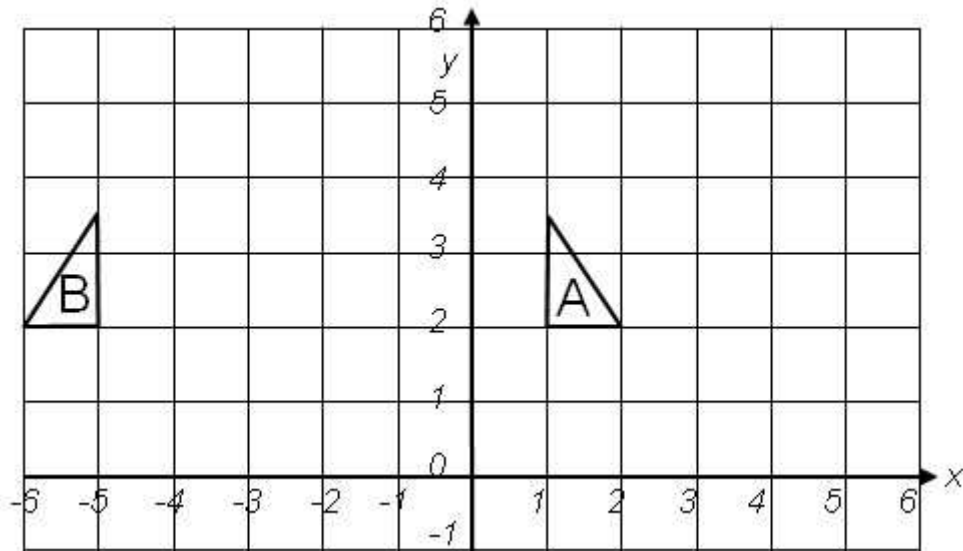
a) Show that the area A of the rectangle above is $y^2 + 5y - 6$

.....
(2)

b) The area is 78 cm^2 . Work out the value for y .

.....
(2)

13.



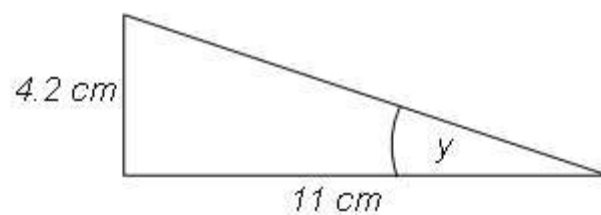
a) What is the single transformation that maps shape A onto shape B

.....
 (2)

b) Enlarge shape A with scale factor 2 and centre of enlargement (0,1)
 Label the new shape C

(2)

14.



What is the size of angle y in this triangle
 Give your answer to 3 significant figures.

.....⁰
 (3)

15. Over a six month period in 2008, the average monthly value of the FTSE on the London stock exchange changed as shown below:

May	June	July	August	September	October
6200	6000	5550	5300	5600	4000

- a) In which month did the trend reverse?

.....
(1)

- b) What was the percentage decrease to 1 decimal place between May and October?

.....%
(2)

16.

- a) Simplify $y^9 \times y^3$

.....
(1)

- b) Simplify $(y^6)^3$

.....
(1)

- c) Simplify $(4x^2)^{-1/2}$

.....
(2)

- d) Simplify $y^9 \div y^3$

.....
(1)

- e) Express in standard form 0.000056

.....
(1)

17. The mass of the planet Venus is 4.869×10^{24} kg

The mass of the Sun is 408 000 times the mass of Venus.

Work out the mass of the Sun.

Give your answer in standard form correct to 3 significant figures.

18. a) At a car boot sale, Matthew buys CDs and DVDs. He buys x CDs and y DVDs. In total he buys 23 items. The CDs costs 50p each and the DVDs costs 65p each. Altogether he spends £13.15. (3)

State this information as a pair of simultaneous equations

..... (2)

b) Solve these simultaneous equations algebraically to find out how many CDs and DVDs he buys.

CD =
DVD =
(2)

19. A sixth form has the following numbers of students

Years and gender	Number
Year 12 boys	195
Year 12 girls	210
Year 13 boys	105
Year 13 girls	145

The head of sixth form wants to take a sample, stratified by each group of the members of the sixth form.

The sample size is 50

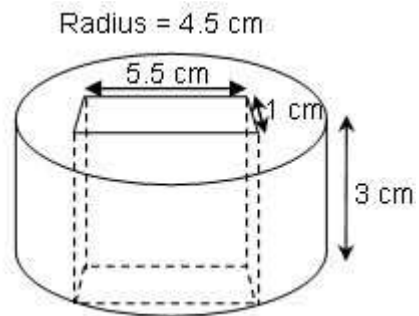
Work out the number of **male** students that should be in the sample.

.....
(3)

20. Express $\frac{5}{2 - \sqrt{3}}$ in the form $a + b\sqrt{3}$

.....
(3)

21. A shape is made from a cylinder of radius 4.5 cm and height 3 cm with a cuboid measuring 5.5cm wide and 1 cm deep cut out of the centre .



- a) Work out the volume of the shape to 2 decimal places

- b) Work out the surface area of the shape to 3 significant figures.

.....
(2)

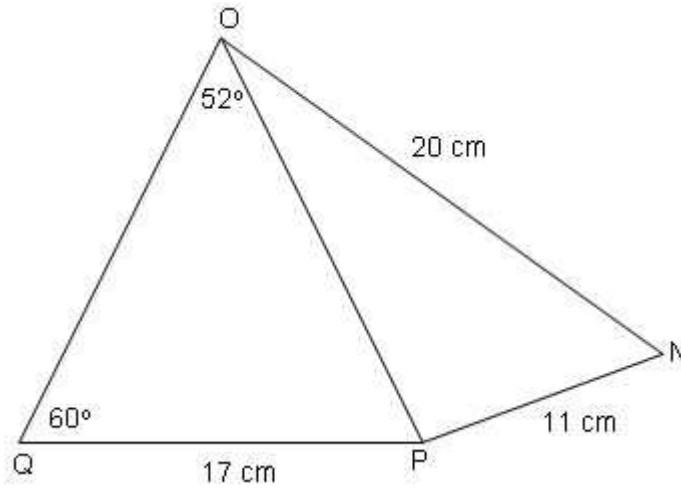
.....
(3)

22. Solve $y^2 + 6y - 50 = 0$

Give your answer correct to 3 significant figures.

.....
(3)

23. In the diagram below, angle $QOP = 52^\circ$ and angle $OQP = 60^\circ$.
 $PN = 11$ cm, $ON = 20$ cm and $QP = 17$ cm.



- a) Find the length of OP correct to one decimal place

.....cm
(2)

- b) Find the angle ONP correct to one decimal place

.....^o
(3)

- c) Calculate the area of the triangle NOP
 Give your answer correct to three significant figures.

.....cm²
(3)

24. Jane recorded how long it took her to jog to school.
She jogged a distance of 945 m, correct to the nearest 1m, in a time of 400 seconds correct to the nearest 10 seconds.

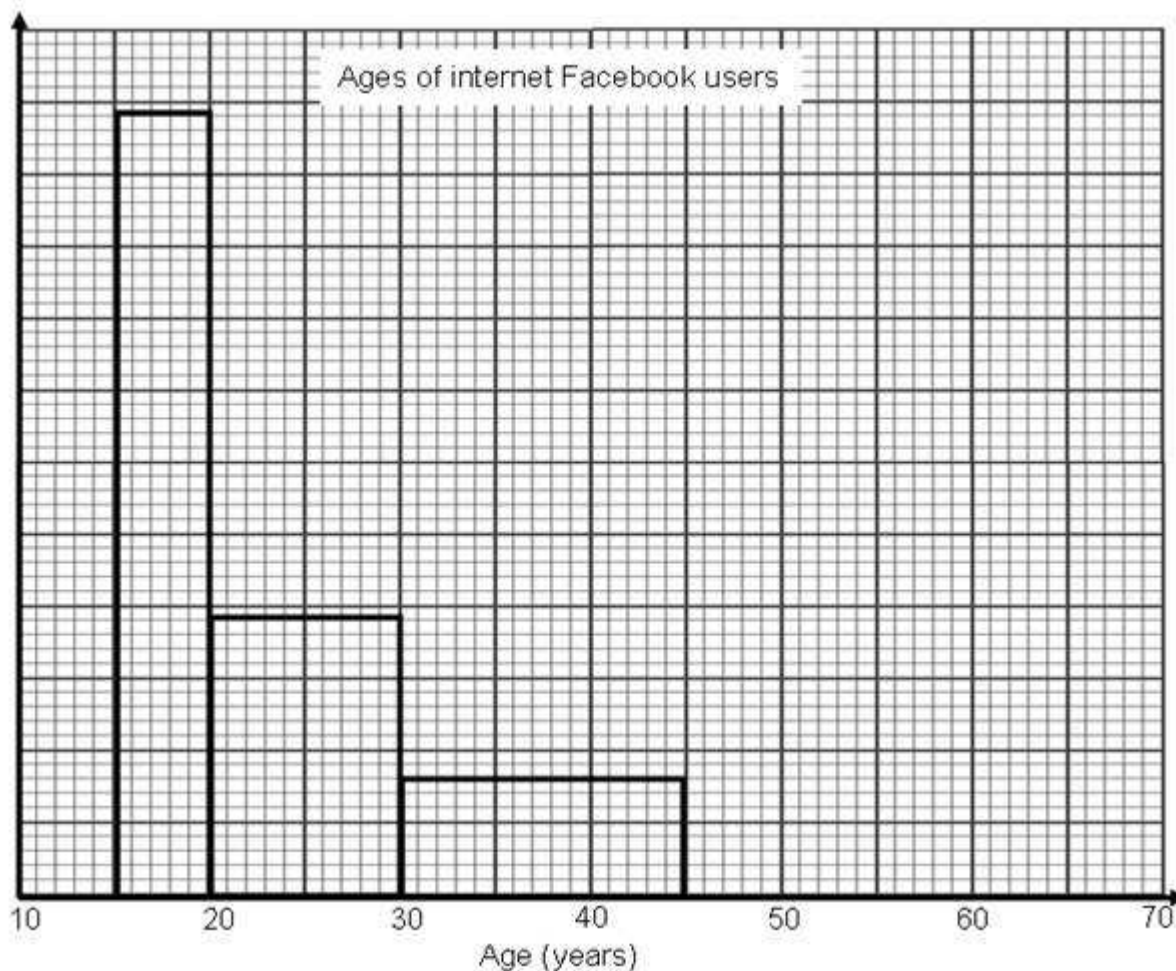
a) For the distance she jogged what is the upper bound?

.....m
(1)

b) Calculate her maximum possible average speed, in metres per minute.
Write down all the figures on your calculator display

.....metres/min
(2)

25. The table and histogram show information about the age of internet Facebook users



a) Use the histogram to complete the table (2)

Age (t years)	Frequency
$10 < t \leq 15$	24
$15 < t \leq 20$	27
$20 < t \leq 30$	
$30 < t \leq 45$	
$45 < t \leq 70$	5

b) Use the table to complete the histogram (2)

TOTAL FOR PAPER: 100 MARKS
END