Name:

GCSE Higher
Set A
Calculator Paper

Corbettmaths

Equipment

1. A blue or black ink ball-point pen.
2. A pencil.
3. An eraser.
4. A ruler.
5. A pair of compasses.
6. A protractor.
7. A calculator

Guidance

1. Read each question carefully before you begin answering it.
2. Don't spend too long on one question.
3. Attempt every question.
4. Check your answers seem right.
5. Always show your workings

Information

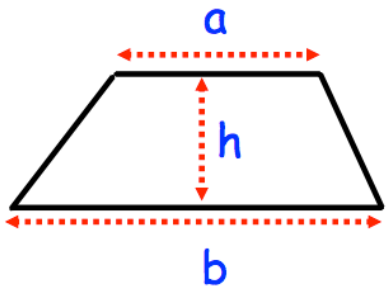
1. The maximum mark for this paper is 100.
2. The marks for questions are shown in brackets
3. You may ask for more lined, graph or tracing paper.

Question	Mark	Available
1		4
2		2
3		3
4		3
5		2
6		6
7		4
8		4
9		2
10		3
11		4
12		4
13		2
14		6
15		4
16		6
17		3
18		3
19		6
20		3
21		2
22		3
23		3
24		4
25		3
26		3
27		3
28		5
Total		100

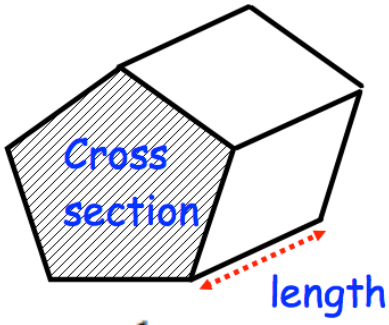
Corbettmaths

Formulae: Higher Tier

Area of a Trapezium = ½(a + b)h

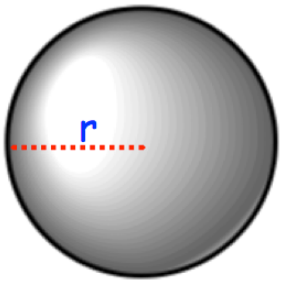


Volume of a prism = area of cross section x length



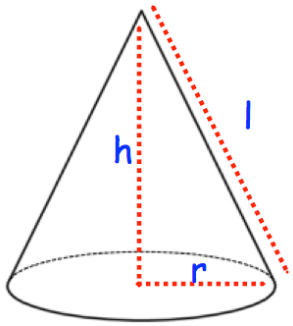
Volume of a sphere = $\frac{4}{3}\pi r^3$

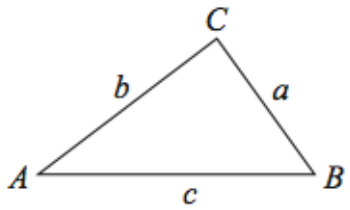
Surface area of a sphere = $4\pi r^2$



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

Curved surface area of a cone = πrl





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 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

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

1. Sophie went to Spain.
She changed £225 into euros (€).

The exchange rate was £1 = €1.62

(a) Change £225 into euros (€).

€.....
(2)

On her return to England, Sophie changed €66 into pounds (£)

The new exchange rate was £1 = €1.50

(a) Change €66 into pounds (£).

£.....
(2)

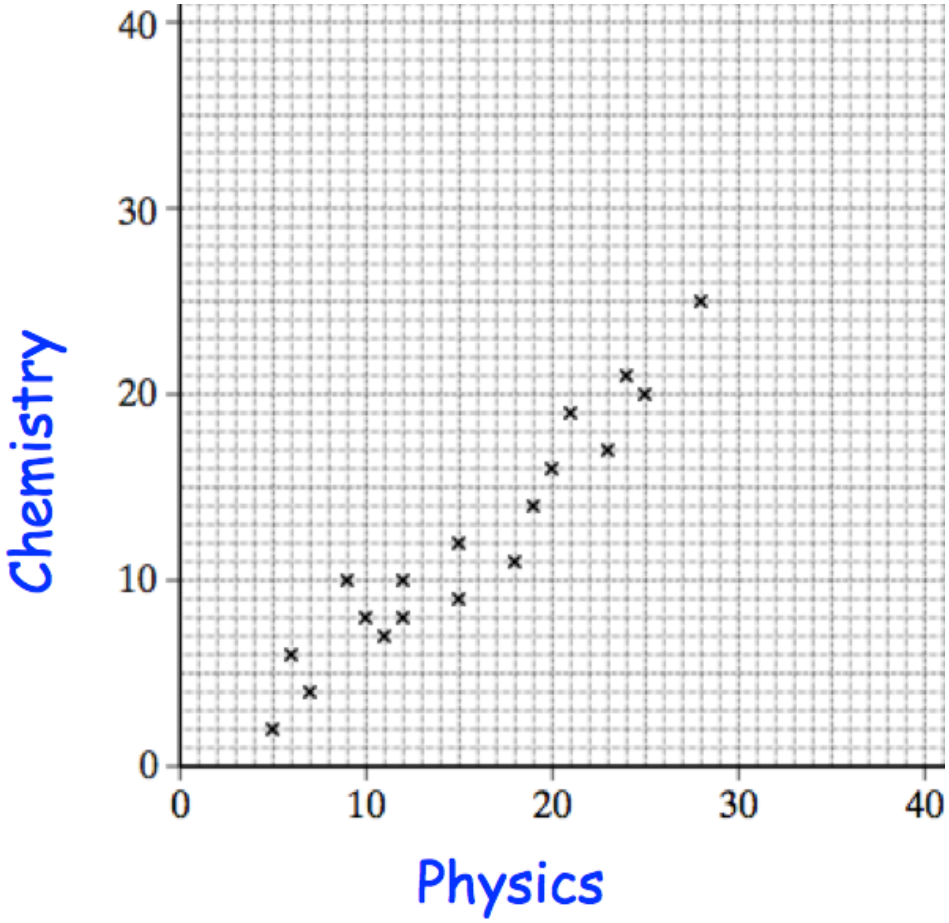
---

2. The nth term of a number sequence is $n^3 + 3$

Write down the first four terms of the sequence.

.....
(2)

3. Students sit a chemistry test and a physics test.
The results are shown in the scatter graph below.



(a) What type of correlation does the scatter graph show?

.....

(1)

Megan missed the chemistry test. She scored 17 in the physics test.

(b) Use a line of best fit to estimate Megan's score in the chemistry test.

.....

(1)

(c) Explain why it would not be sensible to use the line of best fit to estimate the physics score for a student who scored 35 in chemistry.

.....

.....

(1)

4. Rebecca buys 27 identical ornaments.
The total cost is £171.18

Work out the total cost of 19 of these ornaments.

£.....

(3)

5.

$$\frac{183 + 892}{10.4 \times 8.75}$$

(a) Write down your full calculator display.

.....

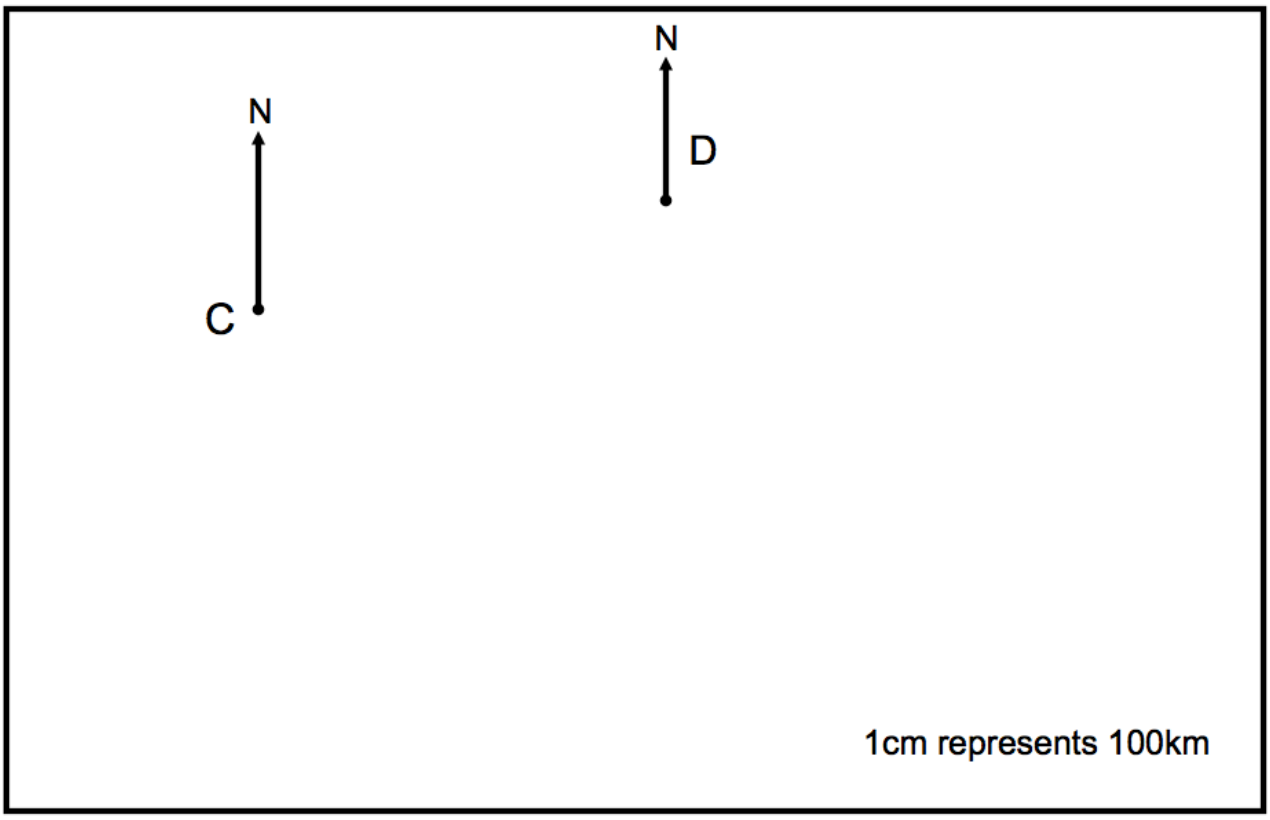
(1)

(b) Write your answer to 3 significant figures.

.....

(1)

6. The diagram shows the position of two cities C and D.



(a) Work out the actual distance of D from C.

.....km
(2)

(b) Find the three figure bearing of D from C.

.....^{0}
(1)

E is South-East of C.

(c) Write down the bearing of E from C.

.....^{0}
(1)

E is also on a bearing of 190^0 from D.

(d) Mark the position of E on the diagram.

(2)

7. At a rugby match, the ratio of children to adults is 2 : 3
There are 80 children in the crowd.
Each adult ticket costs £8
Each child ticket costs a quarter of the adult ticket.

Work out the total money made from ticket sales.

£.....

(4)

8. The equation

$$x^3 + 2x = 50$$

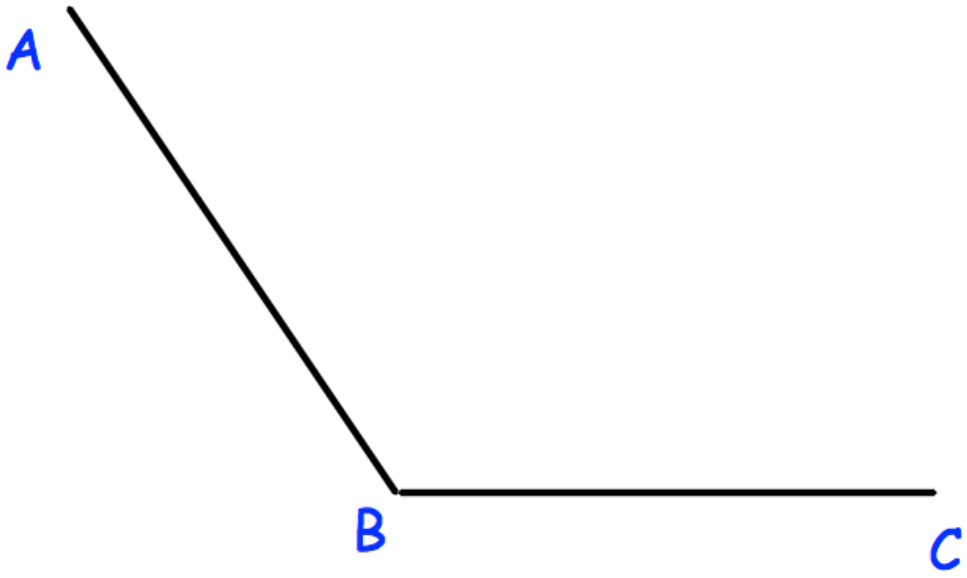
has a solution between 3 and 4.

Use trial and improvement to find this solution.
Give your answer correct to 1 decimal place.
You must show all your working.

x = ...

(4)

9. Using ruler and compasses, construct the bisector of angle ABC.



(2)

10. Prove the sum of three consecutive positive integers is always divisible by 3.

(3)

11. Timothy asked 30 people how long it takes them to get to school.

The table shows some information about his results.

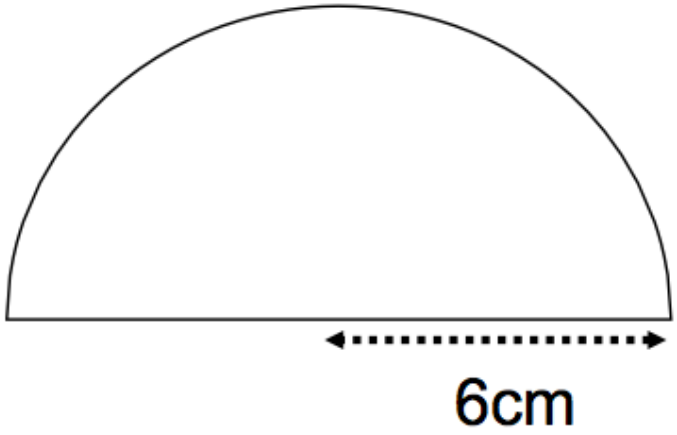
Time (t minutes)	Frequency
$0 < t \leq 10$	2
$10 < t \leq 20$	8
$20 < t \leq 30$	12
$30 < t \leq 40$	7
$40 < t \leq 50$	1

Work out an estimate for the mean time taken.

.....minutes

(4)

12. Shown is a semi-circle.



Work out the perimeter.
State the units for your answer.

.....

(3)

13.

Expand and simplify (w - 2)(w - 7)

.....

(2)

14. (a) Simplify

$$w^3 \times w^{-5}$$

.....

(1)

(b) Simplify

$$a^4 \div a^{-2}$$

.....

(1)

(c) Simplify

$$(2m^4)^3$$

.....

(2)

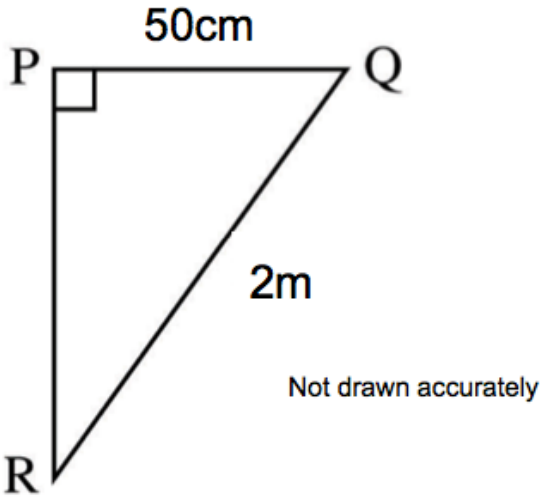
(d) Simplify

$$2a^3c^3 \times 3a^2c$$

.....

(2)

15.



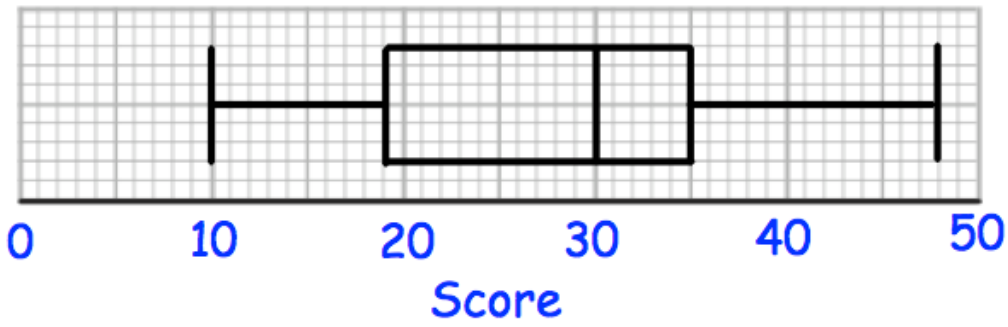
PQR is a right-angled triangle.

PQ is 50cm
QR is 2m

Calculate the length of PR.
Give your answer in metres, correct to 1 decimal place.

..... m
(4)

16. Mrs Davis sets her class a quiz, which has a maximum score of 50.
The distribution of the scores are shown in a box plot below.



(a) Write down the median score.

.....
(1)

(b) Write down the highest score.

.....
(1)

(c) Find the interquartile range.

.....
(2)

Martin scored 35 marks.
(d) What percentage of the class scored a lower mark than Martin?

.....%
(1)

The interquartile range is a better measure of the spread of a distribution than the range.

Explain why.

.....

.....
(1)

17. A radioactive substance decays over time.
Every year its mass decreases by 14%.

How many years will it take for 500kg of the substance to decay to a mass less than 200kg?

.....years

(3)

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18. Declan works in a confectioners.
He is asked to test a sample of 40 chocolates stratified by type of chocolate.
The table shows the number of each type of chocolate in the shop.

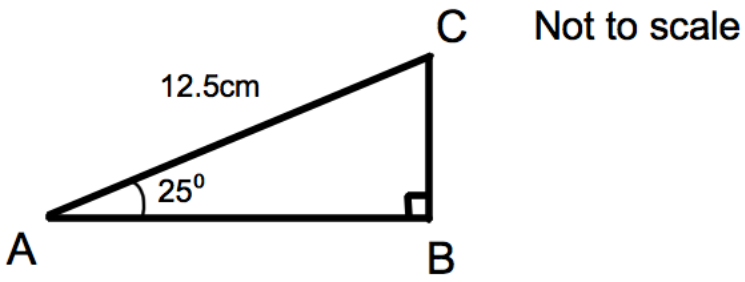
Type	Milk	Dark	White
Number	600	220	130

Calculate the number of dark chocolates required for his stratified sample.

.....

(3)

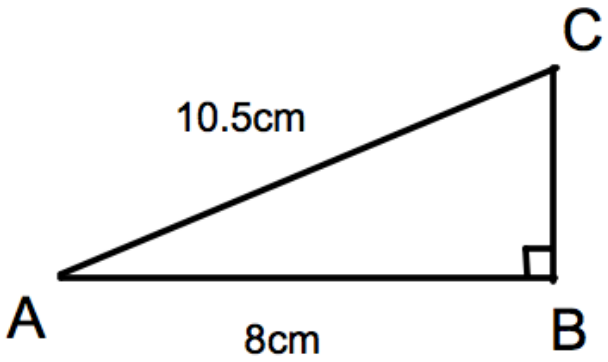
19. (a) Triangle ABC has a right angle.
Angle BAC is 25^0
AC = 12.5cm



Calculate the length of AB

.....cm
(3)

(b) ABC is a right-angled triangle.



Calculate the size of angle ACB.

.....^{0}
(3)

20. Prove $(2n + 3)^2 - (2n - 3)^2$ is always a multiple of 8.

(3)

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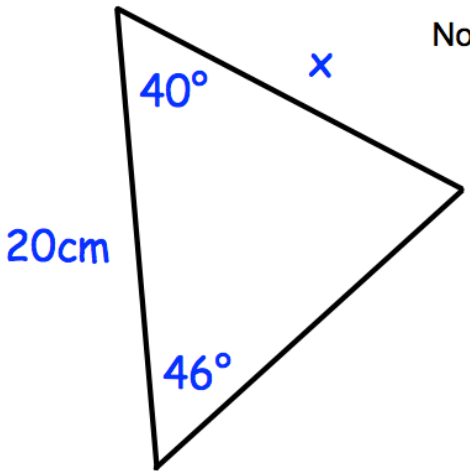
21. Solve $y^2 + 4y - 12 = 0$

.....

(2)

22.



Not drawn is scale.

Find the size of x.

.....cm

(3)

23.

Write $0.\dot{5}7\dot{1}$ as a fraction

You **must** show your method.

.....

(3)

24. David has 12 sweets in a box.

7 of the sweets are chocolates.
3 of the sweets are toffees.
2 of the sweets are mints.

David takes at random two sweets from the bag.

Work out the probability that the sweets will be the same flavour.

.....

(4)

---

25. Simplify fully.

$$\frac{4x^2 - 25}{6x^2 - 11x - 10}$$

.....

(3)

26. Write $x^2 + 10x + 6$ in the form $(x + a)^2 + b$, where a and b are constants.

.....

(3)

---

27. Write the numbers below in the form 2^n

(a) 8

.....

(1)

(b) ¼

.....

(1)

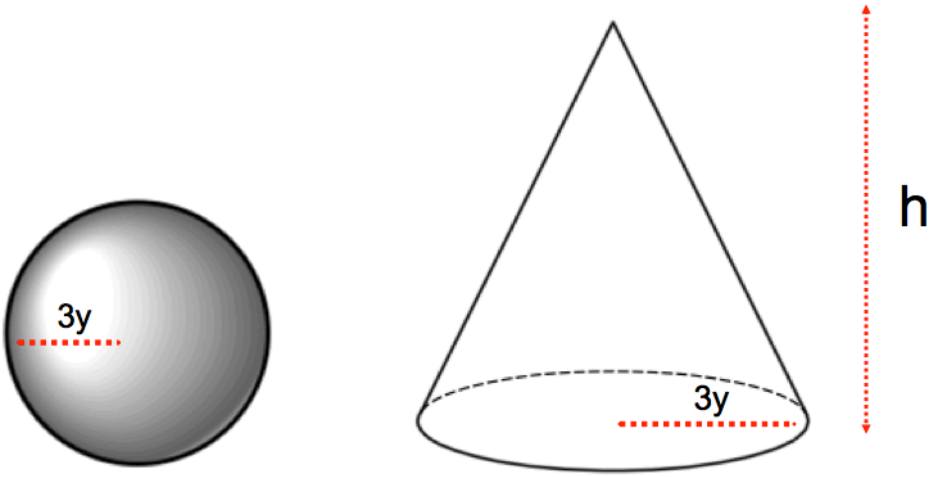
(c) $\sqrt{2}$

.....

(1)

28.

This sphere and cone have the same volume.



Find an expression for h in terms of y.

h = ...

(5)