Name:

GCSE Maths 2022
OCR Higher Paper 4
Set A
Calculator

Corbettmaths

Equipment

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

Guidance

1. Read each question carefully.
2. Check your answers seem right.
3. Always show your workings

Information

1. This paper has been created based on topics in the Advance Information.
2. Also see Corbettmaths for the checklist for the entire GCSE as these topics may still be useful for Paper 4
3. There is one question per topic - this paper is designed to give an opportunity to practice each topic rather than replicate the actual paper.
4. The marks for questions are shown in brackets

GCSE 2022 Resources

1. Use your calculator to work out

$$\frac{\sqrt{39.75 + 24.44}}{0.55 \times \sqrt[3]{1.2 \times 1.9}}$$

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

.....

(2)

(b) Write your answer to (a) correct to 2 significant figures

.....

(1)

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2. Put brackets into the calculation below to make it true.

4 + 3 x 7 − 1 = 42

(1)

3. The number of visitors to some tourist attractions is shown in the table below.

The King's Palace	5.4 million
Castle	923,840
Theme Park	1.43×10^7
Science Museum	4,192,900

(a) Write the number of visitors to the Theme Park as an ordinary number.

.....

(1)

(b) Write the number of visitors to the Castle in standard form.

.....

(1)

(c) How many more people visited the Theme Park than the Science.

.....

(2)

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4. The population of a country at the beginning of 2011 was 4,380,000
Over the next decade, the population increased by 7%

Work out the population at the beginning of 2021

.....

(2)

5. Susan buys an antique for £120 and sells it for £216.

Work out her percentage profit

.....%

(3)

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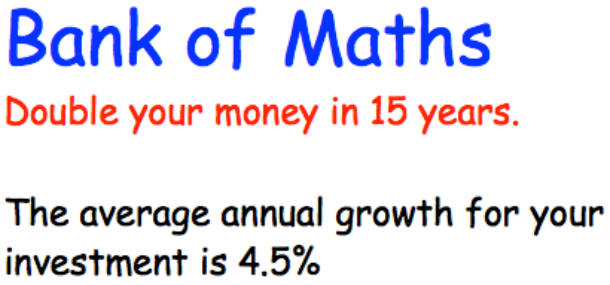
6. Martyn has some money to invest and sees this advert.



Will Martyn double his money in 15 years by investing his money with “Bank of Maths?”

You **must** show your workings.

(3)

7. Lauren is given a 12% pay rise.
Her new salary is £24,080

What was Lauren's salary before the pay rise?

£.....

(3)

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8. Bag A contains 5x coins.
Bag B contains 3x coins.
8 coins are taken from Bag B and put into Bag A
The ratio of coins in Bag A to Bag B is now 11:5

Work out the total number of coins.

.....

(3)

9. The table shows a set of values for x and y.
y is directly proportional the the square root of x.

x	25	
y	9	36

Complete the table

(3)

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10. Miss Jones owns a factory that makes pens.
She has received an order for a large quantity of pens and she knows if she used 8 machines, it would take 72 hours for enough pens to be made.

Miss Jones plans to start making pens at 8am on Monday with 2 machines.
She can start using a third machine at 5pm on Tuesday.
Finally 3 more machines will be free at 10am on Wednesday.

Approximately when will enough pens be made?

.....

(4)

11. Anthony measured the length and width of a rectangle.
He measured the length to be 38cm correct to the nearest centimetre.
He measured the width to be 30cm correct to the nearest 10 centimetres.

Calculate the lower bound for the area of this rectangle.

.....cm²

(2)

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12. Jim picks a five digit odd number.
The second digit is less than 5.
The fourth digit is a positive cube number
The first digit is a prime number.

How many different numbers could he pick?

.....

(3)

13. Write $\frac{4}{11}$ as a percentage.

Give your answer to 2 decimal places.

.....%

(2)

---

14. (a) Expand and simplify $5(3y + 7) – 3(2y – 5)$

.....

(2)

(b) Expand and simplify $(1 - 2x)(x + 3)(x - 1)$

.....

(3)

15. Factorise

(a) $3x^2 + 13x + 4$

.....

(2)

(b) $5x^2 – 13x – 6$

.....

(2)

---

16. Simplify fully

$$\frac{x^3 - x}{x + 2} \div \frac{x^2 - x}{x^2 - 5x - 14}$$

.....

(3)

17. Given that $a = 4$, $b = 9$ and $c = -5$

Work out the value of

$$\frac{ab + 24}{2c}$$

.....

(3)

---

18. (a) Solve $19 - x < \frac{3x + 1}{2}$

.....

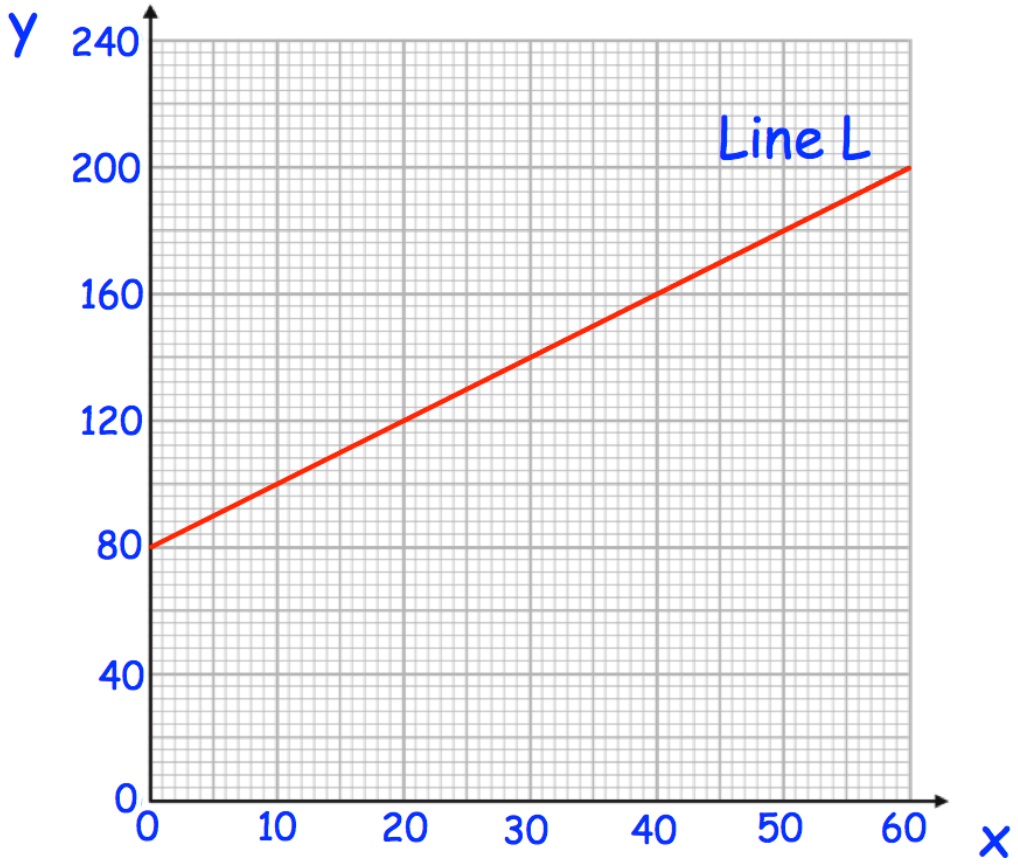
(3)

(b) Solve the inequality $x^2 - x - 30 \geq 0$

.....

(3)

19.



(a) Work out the gradient of Line L.

.....

(2)

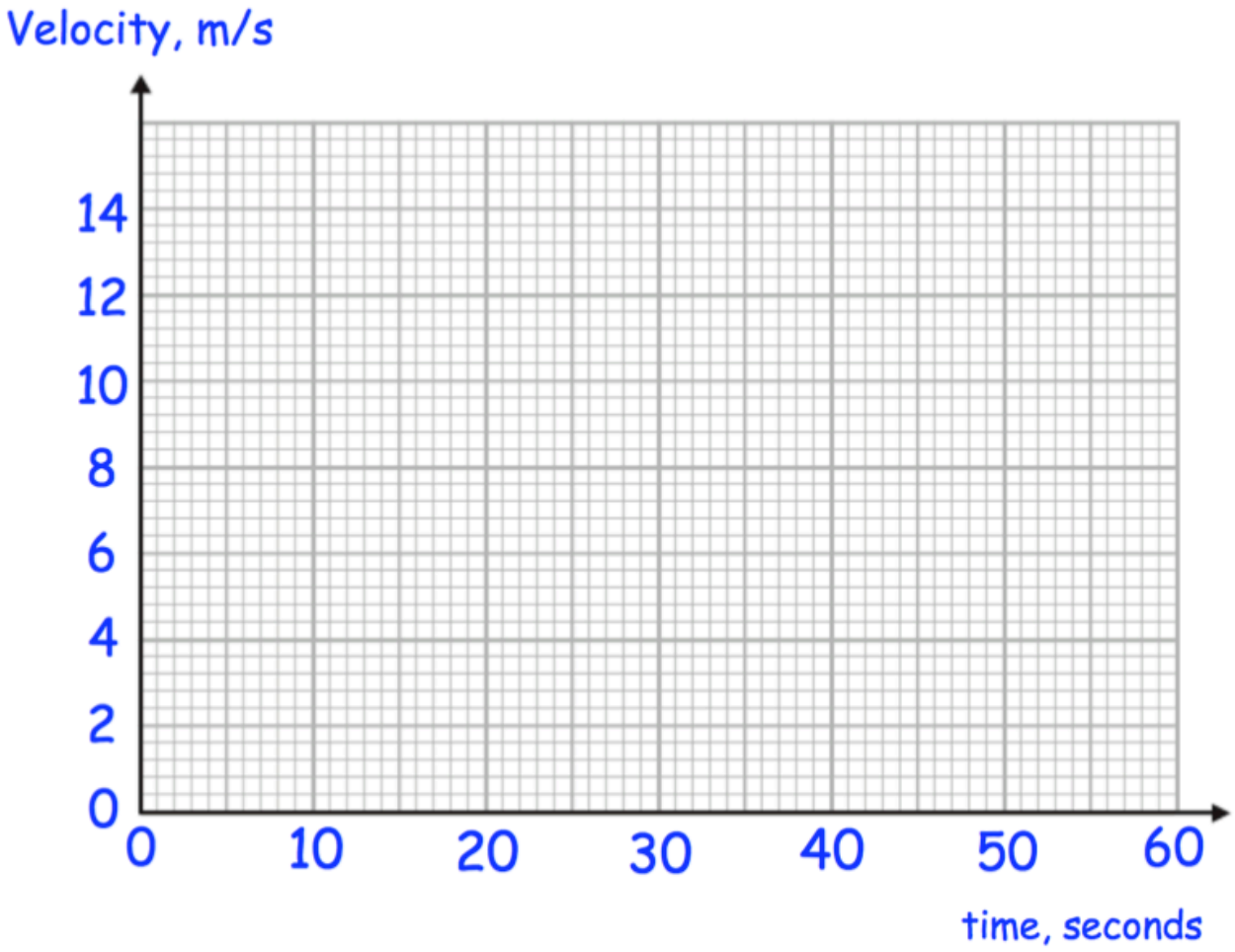
(b) Work out the equation of Line L.

.....

(2)

20. A remote control car drives in a straight line.
It starts from rest and travels with constant acceleration for 15 seconds reaching a velocity of 10m/s.
It then travels at a constant speed for 5 seconds.
It then slows down with constant deceleration of 0.5m/s^2.

(a) Draw a velocity time graph

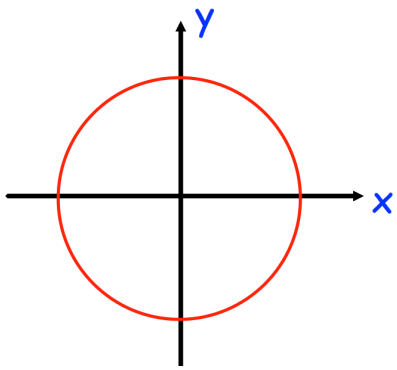


(b) Using your velocity-time graph, work out the total distance travelled.

……..m
(2)

21. The circle shown has $x^2 + y^2 = 42.25$

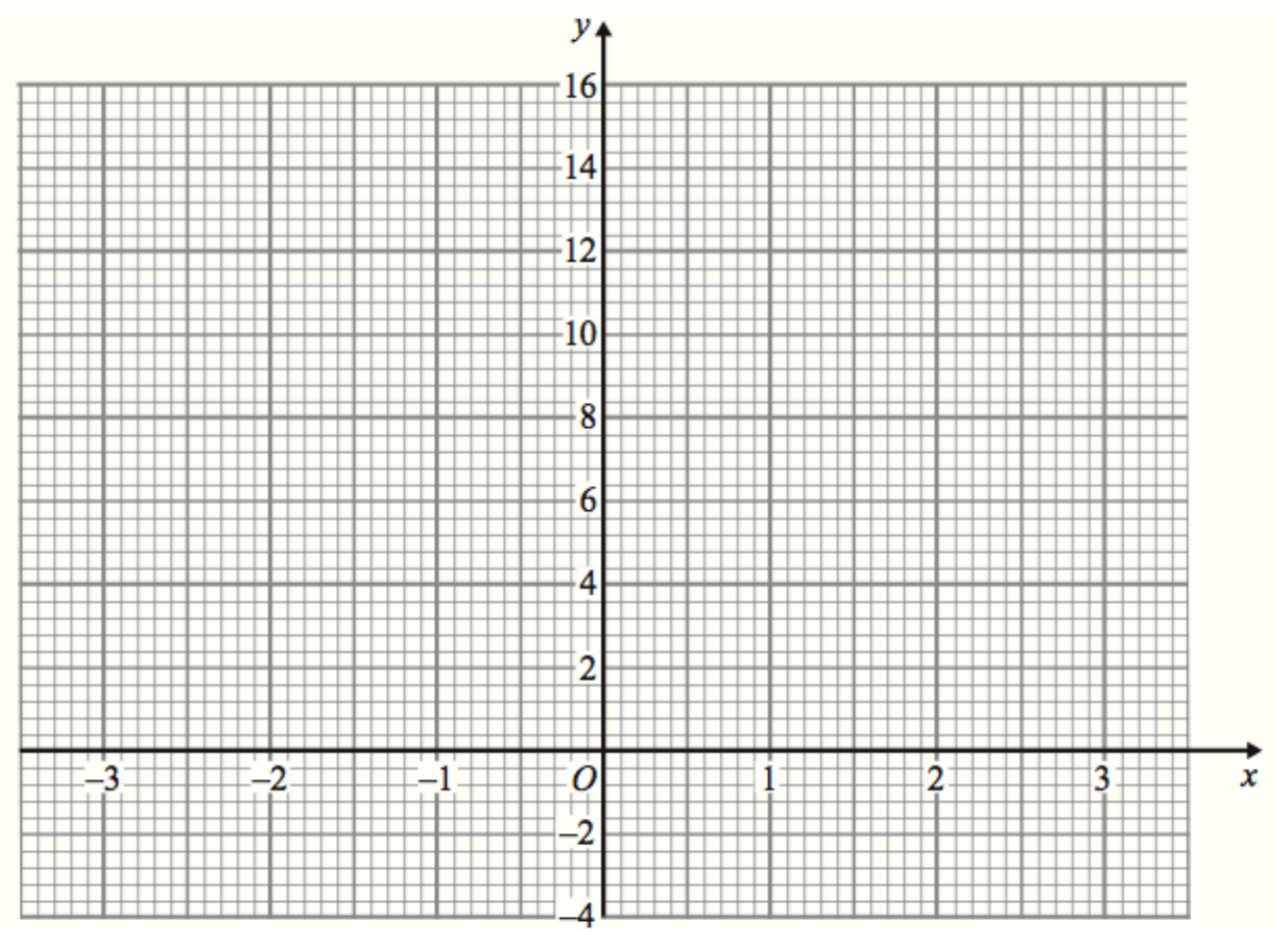
Find the circumference of the circle.
Give your answer in terms of π



.....

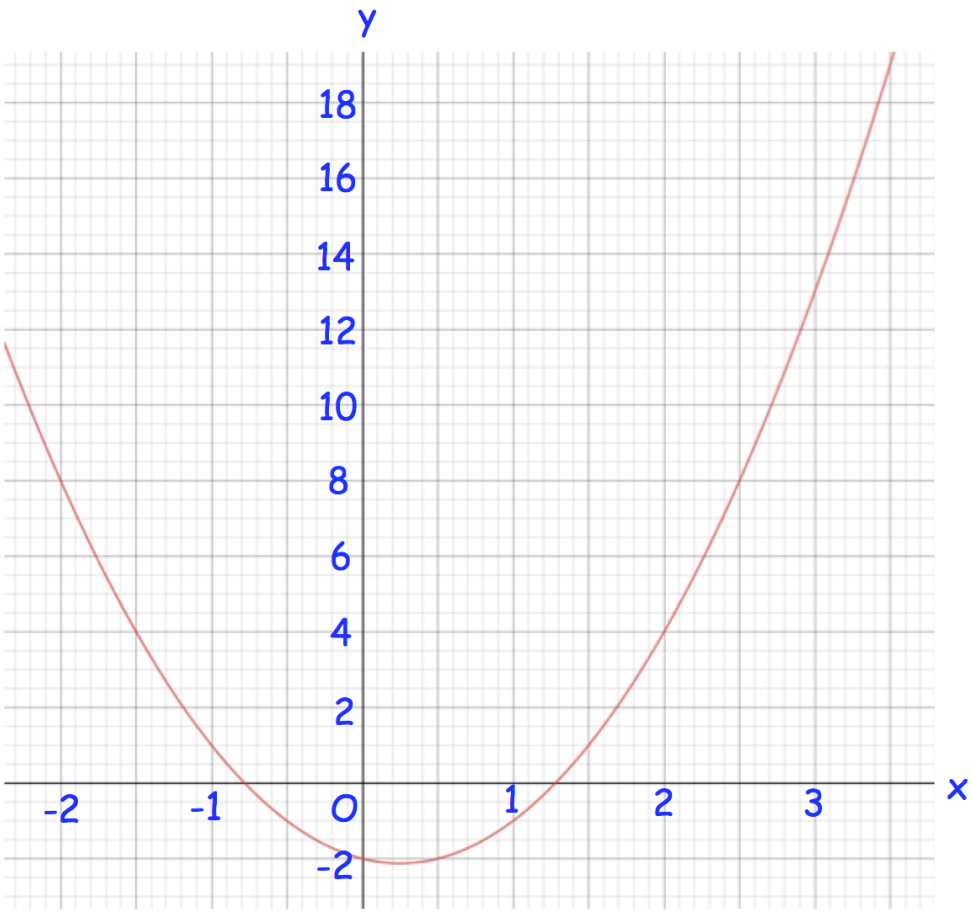
(2)

22. Draw the graph of $y = x^2 + 2x + 1$



(2)

23. Shown below is $y = 2x^2 - x - 2$

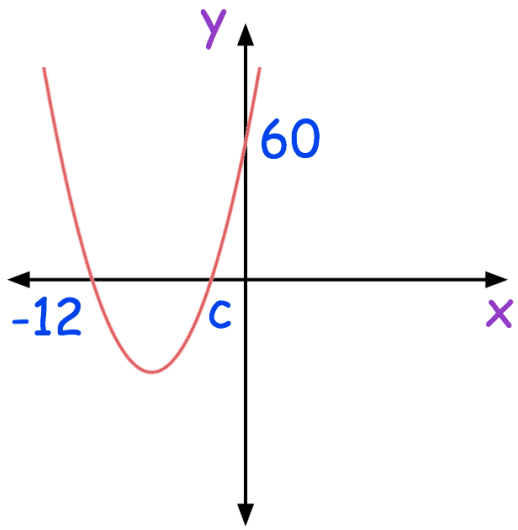


By drawing an appropriate straight line, use your graph to find estimates for the solutions of $2x^2 - 4x - 3 = 0$

.....

(4)

24. Shown is the graph of $y = x^2 + ax + b$



Find the values of a, b and c.

a = ...

b = ...

c = ...

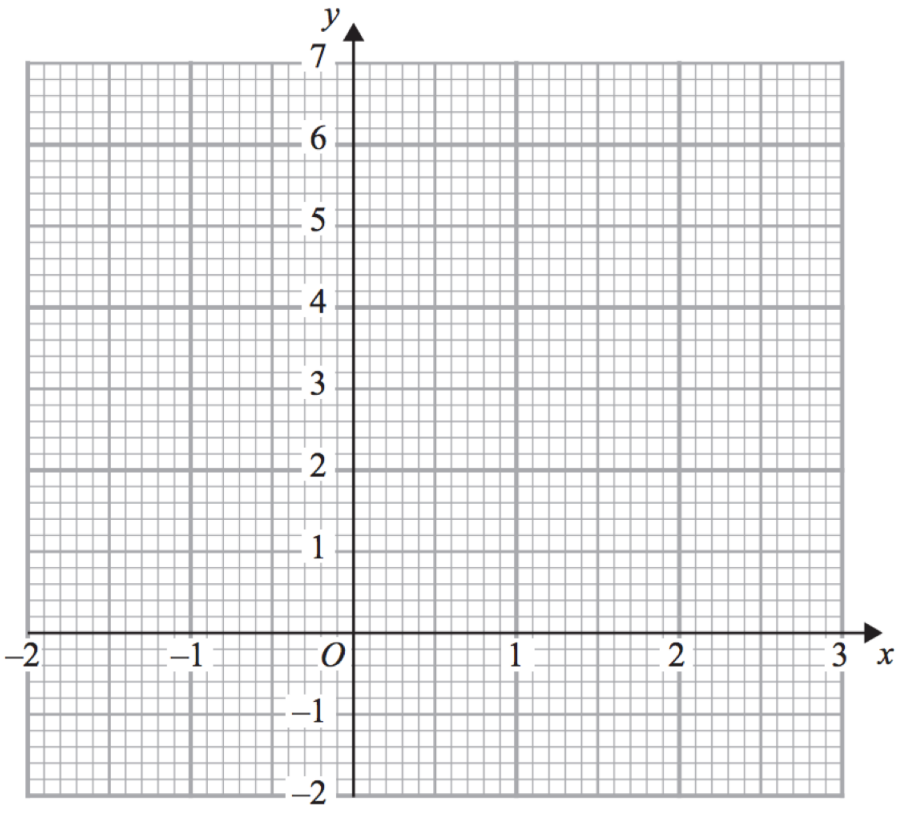
(3)

25. (a) Complete the table of values for $y = x^3 - 2x + 3$

x	-2	-1	0	1	2
y					

(2)

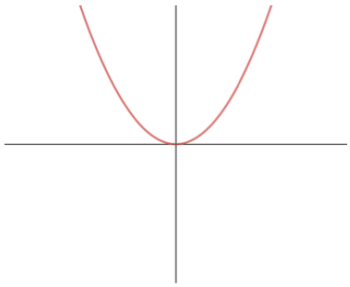
(b) On the grid, draw the graph of $y = x^3 - 2x + 3$ for the values of x $-2 \leq x \leq 2$



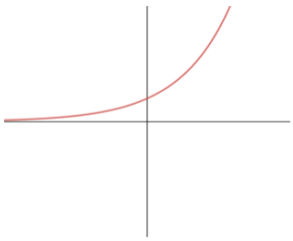
(2)

26. Match each graph to the correct equation

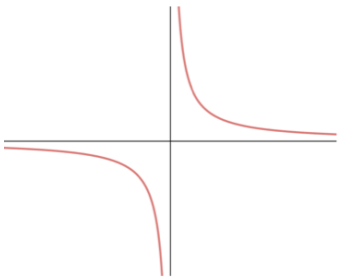
Graph A



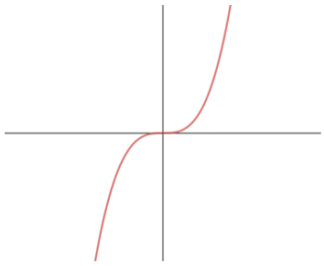
Graph B



Graph C



Graph D



$y = x^2$ is graph **A**

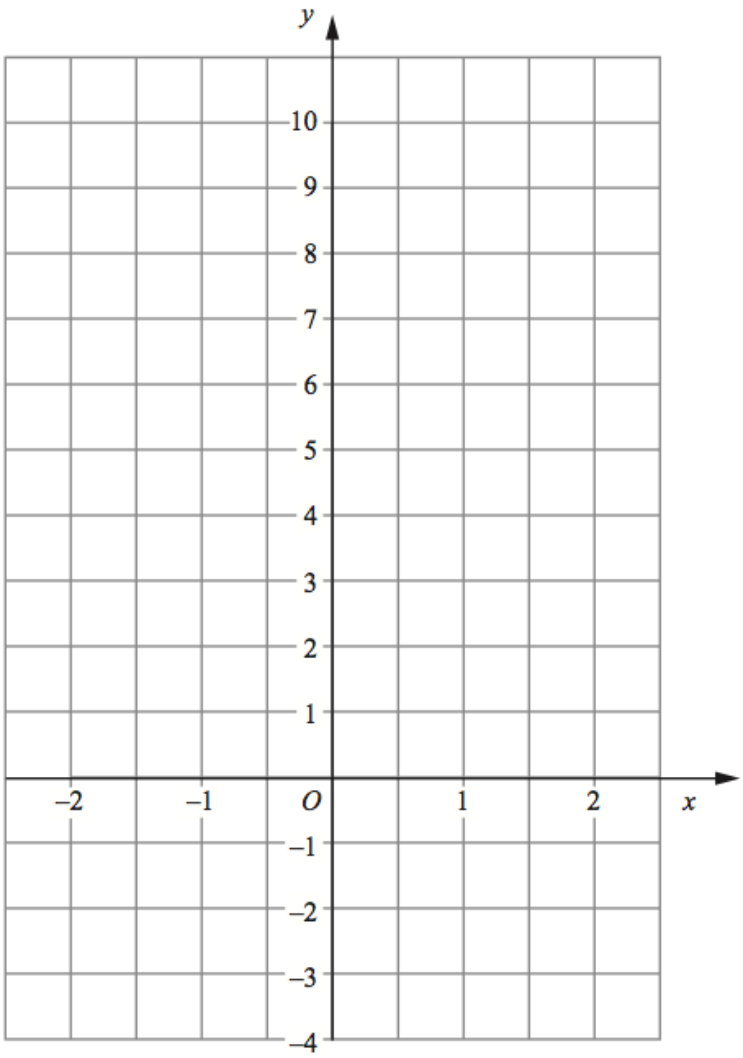
$y = x^3$ is graph ……..

$y = 2^x$ is graph ……..

$y = \frac{1}{x}$ is graph ……

(2)

27. Draw the graph of $y = 3^x$ for values of x from -2 to 2



(2)

28. Prove $(2n + 9)^2 - (2n + 5)^2$ is always a multiple of 4

(4)

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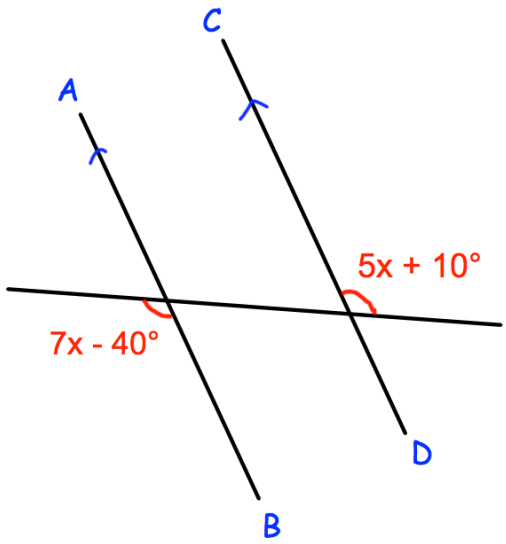
29. AB and CD are parallel lines.

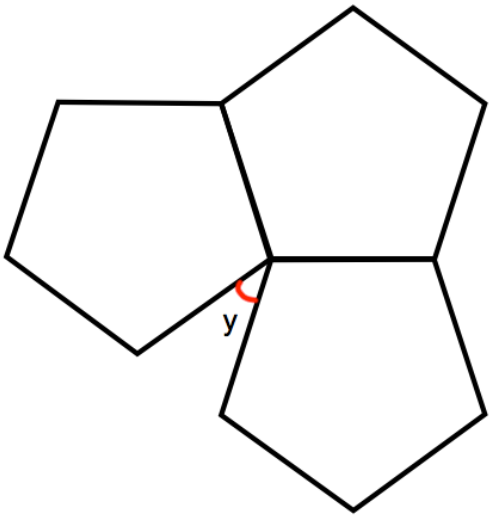


Work out the size of x.

.....

(3)

30.



Three identical regular pentagons are joined as shown above.

(a) Work out the size of angle y.

y = ...°

(2)

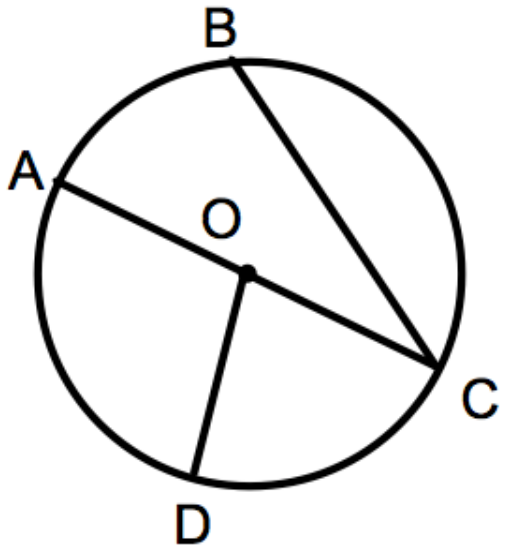
The interior angle of a different regular polygon is 175°

(b) How many sides does the polygon have?

.....

(2)

31. Points A, B, C and D are four points on the circle with centre O.



Here are six words that are used with circles.

Arc **Diameter** **Chord** **Tangent** **Circumference** **Radius**

Choose the correct word to describe each line below.

(a) The straight line AC is a ..... of the circle.

(1)

(b) The straight line OD is a ..... of the circle.

(1)

(c) The straight line BC is a ..... of the circle.

(1)

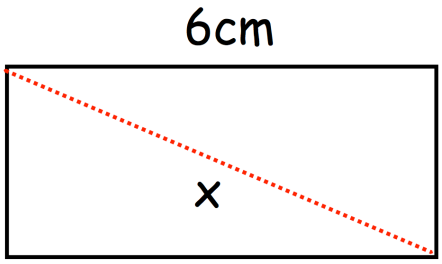
32. James has a bicycle.
Each wheel has diameter 45cm.

James cycles his bicycle in a straight line in the playground.
The front wheel makes 15 complete revolutions.

How far does the bicycle travel?
Give your answer in metres.

.....m
(4)

33.



The rectangle has an area of 15cm²

Find x

.....

(3)

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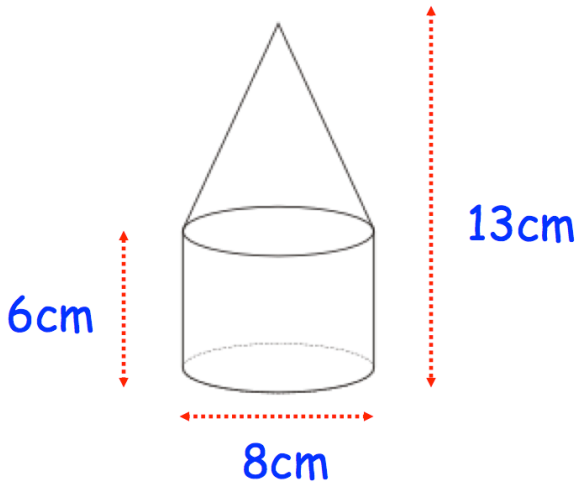
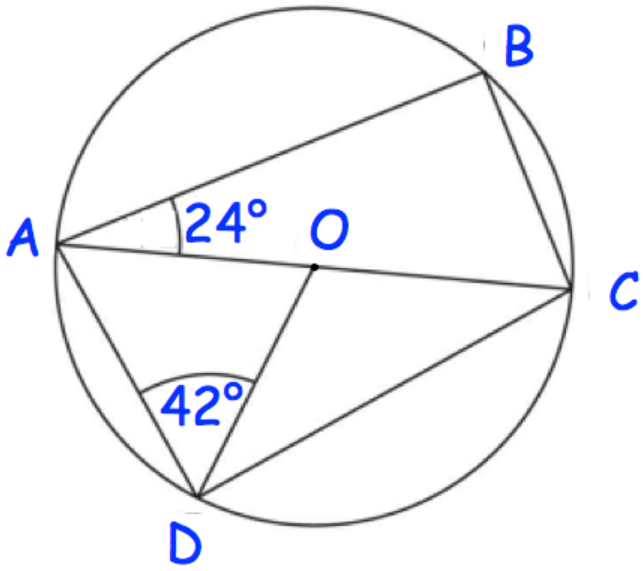
34. A solid is formed from a cylinder and a cone.
Find the volume of the solid.



.....cm³

(3)

35.



In the diagram O is the centre of the circle.
AOC is a straight line.
Angle BAO is 24° and Angle ADO is 42°

(a) Find the size of angle CAD.

.....°

(1)

(b) Find the size of angle ACB.

.....°

(1)

(c) Find the size of angle BCD.

.....°

(1)

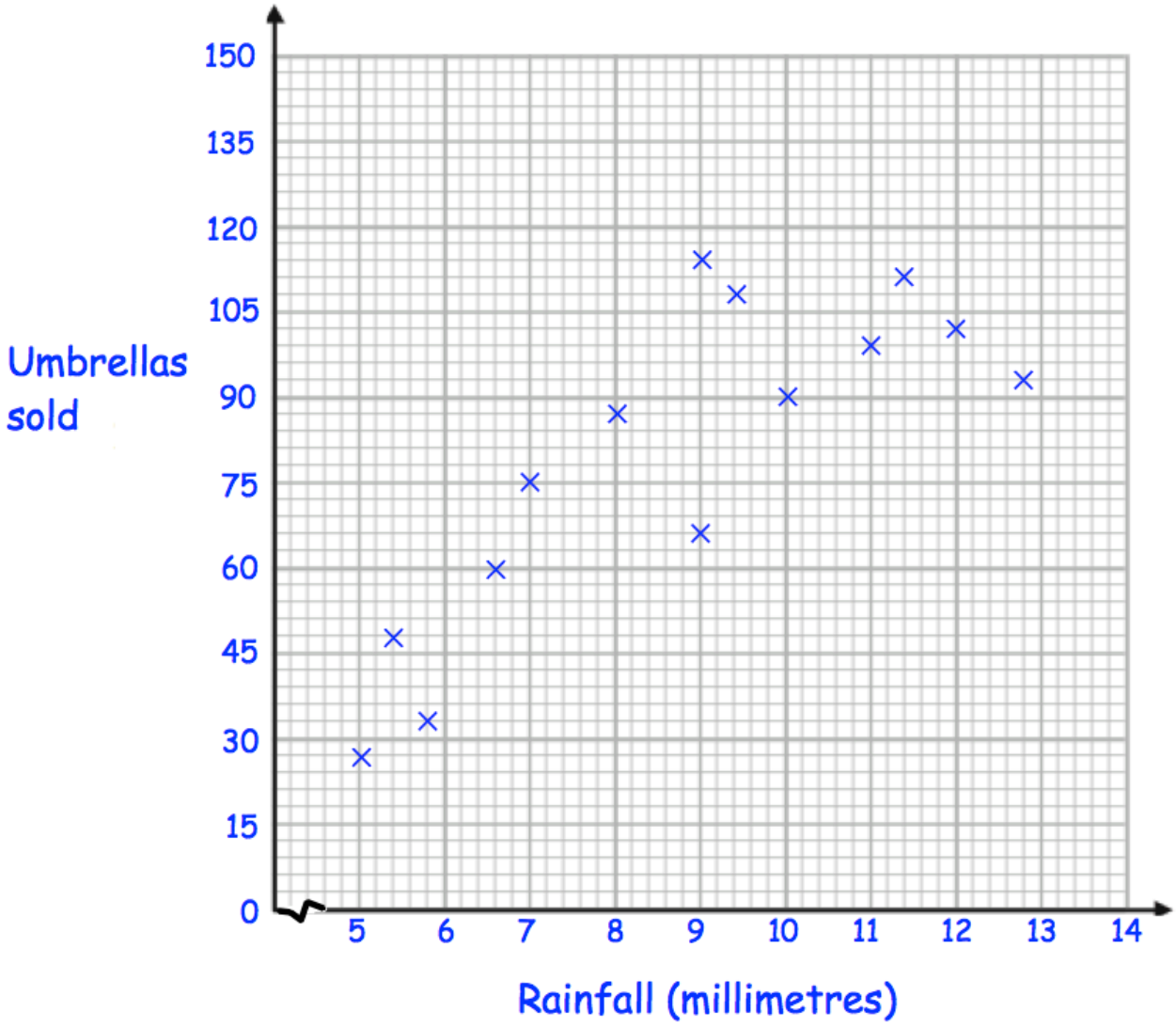
36. Miss Black completes a journey in 3 stages.
In stage 1, she drives at a speed of 40km/h for 45 minutes.
In stage 2, she drives at 60 km/h for 2 hours 9 minutes.
Altogether, over the 3 stages, Miss Black drives 171.6km in 3 hours 15 minutes

What is her average speed, in km/h, in stage 3?

……..km/h
(4)

37. A shop sells umbrellas.

The scatter graph shows information about the number of umbrellas sold each week and the rainfall that week, in millimetres.



(a) Describe the relationship between the rainfall and umbrellas sold.

.....

.....

(1)

(b) What is the most number of umbrellas sold in one week?

.....

(1)

(c) What is the greatest amount of rainfall in one week?

.....

(1)

(d) In how many weeks did the shop sell over 105 umbrellas?

.....

(1)

In another week, there was 6mm of rain.

(e) Estimate the number of umbrellas sold.

.....

(2)

(f) Explain why it may **not** be appropriate to use your line of best fit to estimate the number of umbrellas sold in a week with 25mm of rainfall.

.....

.....

(1)

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38. There are 8 sweets in a bag.
Three sweets are red, three sweets are blue and two sweets are green.

A sweet is chosen at random and then replaced.
A second sweet is chosen at random.

Calculate the probability that the sweets are **not** all the same colour.

.....

(3)

39. There are white chocolate, milk chocolate and dark chocolate sweets in a bag.
A sweet is taken at random from the bag.

The table shows the probability of getting each type of chocolate

Chocolate	dark	milk	white
Probability	$\frac{3}{20}$		$\frac{1}{3}$

(a) Work out the probability of getting a milk chocolate

.....

(1)

There are less than 500 chocolates in the bag.

(b) What is the greatest possible number of chocolates in the bag?

.....

(2)

40. A group of scientists want to estimate the number of squirrels in a wood.
They catch and ring 20 squirrels.
They return the 20 squirrels to the wood.
They then catch 50 squirrels and 13 are ringed.

Estimate the number of squirrels in the wood.

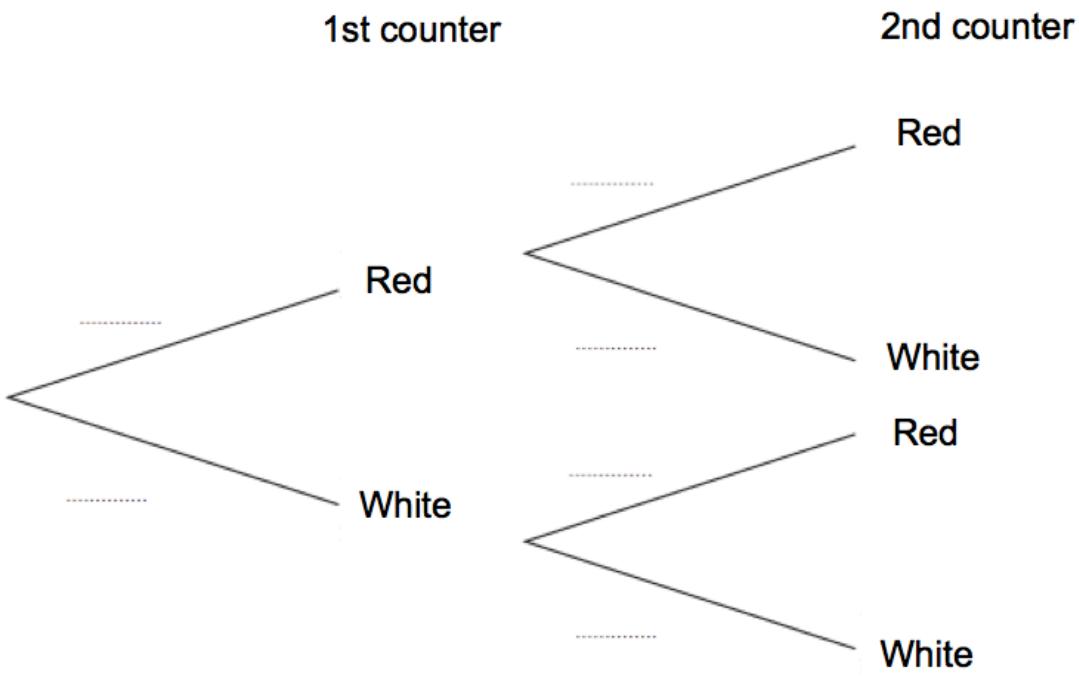
.....

(2)

41. George has a bag of marbles.
There are 6 red and 4 white marbles.

George takes out a marble at random and records its colour.
Without replacement, George takes out another marble, at random.

(a) Complete the probability tree diagram.



(2)

(b) Find the probability that the two marbles are the same colour.

.....

(3)

42. There are 8 sweets in a bag.
Three sweets are red, three sweets are blue and two sweets are green.

Three sweets are selected at random **without** replacement.

Calculate the probability that the sweets are **not** all the same colour.

.....

(4)