

Name: _____

GCSE Maths 2022
OCR Higher Paper 6
Set A
Calculator



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 6
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. Calculate

$$\frac{13.2 + 8.9}{2.3^2}$$

(a) Write down your full calculator display.

.....
(1)

(b) Write your answer to 2 significant figures.

.....
(1)

2. (a) Write 132 as a product of its prime factors.

.....
(2)

(b) Find the Highest Common Factor (HCF) of 88 and 132.

.....
(2)

3. (a) $y^4 \times y^n = 1$

Work out the value of n

.....
(1)

(b) Simplify fully $\frac{a^8}{a^3 \times a^{-9}}$

.....
(2)

4. (a) Write down the value of 5^{-3}

.....
(1)

(b) Write down the value of $49^{-\frac{1}{2}}$

.....
(1)

5. The distance of the moon to the Earth is 384,400 km.
The speed of light is 2.998×10^8 m/s.

Work out how long it will take light to travel from the moon to the Earth.
Include suitable units.

.....
(3)

-
6. An empty bucket weighs 800g.
The weight of the bucket increases to 2.1kg when filled with water.

Calculate the percentage increase in the weight of the bucket.
Give your answer to two significant figures.

.....%
(3)

7. Charlotte invests £5000.
The bank pays 10% interest for the first year and then $y\%$ every year after that.
After three years, Charlotte has £5610.55

Calculate y .

£.....
(3)

-
8. There are 1500 people at an ice hockey match.
The announcer says that this is exactly 30% more people than the previous match.

Explain why the announcer is wrong.

.....
.....
(2)

9. Harley sold 380 ice creams.
He sold only vanilla, chocolate, strawberry and honeycomb ice creams.
45% of the ice creams are chocolate.

The ratio of vanilla ice creams to strawberry ice creams to honeycomb ice creams is 1:2:8.

Work out how many more chocolate ice creams are sold than honeycomb ice cream.

.....
(4)

10. A is directly proportional to the cube root of B.
B is increased by 60%.

Work out the percentage increase in A.

.....
(3)

11. 12 builders can finish a house in 20 days.
Each of the builders works at the same rate.
9 of the builders stop working after 14 days.
The other builders continue building the house at the same rate until it is finished.

How long does it take to build the house?

.....
(3)

12. A food standards inspector is going to visit 3 establishments in one day.
In the town, there are 40 restaurants and 12 cafes.

He writes a list of the three different establishments, and the order will either be:

Cafe
Restaurant
Restaurant

Restaurant
Cafe
Cafe

How many possible lists could he write?

.....
(3)

13. Expand and simplify $8(5y - 1) - 3(y + 4)$

.....
(2)

14. (a) Expand and simplify $(4y - 3)(7 + 2y)$

.....
(2)

(b) Expand and simplify fully $(y + 1)(y - 5)(y + 2)$

.....
(3)

15. Factorise fully $3x^2 - 75$

.....
(2)

16. Factorise

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

.....
(2)

(b) $5x^2 - 13x - 6$

.....
(2)

17. Solve

$$\frac{10x - 3}{3} + \frac{5x + 2}{4} = 5$$

You must show your working.

x =
(4)

18. Make w the subject of the formula

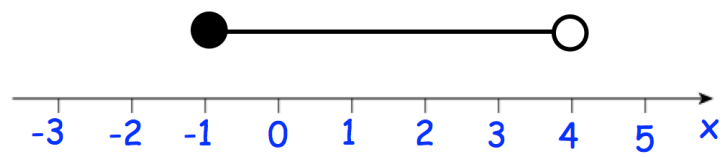
$$g = \frac{w}{w - 5}$$

w =
(3)

19. (a) Solve the inequality $3(x - 4) \leq 15$

.....
(2)

(b) Write down the inequality shown by the diagram.



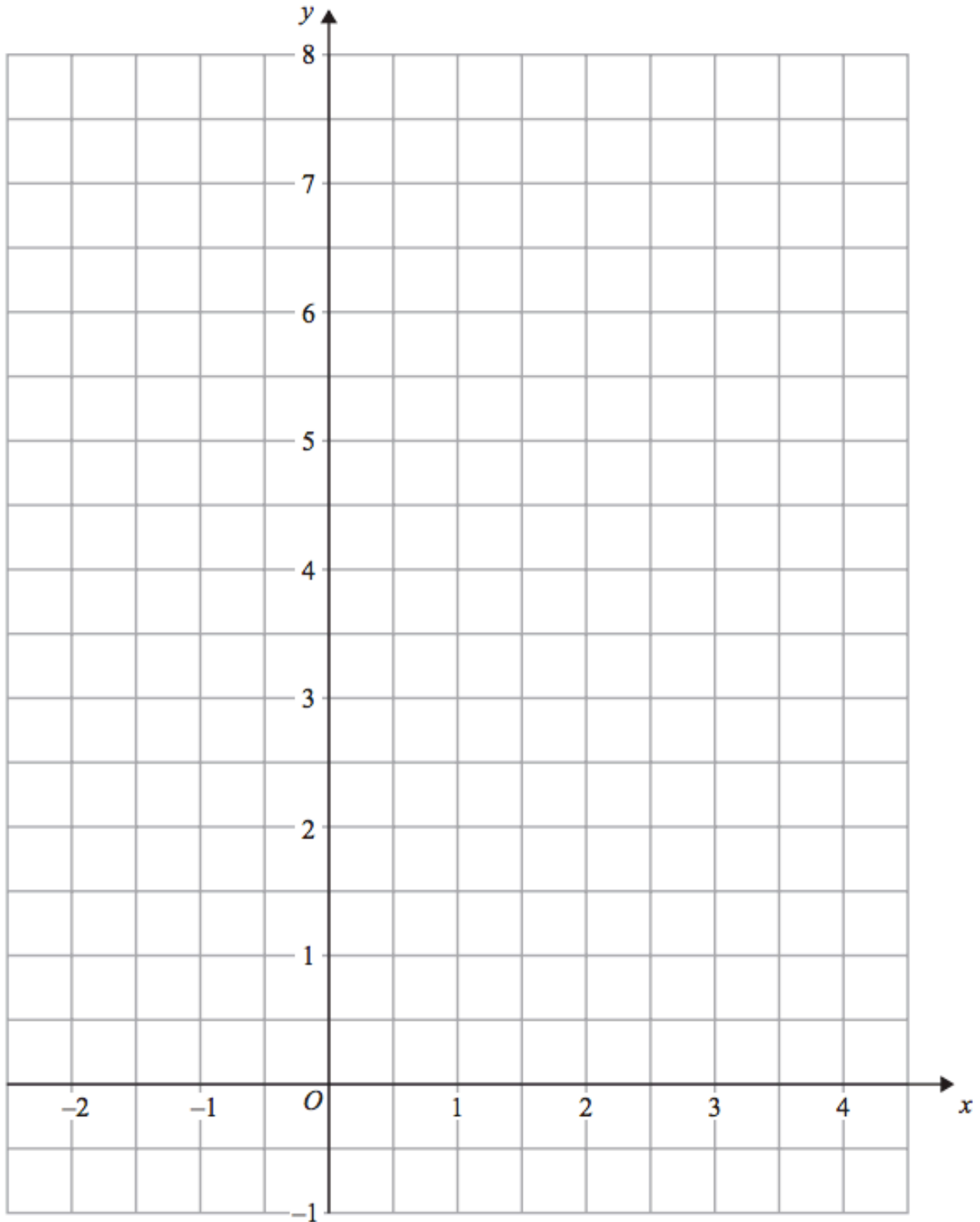
.....
(2)

20. On the grid, clearly label the region which satisfies all three inequalities below

$x > 0$

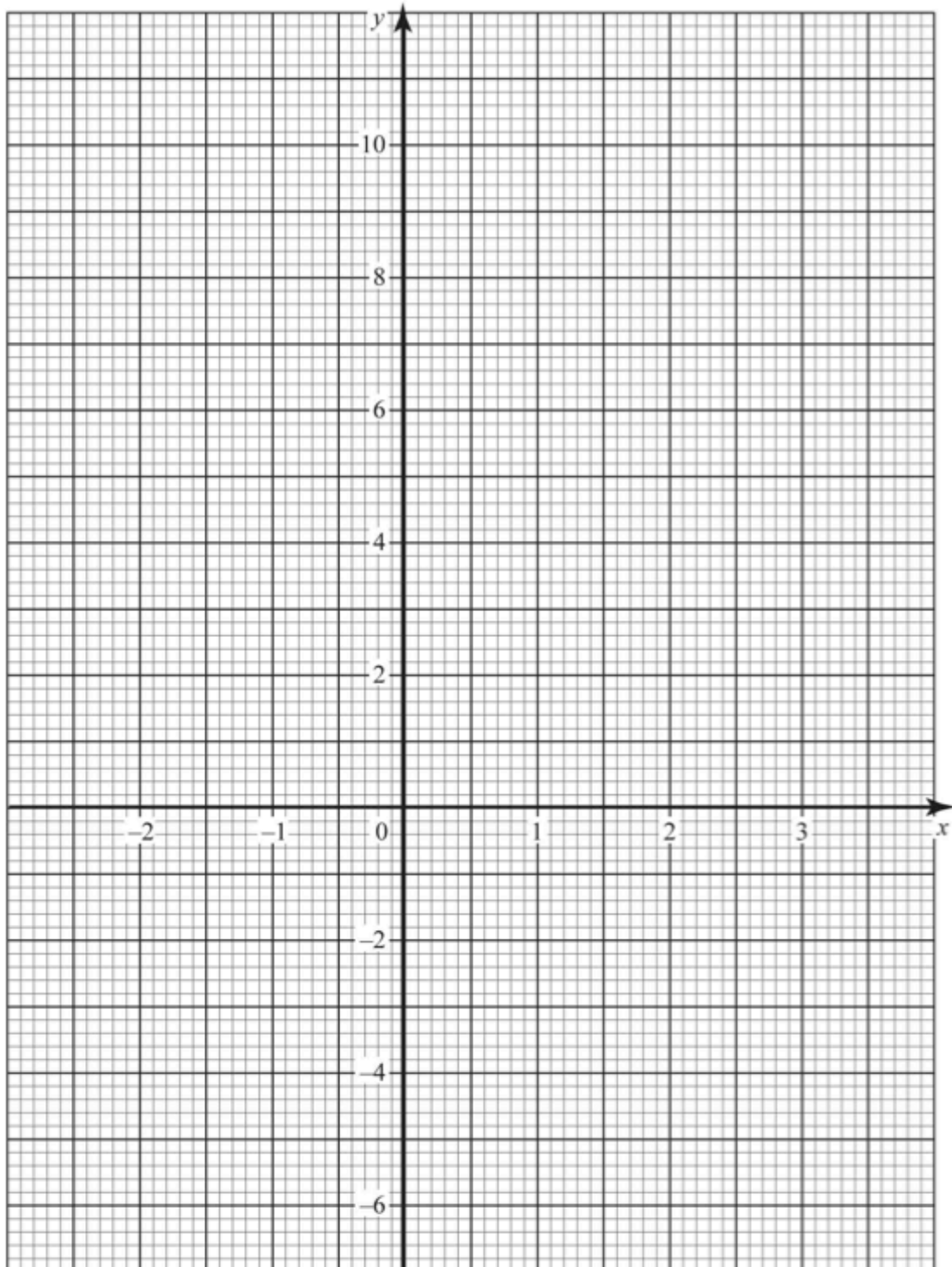
$y \geq \frac{1}{2}x$

$x + 2y < 4$



(4)

21. Draw the graph $y = 4 - 3x$ for the values of x from -2 to 3 .



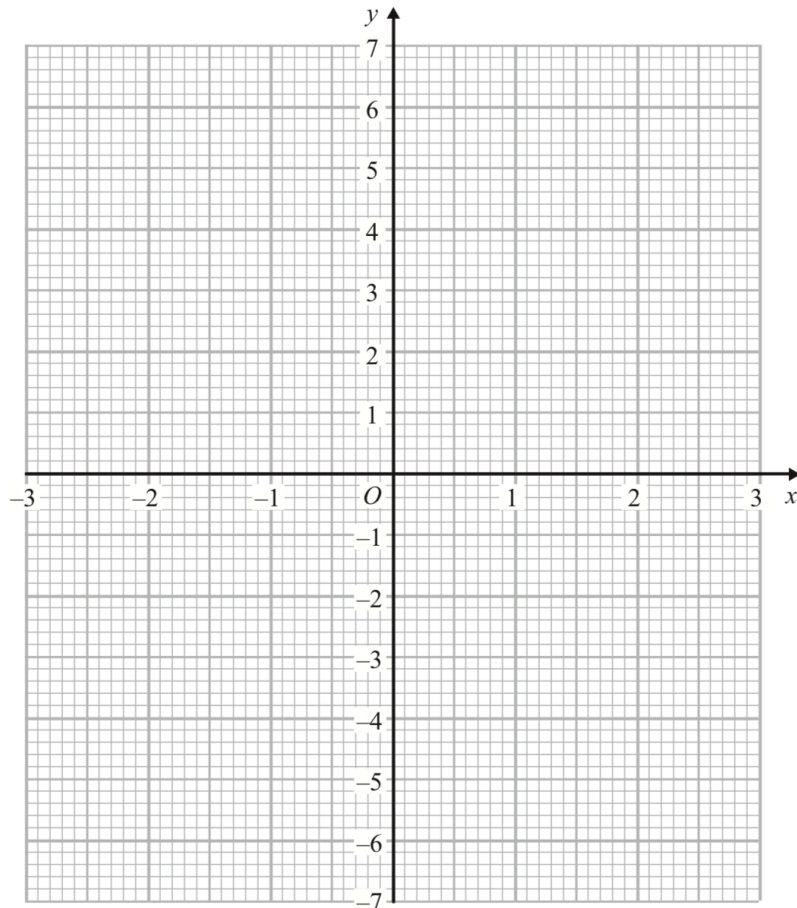
(3)

22. (a) Complete the table of values for $y = x^2 - x - 5$

x	-3	-2	-1	0	1	2	3
y							

(2)

(b) Draw the graph of $y = x^2 - x - 5$ for the values of x from -3 to 3

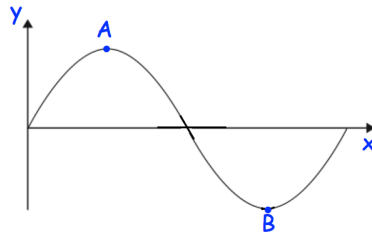


(2)

(c) Write down the coordinates of the turning point of the graph

.....
(1)

23. Shown is part of the curve $y = \sin x$



(a) Write down the coordinates of the point A.

(..... ,)
(1)

(b) Write down the coordinates of the point B.

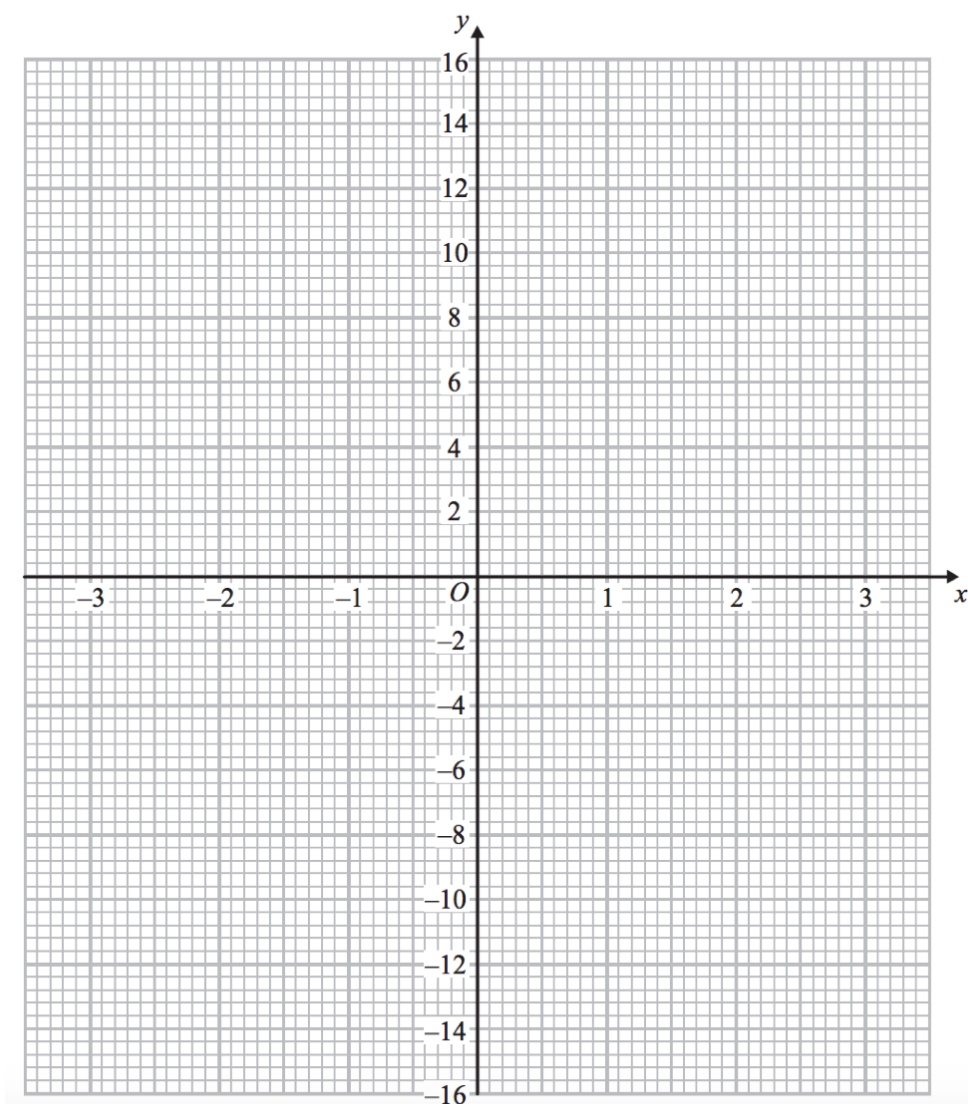
(..... ,)
(1)

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

x	-2	-1	0	1	2
y					

(2)

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



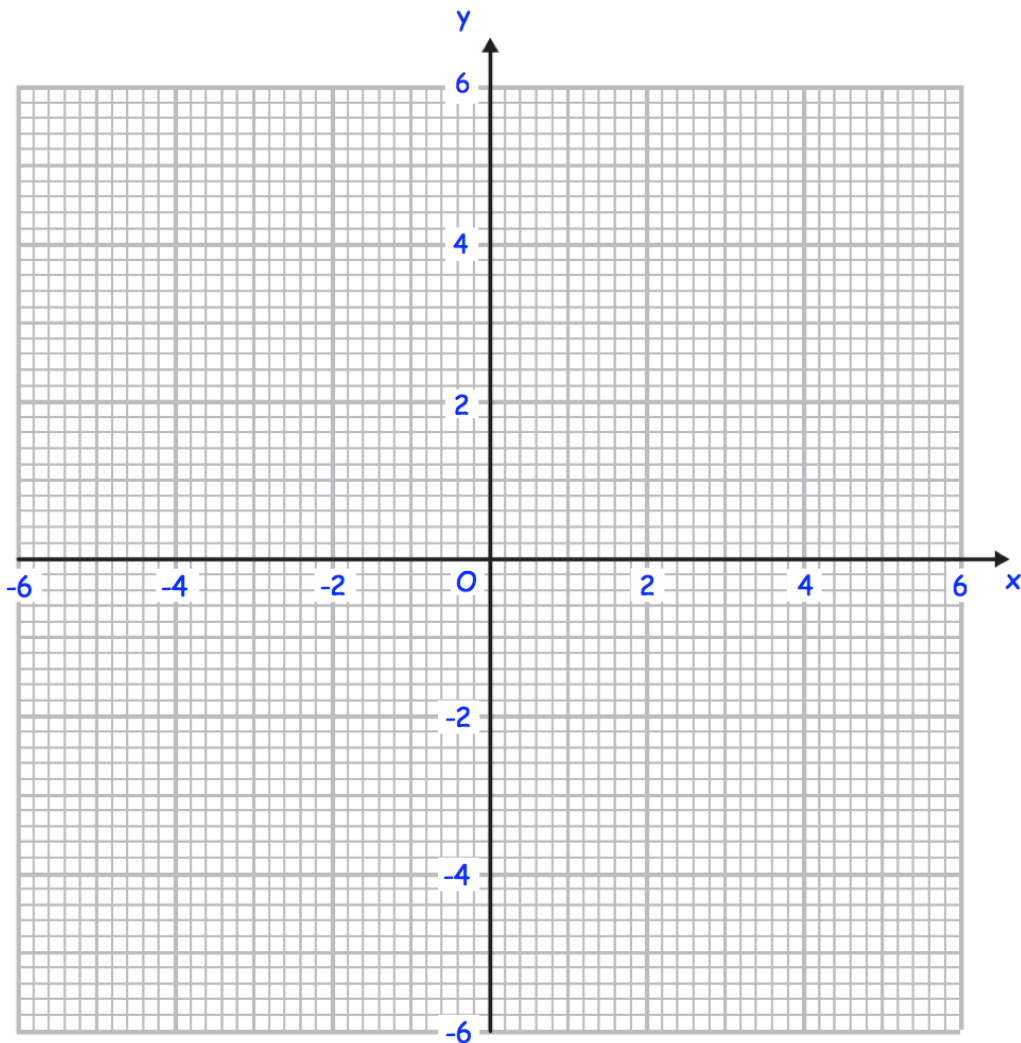
(2)

25. (a) Complete the table of values for $y = \frac{2}{x}$

x	-5	-2	-1	-0.5	0.5	1	2	5
y								

(2)

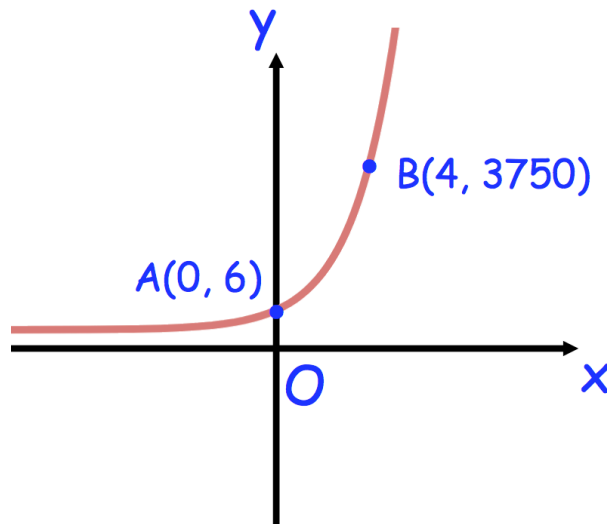
(b) On the grid, draw the graph of $y = \frac{2}{x}$ for $0.5 \leq x \leq 10$



(2)

26. The sketch shows a curve with equation $y = ab^x$ where $a > 0$ and $b > 0$

The curve passes through the points $(0, 6)$ and $(4, 3750)$



Calculate the value of a and b

.....
(3)

27. Solve $x^2 - x - 11 = 0$

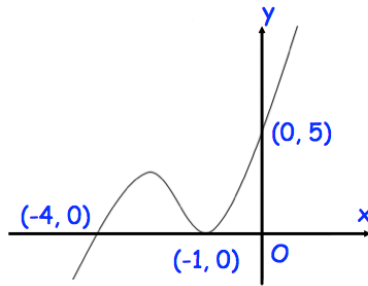
Give your answers to 1 decimal place.

.....
(3)

28. Write $x^2 + 10x + 7$ in the form $(x + a)^2 + b$, where a and b are constants.

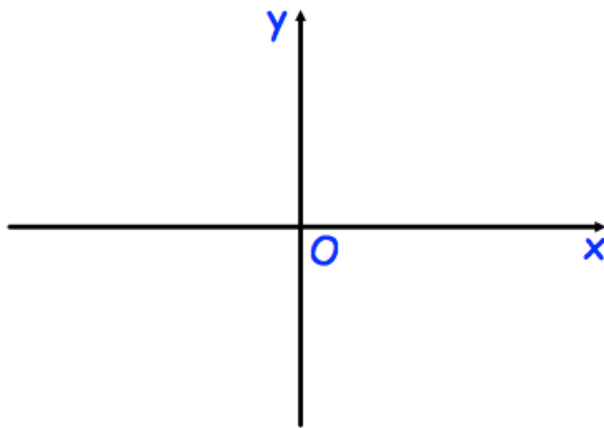
.....
(3)

29. Shown below is the curve with equation $y = f(x)$.
The curve passes through the points $(-4, 0)$, $(-1, 0)$ and $(0, 5)$



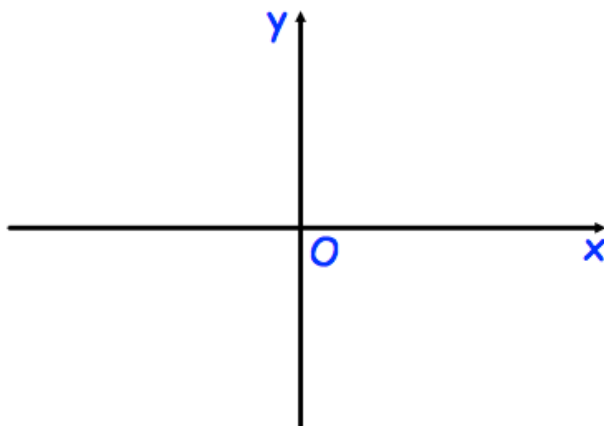
Sketch the curve with equation:

(a) $y = f(x - 1)$



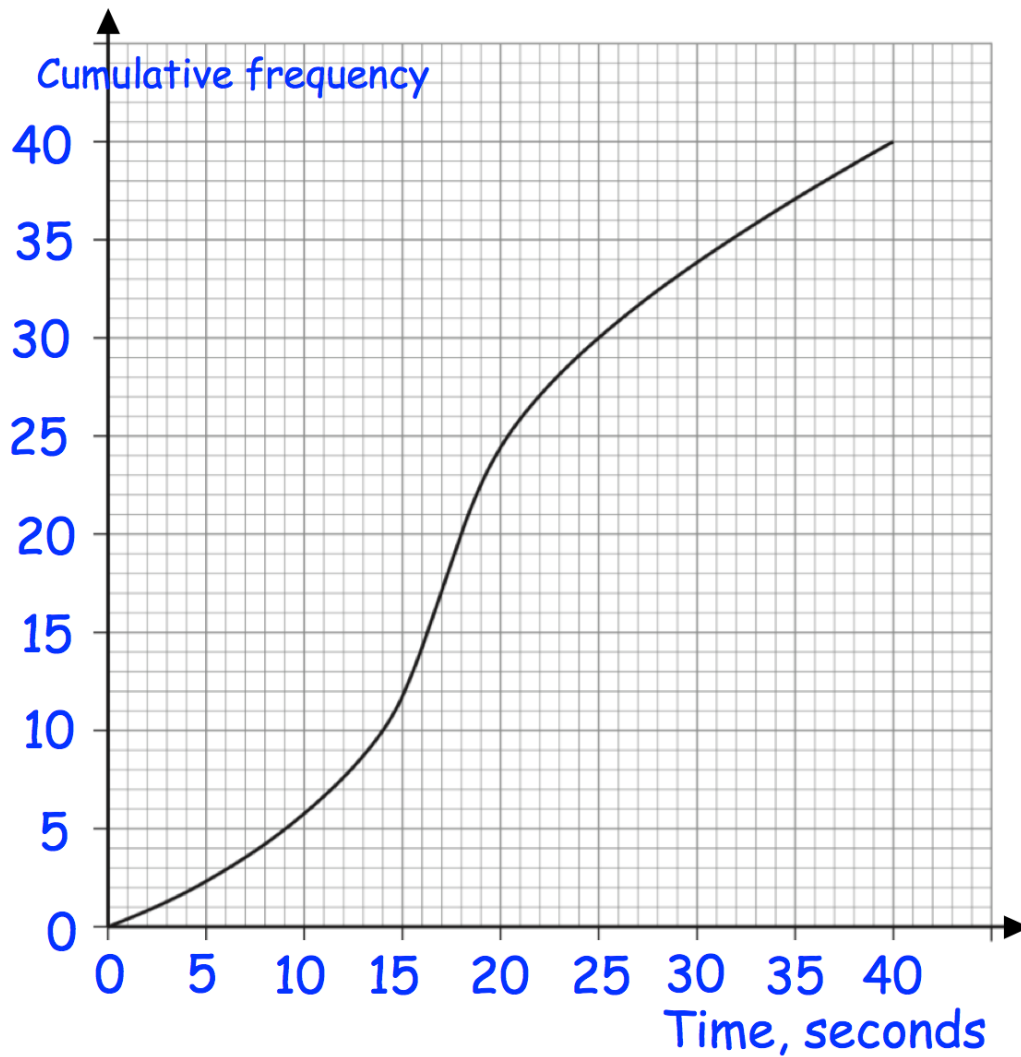
(2)

(b) $y = f(-x)$



(2)

30. The graph shows information about the time taken by 40 children to solve a puzzle.



- (a) Use the graph to find an estimate for the median time taken.

.....
(1)

- (b) Show that less than 20% of the students took longer than 30 seconds.

.....
(2)

31. Harry gets the train to work in the morning.
He works Monday to Friday.

The probability the train is late is 0.2

Find the probability the train is late exactly once.

.....
(4)

-
32. The table shows information about the beads in a bag.

Colour	Red	White	Black	Brown
Frequency	$3x - 1$	x	4	$x + 8$

A bead is picked at random.

The probability of a black bead is $\frac{2}{33}$

Work out the probability of a red bead.

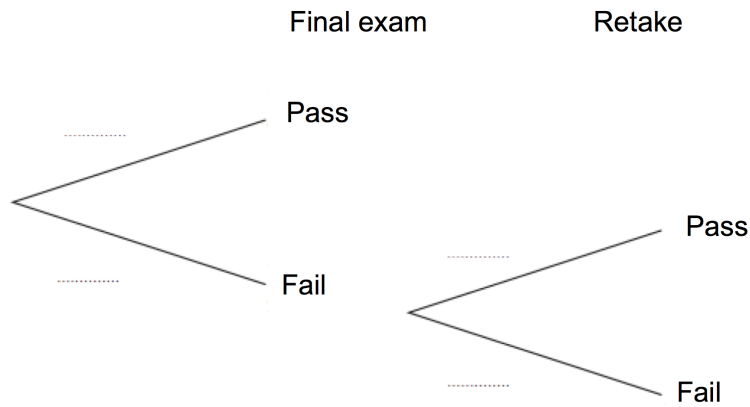
.....
(4)

33. A college course consists of 8 weeks of teaching with a final exam at the end of the course

If a student fails the final exam, they have one opportunity to retake the exam.

The probability of a student passing the final exam is $\frac{7}{8}$

The probability of a student passing the retake is $\frac{2}{3}$



(a) Complete the tree diagram

(2)

If a student passes the final exam or retake, they receive a certificate.

(b) Work out the probability that a student receives a certificate.

.....
(2)

34. There are x apples in a crate.
4 of the apples are bad.

Fiona chooses two apples from the crate, without replacement.
The probability she selects two bad apples is $\frac{1}{11}$

(a) Prove $x^2 - x - 132 = 0$

(3)

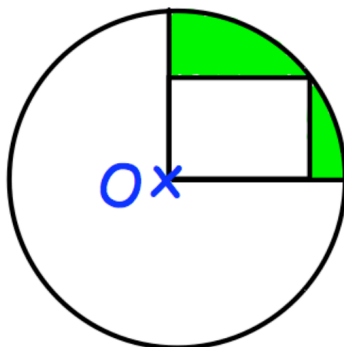
- (b) Find x , the number of apples in the crate.

.....
(2)

35. The area of a circle is 40cm^2 .
Calculate the circumference of the circle.

.....cm
(3)

36. A rectangle is drawn inside of a circle with centre O.

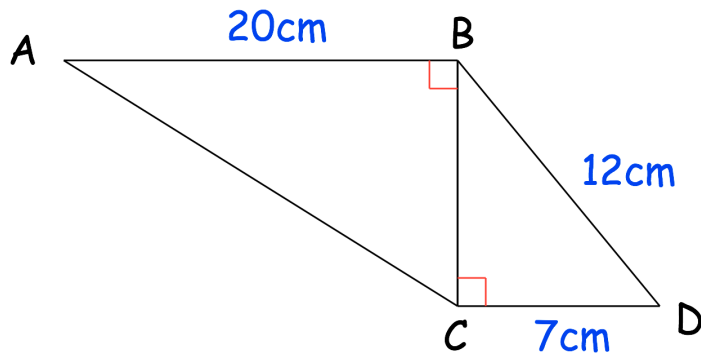


The rectangle is 4cm by 3cm .

Find the shaded area.

..... cm^2
(4)

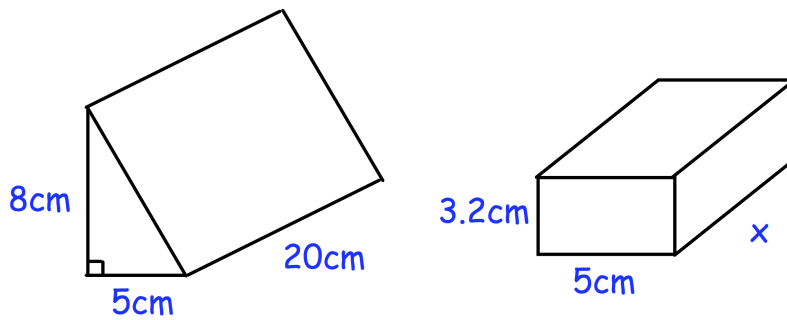
37.



Work out the size of angle CAB

.....
(4)

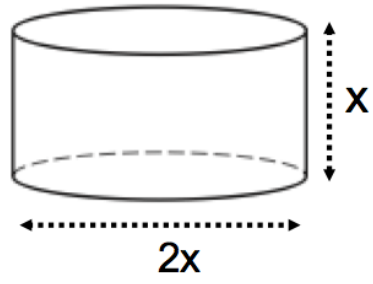
38. The cuboid and the triangular prism have the same volume.



Find x.

.....
(3)

39.

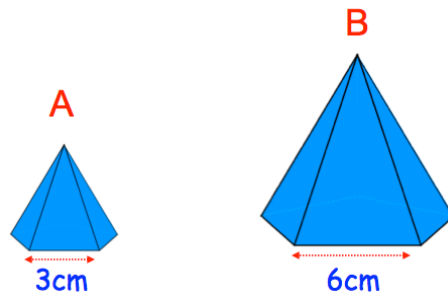


The cylinder above has surface area 400cm^2

Calculate x .

.....cm
(3)

40. Below are two similar pyramids.



Pyramid A has a volume of 26cm^3

(a) Work out the volume of Pyramid B.

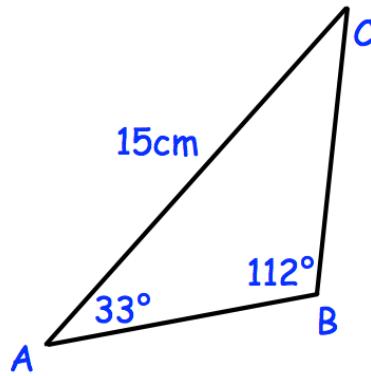
..... cm^3
(2)

Pyramid B has a total surface area of 224cm^2

(b) Work out the total surface area of Pyramid A.

..... cm^2
(2)

41.

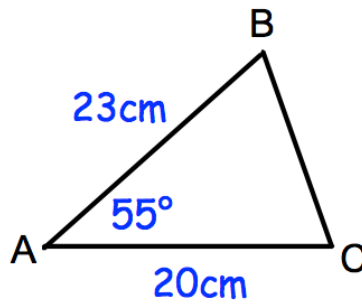


In triangle ABC the length of AC is 15cm.
Angle ABC = 112°
Angle BAC = 33°

Work out the length of BC.

.....cm
(3)

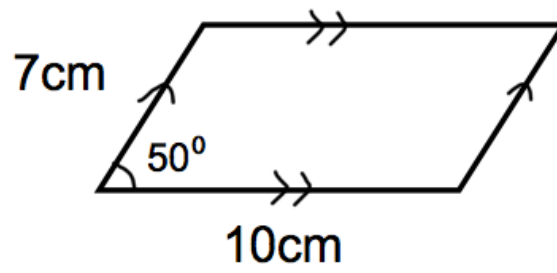
42.



Calculate the length of BC.

.....cm
(3)

43. Shown below is a parallelogram.



Calculate the area of the parallelogram.

.....cm²
(5)

44. Kelvin completes a journey in three stages.

In stage 1 of his journey, he drives at an average speed of 32 miles per hour for 45 minutes.

(a) How far does Kelvin travel in stage 1 of his journey?

.....miles
(2)

In stage 2 of his journey, Lee drives at an average speed of 44 miles per hour for 2 hours 45 minutes.

Altogether, over all three stages, Lee drives 150 miles in 4 hours.

What is his average speed, in miles per hour, in stage 3 of his journey?

.....miles per hour
(3)

45. The mass of 3m^3 of tin is 21840kg .

(a) Work out the density of tin.

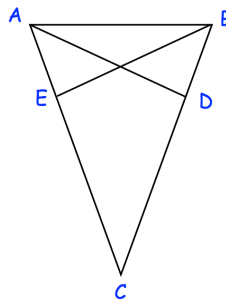
..... kg/m^3
(2)

The density of aluminium is $2712\text{kg}/\text{m}^3$.

(b) Work out the difference in mass between 5m^3 of tin and 5m^3 of aluminium.

..... kg
(3)

46. ABC is an isosceles triangle in which $AC = BC$.
D and E are points on BC and AC such that $CE = CD$.



Prove triangles ACD and BCE are congruent.

(4)