Name:

GCSE Maths 2022
Edexcel Higher Paper 1
Set A
Non-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.

Answers:

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 1
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. Work out

$$3\frac{2}{3}+1\frac{7}{10}$$

Give your answer as a mixed number.

$\frac{11}{3} + \frac{17}{10}$

$\frac{110}{30} + \frac{51}{30} = \frac{161}{30}$

$5\frac{11}{30}$

(2)

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2. Work out

$$1\frac{1}{3} \times 2\frac{2}{5}$$

Give your answer as a mixed number.

$\frac{4}{3} \times \frac{12}{5} = \frac{48}{15}$

$= 3\frac{3}{15}$

$3\frac{1}{5}$

(2)

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3. Work out

$$\frac{2}{17} \div \frac{2}{5}$$

Give your answer as a fraction in its simplest form.

$\frac{2}{17} \times \frac{5}{2} = \frac{10}{34}$

$\frac{5}{17}$

(2)

4. What is the reciprocal of 4?

Circle the correct answer.

4 0.4 $\frac{1}{4}$ –4

(1)

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5. Bill is 80 years old.

His son Max is $\frac{5}{8}$ of his age. 50

His granddaughter Jayne is $\frac{1}{5}$ of his age. 16

How many years older than Jayne is Max?

34

.....

(4)

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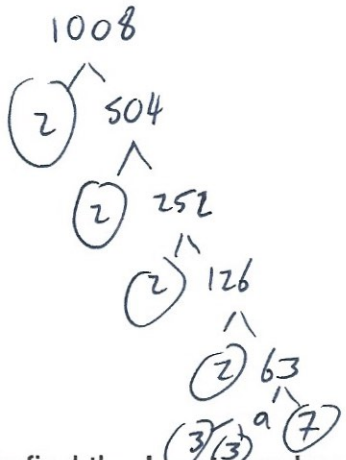
6. (a) Write 1008 as a product of prime factors.
Express your answer in index form.



$2^4 \times 3^2 \times 7$

.....

(3)

(b) Hence find the ~~least~~ number by which 1008 would need to be multiplied by to give a square number.

7

.....

(1)

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

$\frac{1}{5^3} = \frac{1}{125}$

$\frac{1}{125}$

(1)

(b) Write down the value of $36^{\frac{3}{2}}$

$\sqrt{36} = 6$

$6^3 = 216$

216

(1)

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8. 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.

14300000

(1)

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

9.2384×10^5

(1)

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

$$\begin{array}{r} 14^{2}3^{9}0^{9}0^{9}000 \\ -\ 4192900 \\ \hline 10107100 \end{array}$$

10107100

(2)

9. Edward and his four friends go on holiday.
The total cost of the holiday is £3600.

Edward is going to stay longer than his friends and he is going to pay 35% of the total cost.

The rest of the total cost is to be shared equally between his four friends.

Edward says,

"*I pay twice as much money for the holiday than each of my friends.*"

Is Edward correct?
Explain your answer.

$3600 \times 0.35 = £1260$

$3600 - 1260 = £2340$

$£2340 \div 4 = £585$

$585 \times 2 = £1170$

No, Edward paid more than twice the amount that his friends paid.

(4)

$1.\dot{3}2\dot{5}$

10. Write ~~0.1590~~ as a fraction.

Give your answer in its simplest form.

$x = 1.325325\ldots$

$1000x = 1325.325\ldots$

$999x = 1324$

$x = \frac{1324}{999}$

$1\frac{325}{999}$

(3)

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11. Charlene and Danielle share some money in ratio 7 : 9

(a) What fraction of the money does Danielle receive?

$\frac{9}{16}$

.....

(1)

Danielle gets £48 more than Charlie.

(b) How much does each woman receive?

$48 \div 2 = 24$

24×7

24×9

Charlene £ 168

Danielle £ 216

(3)

12. C is directly proportional to the square root of y.
When C = 12.8, y = 16.

(a) Express C in terms of y.

$C \propto \sqrt{y}$

$C = k\sqrt{y}$

$12.8 = k \times \sqrt{16}$

$k = 3.2$

C = $3.2\sqrt{y}$

(3)

(b) Find C when y = 400

$3.2 \times \sqrt{400}$

3.2×20

C = 64

(1)

13. The force, F newtons, exerted by a magnet on a metal object is inversely proportional to the square of the distance d cm.

When d = 2 cm, F = 50 N.

(a) Express F in terms of d.

$F \propto \frac{1}{d^2}$ $\quad 50 = \frac{k}{4}$

$F = \frac{k}{d^2}$ $\quad k = 200$

$50 = \frac{k}{2^2}$

F = $\frac{200}{d^2}$

(3)

(b) Find the force when the distance between the magnet and metal object is 10cm

$\frac{200}{10^2} = 2$

F = 2 N

(1)

(c) Find the distance between the magnet and metal object when the force is 8N.

$8 = \frac{200}{d^2}$

$8d^2 = 200$

$d^2 = 25$

d = 5 cm

(1)

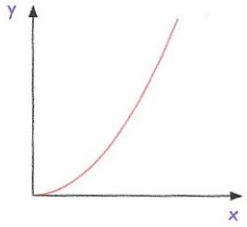
(d) Explain what happens to F when d is halved.

It is 4 times larger.

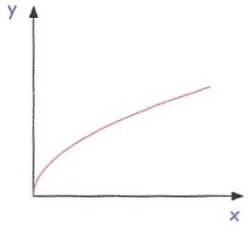
(1)

14. These graphs represent four different types of proportionality.
Match each type of proportionality to the correct graph.

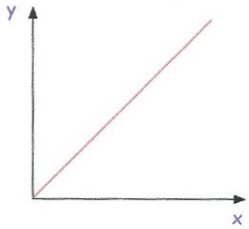
Graph 1



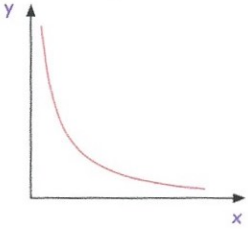
Graph 2



Graph 3



Graph 4



Graph	Type of Proportionality
3	$y \propto x$
2	$y \propto \sqrt{x}$
1	$y \propto x^2$
4	$y \propto \frac{1}{x}$

(3)

15. 8 builders can finish a house in 20 days. $8 \times 20 = 160$
Each of the builders works at the same rate.
6 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?

$8 \times 14 = 112$

$160 - 112 = 48$

$48 \div 2 = 24$

$24 + 14 = 38$

38 days

(3)

16. Show that $\frac{3-\sqrt{32}}{1+\sqrt{2}}$ can be written in the form $a+b\sqrt{2}$

where a and b are integers.

$\frac{3-\sqrt{32}}{1+\sqrt{2}} \times (1-\sqrt{2})$

$\frac{3-\sqrt{32}}{1+\sqrt{2}} \times (1-\sqrt{2})$

$\frac{3-3\sqrt{2}-\sqrt{32}+\sqrt{64}}{1-\sqrt{2}+\sqrt{2}-2}$

$\frac{3-3\sqrt{2}-4\sqrt{2}+8}{-1}$

$\frac{11-7\sqrt{2}}{-1}$

$-11+7\sqrt{2}$

or

$7\sqrt{2}-11$

(3)

17. Simplify $13a + 2c - 3(3c + 7a)$

$13a + 2c - 9c - 21a$

$-8a - 7c$

$-8a - 7c$

(2)

18. Expand and simplify $(3y - 2)(y + 3)$

$3y^2 + 9y - 2y - 6$

$3y^2 + 7y - 6$

$3y^2 + 7y - 6$

(2)

19. (a) Solve $m^2 + 24m + 63 = 0$

$(m + 3)(m + 21) = 0$

$m = -3$ or $m = -21$

(2)

(b) Solve $5y^2 + 8y - 100 = y^2 + 4y - 37$

$4y^2 + 4y - 63 = 0$

$(2y + 9)(2y - 7) = 0$

$y = -4.5$ or $y = 3.5$

(2)

20. (a) Simplify $\dfrac{2(x+3)^2}{x+3}$

$2(x+3)$

$2x+6$

.....

(1)

(b) Simplify $\dfrac{x^2+3x-4}{x^2-8x+7}$

$\dfrac{(x+4)(x-1)}{(x-7)(x-1)}$

$\dfrac{x+4}{x-7}$

.....

(2)

21. James has x pence.
Hannah has 5 pence more than James. $x+5$
Liam has 2 pence less than James. $x-2$

The total amount of money they have is 75 pence.

(a) Use this information to write down an equation in x.

$3x+3=75$

$3x+3=75$

(2)

(b) Solve the equation to find out how much money James has.

$3x=72$

$x=24$

24 pence

(2)

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22. Solve $4-3(2-5x)<9(x+1)$

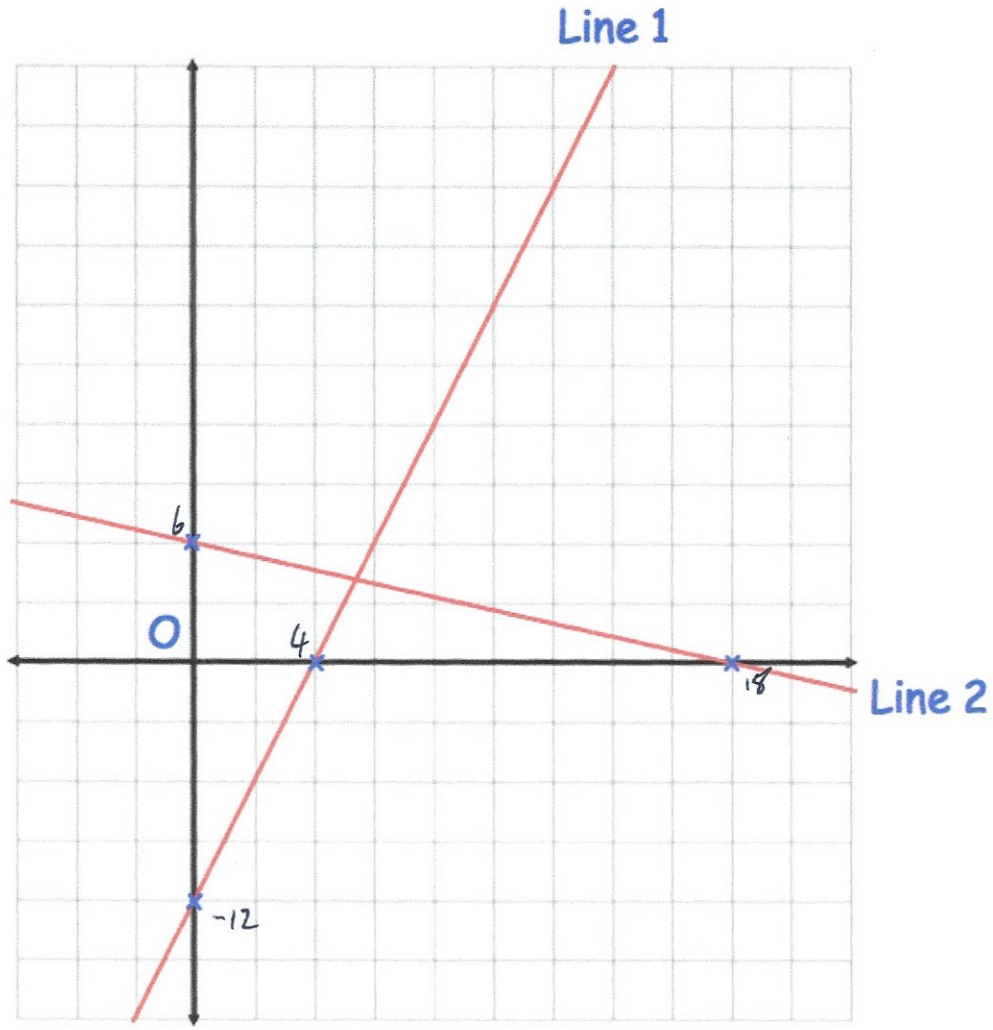
$4-6+15x<9x+9$

$6x<11$

$x<\frac{11}{6}$

(3)

23. Shown are two straight lines drawn on the grid.



Line 1 has equation $y = 3x - 12$

(a) Find the equation of Line 2

$y = -\frac{1}{3}x + 6$

$y = -\frac{1}{3}x + 6$

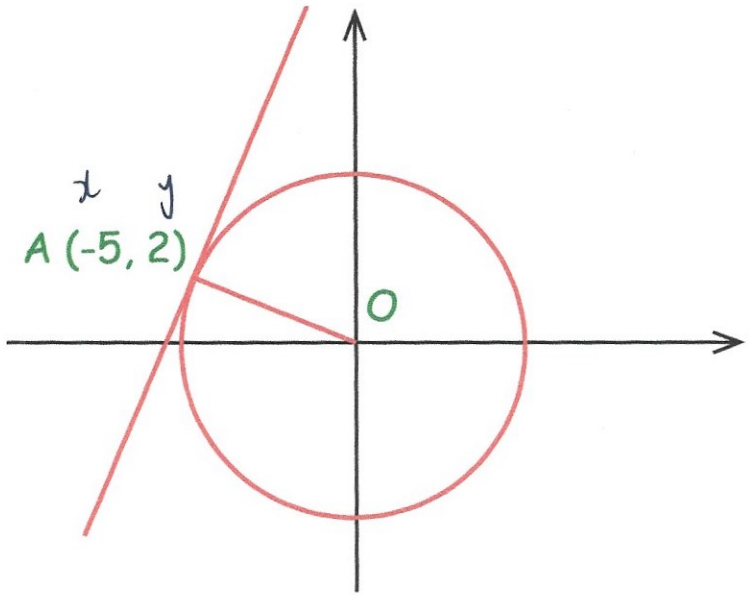
(4)

(b) Are the two lines perpendicular?
Explain your answer.

yes $3 \times -\frac{1}{3} = -1$

(1)

24. The diagram shows the circle $x^2 + y^2 = 29$ with a tangent at the point $(-5, 2)$



(a) Find the gradient of the line AO.

$-\frac{2}{5}$

.....

(1)

(b) Find the gradient of the tangent

$\frac{5}{2}$

.....

(1)

(c) Find the equation of the tangent

$y = \frac{5}{2}x + c$

$2 = -\frac{25}{2} + c$

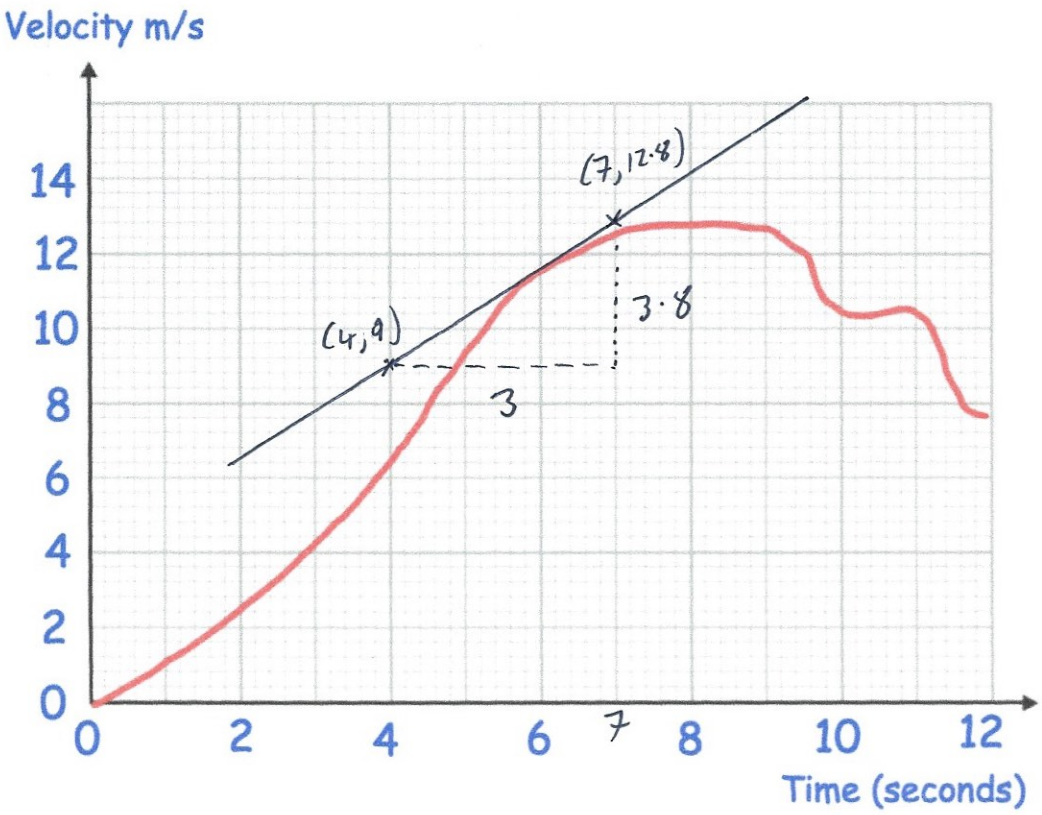
$c = 14.5$

$y = \frac{5}{2}x + \frac{29}{2}$

.....

(2)

25.



Above is the velocity-time graph of a particle over 12 seconds.

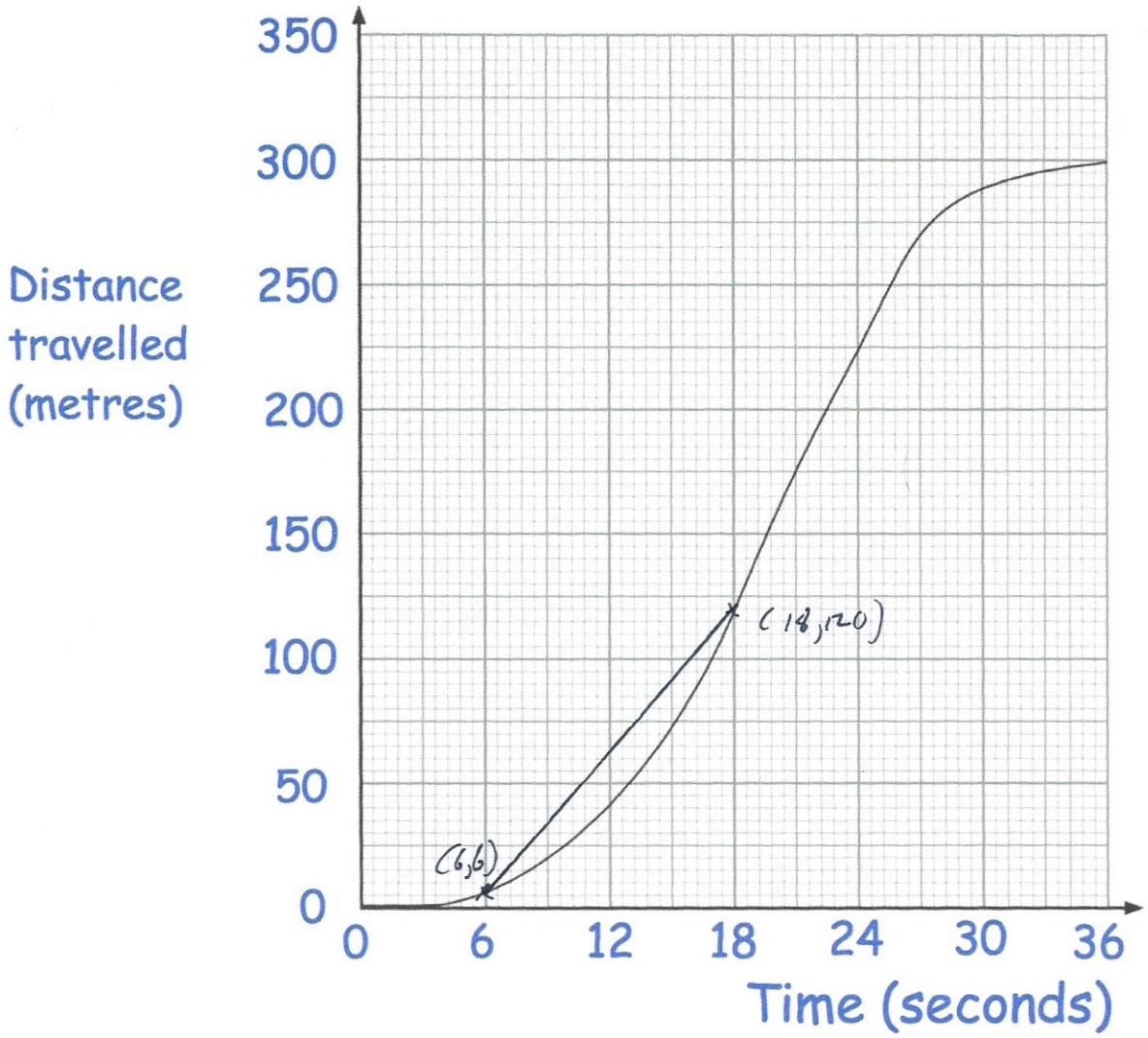
Find an estimate of the particle's acceleration at 6 seconds
Include suitable units

$\frac{3.8}{3} = 1.2\dot{6}$

$1.2\dot{6}$ m/s^2

(3)

26. The graph shows the distance travelled by a train over 36 seconds.



Work out the average speed of the train between 6 and 18 seconds.

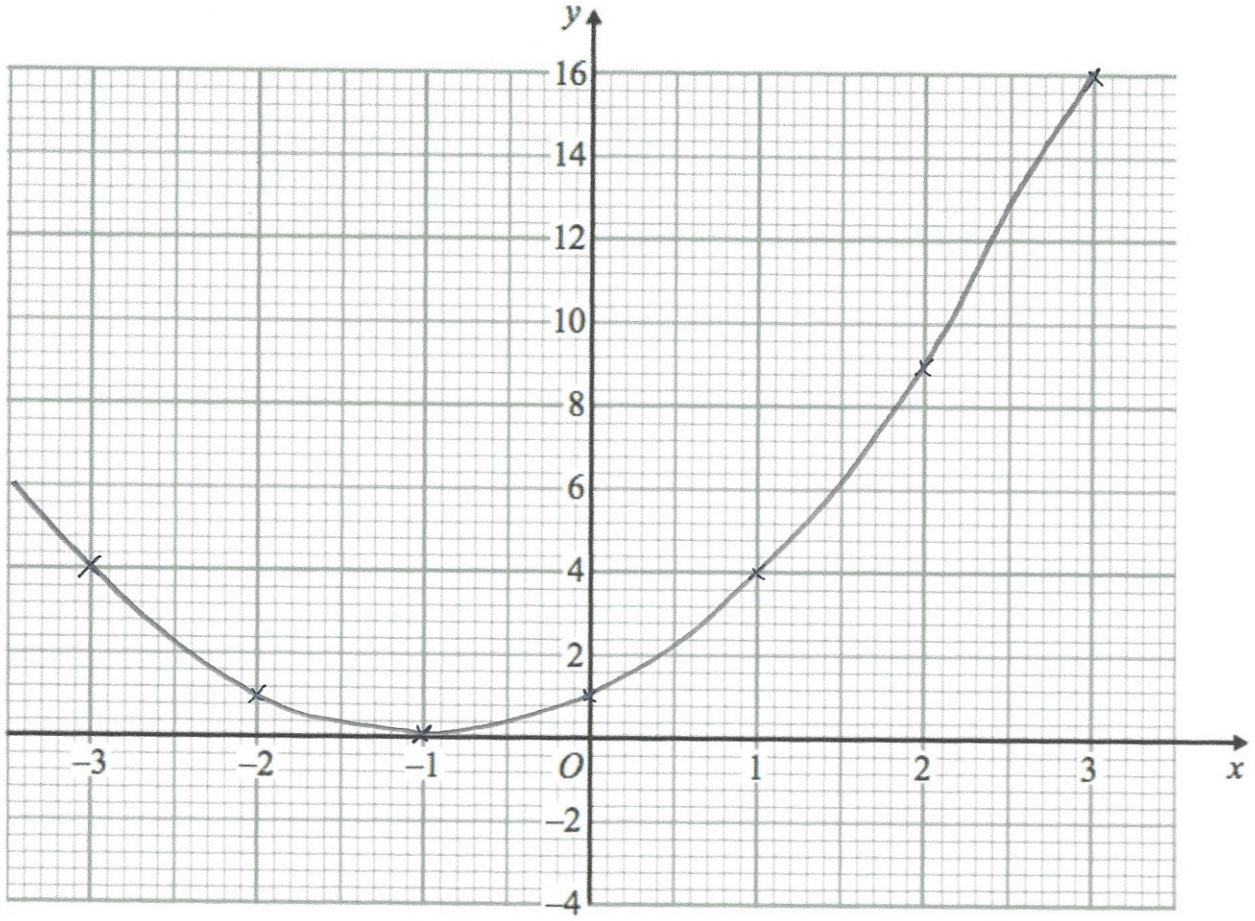
$\frac{114}{12}$

9.5 .....m/s

(3)

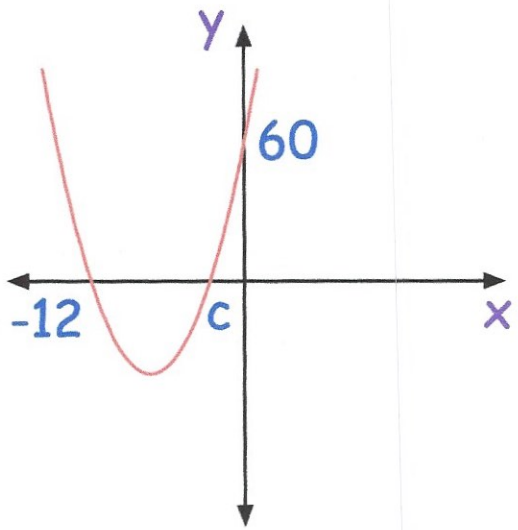
27. Draw the graph of $y = x^2 + 2x + 1$

x	-3	-2	-1	0	1	2	3
y	4	1	0	1	4	9	16



(2)

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



Find the values of a, b and c.

$y = x^2 + ax + 60$

$y = (x+12)(x+5)$

$y = x^2 + 17x + 60$

a = 17

b = 60

c = -5

(3)

29. Hannah is solving a quadratic equation in the form $ax^2 + bx + c = 0$
She has got to this point in her working out.

$$x = \frac{3 \pm \sqrt{29}}{2}$$

Find possible values of a, b and c for the equation Hannah is solving.

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

$b = -3$

$a = 1$

$b^2 - 4ac = 29$

$9 - 4c = 29$

$4c = -20$ $\quad c = -5$

a = 1

b = −3

c = −5

(3)

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

$(x+5)^2 - 25 + 7$

$(x+5)^2 - 18$

.....

(3)

31. 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

$\frac{3}{20} + \frac{1}{3} = \frac{9}{60} + \frac{20}{60}$

$\frac{29}{60}$

$\frac{31}{60}$

.....

(1)

There are less than 500 chocolates in the bag.

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

Common multiples of 20, 60, 3 : 60, 120, 180, 240, 300, 360, 420, 480

480

.....

(2)

32. Sally and Laura sit their driving tests.

The probability of Sally passing her driving test is 0.7
The probability of both Sally and Laura passing is 0.56

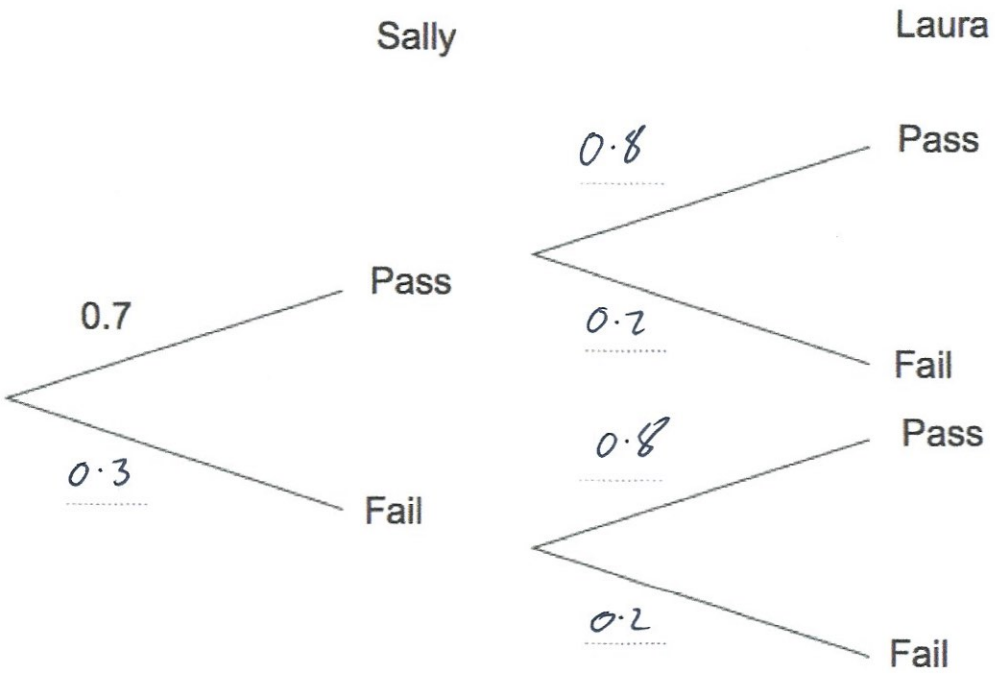
(a) Work out the probability of Laura passing her driving test.

$0.56 \div 0.7 = 0.8$

0.8

(2)

(b) Complete the tree diagram.



(2)

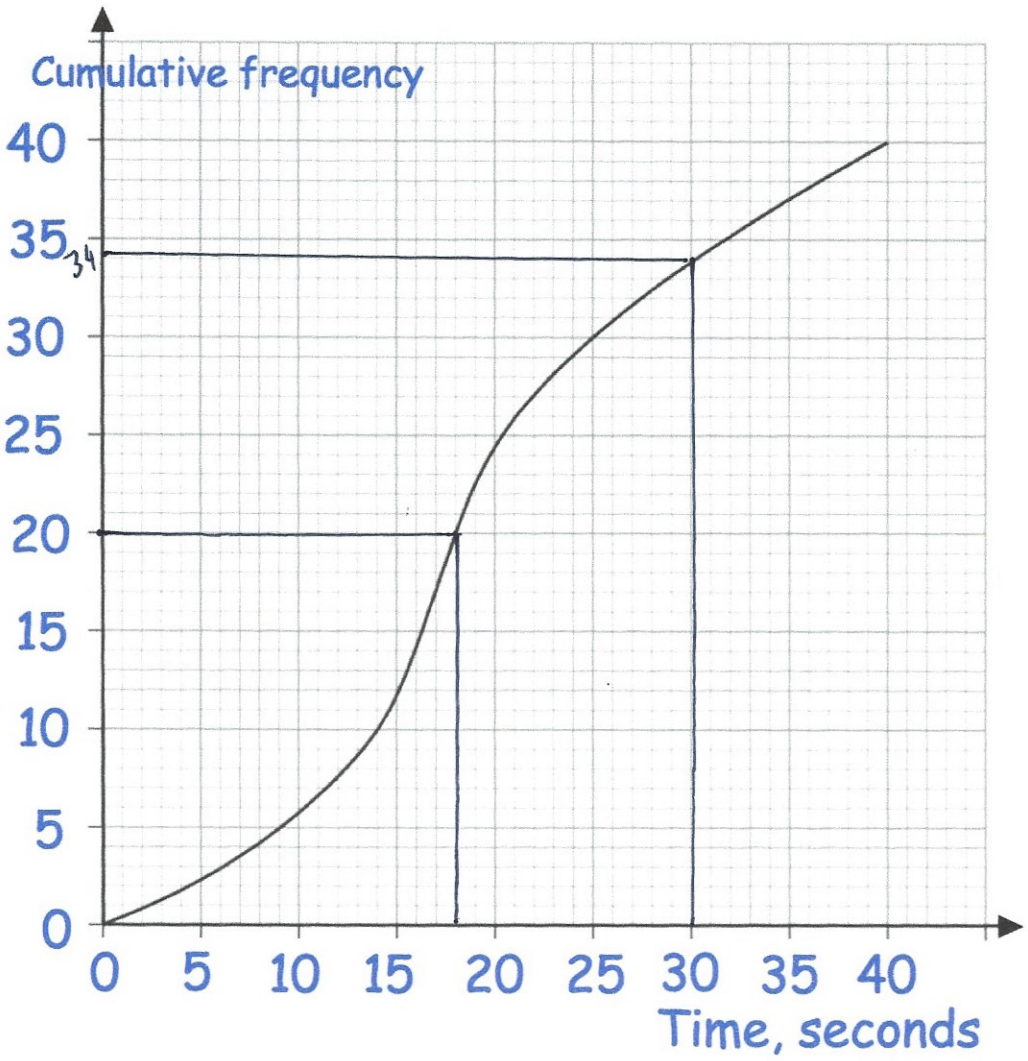
(c) Find the probability of both women failing.

$0.3 \times 0.2 = 0.06$

0.06

(2)

33. 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.

18 seconds

(1)

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

$\frac{6}{40} = \frac{3}{20} = 15\%$

only 15% took longer.

(2)

34. 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	fx
$0 < t \leq 10$ 5	2	10
$10 < t \leq 20$ 15	8	120
$20 < t \leq 30$ 25	12	300
$30 < t \leq 40$ 35	7	245
$40 < t \leq 50$ 45	1	45
		720

Work out an estimate for the mean time taken.

$720 \div 30 = 24$

24 .....minutes

(4)

35. The 10 students from class A and the 15 students from class B sit a test.

The mean mark for the class B is 70.
The mean mark for all 25 students is 77.

Work out the mean mark for the class A.

$$\begin{array}{r} 70 \\ \times 15 \\ \hline 350 \\ 700 \\ + \\ \hline 1050 \end{array} \qquad \begin{array}{r} 77 \\ \times 25 \\ \hline 385 \\ 1540 \\ \hline 1925 \end{array} \qquad \begin{array}{r} 875 \\ 1925 \\ -1050 \\ \hline \end{array}$$

$875 \div 10 = 87.5$

87.5

.....

(3)

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36. The table shows information about the amounts of money withdrawn from an ATM.

Money Withdrawn	Frequency	fx
£10	16	160
£20	19	380
£30	4	120
£40	3	120
£50	6	300
£60	2	120
	50	1200

Calculate the mean withdrawal amount.

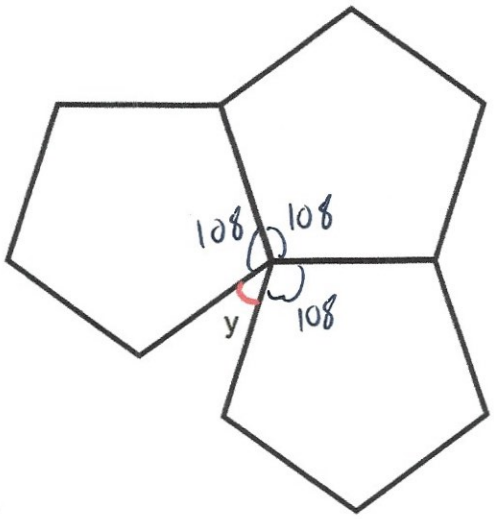
$1200 \div 50 = 24$

£24

.....

(3)

37.



Three identical regular pentagons are joined as shown above.

(a) Work out the size of angle y.

$360 - (3 \times 108)$

$360 - 324$

y = 36 °

(2)

The interior angle of a different regular polygon is 175°

(b) How many sides does the polygon have?

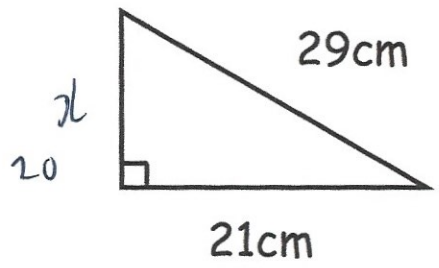
$180 - 175 = 5°$

$360 \div 5 = 72$

72

(2)

38. Shown is a right angled triangle.



Find the area of the triangle.

$x^2 + 21^2 = 29^2$

$x^2 = 400$

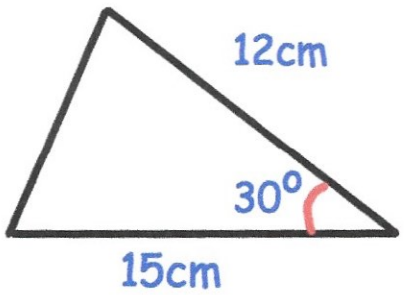
$x = 20$

$\frac{1}{2} \times 20 \times 21 = 210$

$210\ cm^2$

(4)

39.



Work out the area of the triangle.

$\frac{1}{2}$

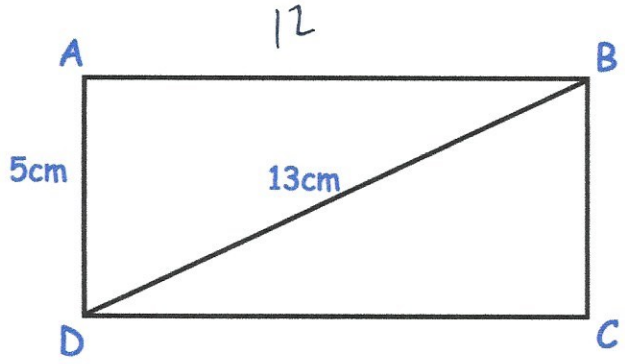
$\frac{1}{2} \times 12 \times 15 \times \sin 30$

$\frac{1}{4} \times 180 = 45$

$45\ cm^2$

(2)

40. Below is rectangle, ABCD



AD = 5cm
BD = 13cm

Calculate the perimeter of rectangle ABCD

$5^2 + y^2 = 13^2$

$25 + y^2 = 169$

$y^2 = 144$

$y = 12$

$12 + 5 + 12 + 5$

34

.....cm

(3)

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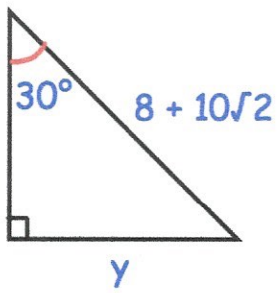
41. Shown below is a right angled triangle.

SOH



Find the exact length of the side labelled y.

$\sin(30) \times (8 + 10\sqrt{2})$

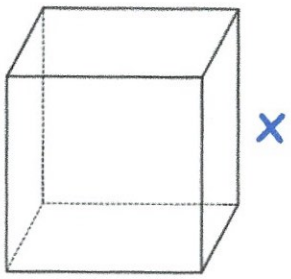
$\frac{1}{2} \times (8 + 10\sqrt{2})$

$4 + 5\sqrt{2}$

.....

(3)

42. A cube is shown below.



The volume of the cube is 729cm³.
Find x.

$\sqrt[3]{729} = 9$

9 .....cm
(2)

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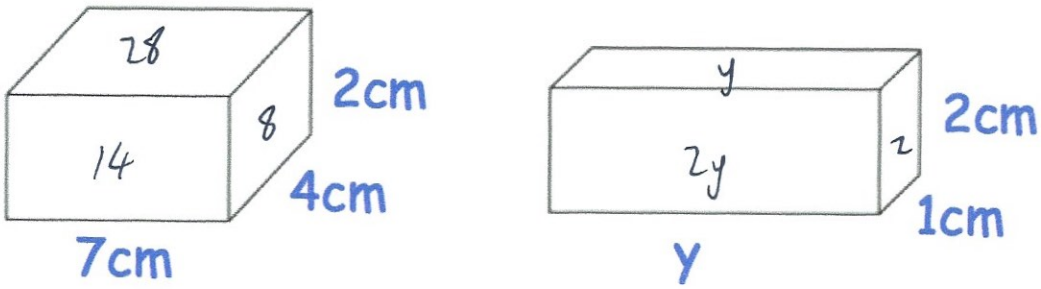
43. Shown below are two cuboids.



Both cuboids have the same surface area.

Find y.

$14 + 14 + 28 + 28 + 8 + 8 = 100\ cm^2$

$y + y + 2y + 2y + 2 + 2 = 6y + 4$

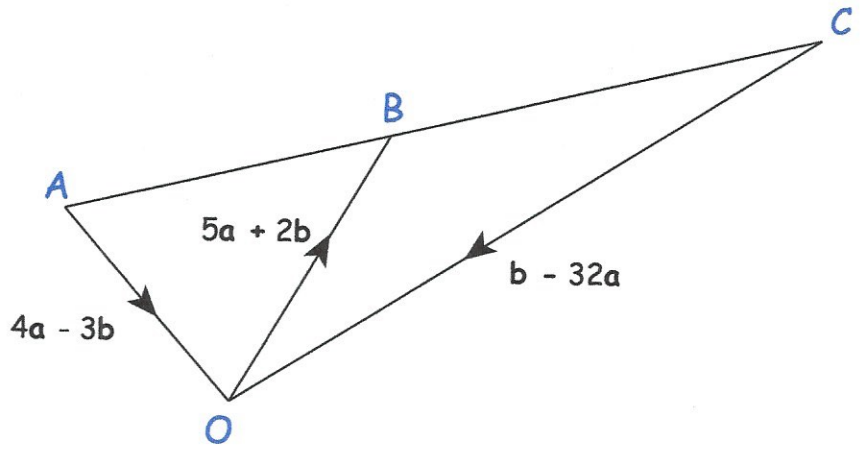
$6y + 4 = 100$

$6y = 96$

$y = 16$

16 .....cm
(5)

44.



Is ABC a straight line?
Explain your answer

$\overrightarrow{AB} = 9\underline{a} - \underline{b}$

$\overrightarrow{BC} = 27\underline{a} - 3\underline{b}$

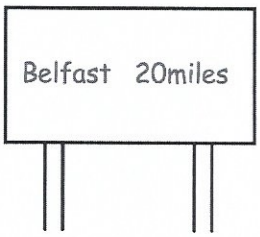
$= 3(9\underline{a} - \underline{b})$

$\overrightarrow{BC} = 3\overrightarrow{AB}$

$\overrightarrow{BC}$ is parallel to $\overrightarrow{AB}$ and they both pass through B. Therefore ABC is a straight line.

(3)

45.



A village is 20 miles from Belfast.

Conor drives from the village to Belfast at 40mph
Kelly drives from the village to Belfast at 50mph

Work out how much longer the journey takes Conor.
Give your answer in minutes.

s d t

$t = \frac{d}{s}$

$\frac{20}{40} = \frac{1}{2}$ hour

$\frac{20}{50} = 0.4$ hour

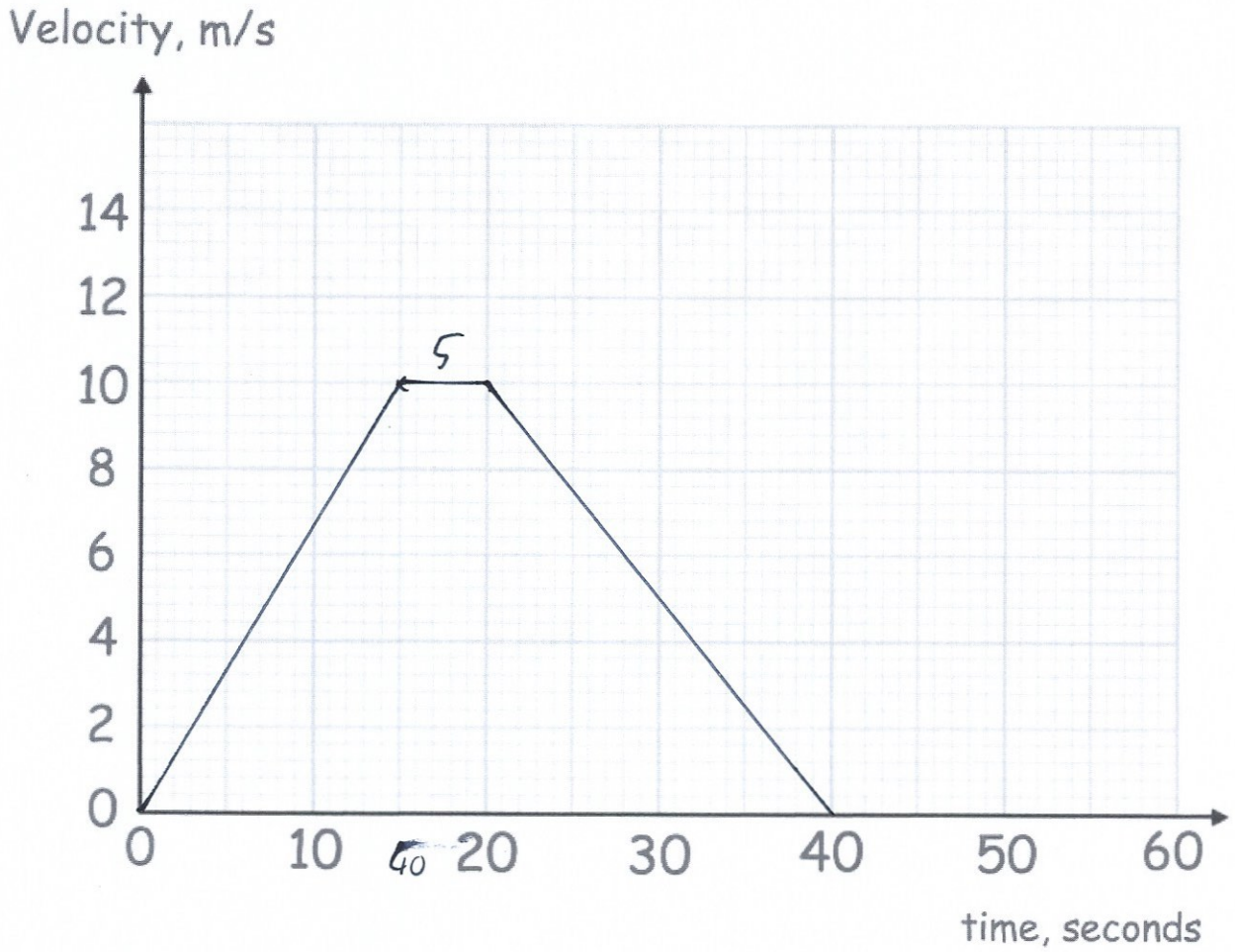
$0.4 \times 60 = 24$ min

6 .....minutes
(3)

~~47.~~ A remote control car drives in a straight line.

46. 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.

$\frac{1}{2}(40+5) \times 10$

$\frac{1}{2} \times 45 \times 40$

5×45

225 .....m

(2)

47. The mass of $3m^3$ of tin is 21840kg.

(a) Work out the density of tin.

d m v

$3 \overline{)21840}$ = 07280

7280 kg/m^3

(2)

The density of aluminium is 2712kg/m^3.

2712 × 5 = 13560kg

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

21840 ÷ 3 = 7280

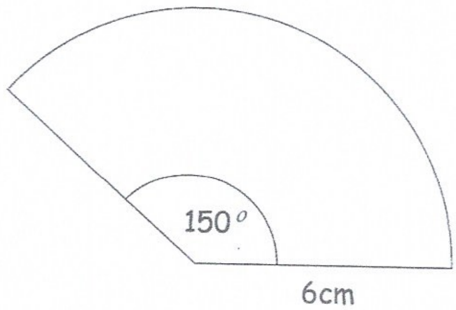
7280 × 5 = 36400kg

36400 − 13560 = 22840

22840 kg

(3)

48. Shown is a sector of a circle.



Find the area of the sector.
Give your answer in terms of π

$\frac{150}{360} \times \pi \times 6^2$

$\frac{5}{12} \times \pi \times 36$

15π cm²

(3)