Name:

GCSE Maths 2022
OCR Higher Paper 5
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.

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 5
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

© CORBETTMATHS 2022

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)

2. Work out

$$1\frac{2}{11} \times \frac{8}{9}$$

$\frac{13}{11} \times \frac{8}{9} = \frac{104}{99}$

$1\frac{5}{99}$

.....

(2)

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)

© CORBETTMATHS 2022

4. What is the reciprocal of 4?

Circle the correct answer.

4 0.4 $\frac{1}{4}$ –4

(1)

---

5. (a) 1.7 x 1.5

17
×15
85
170
+
255

2.55

(2)

(b) 1.88 ÷ 0.8

0.2 3 5
8 | 1 8 . 8 4 0

2.35

(2)

(c) 14 ÷ 0.04

1400 ÷ 4

350

(2)

© CORBETTMATHS 2022

6. Work out an estimate for

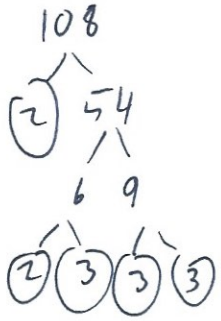
$$\frac{596.4 \times 2.06}{0.521}$$

$\approx \frac{600 \times 2}{0.5}$ $\quad \frac{1200}{0.5}$

2400

(3)

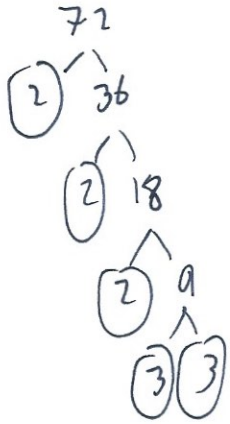
7. (a) Express 108 as a product of its prime factors.
Give your answer in index form.

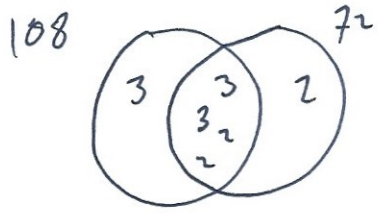


$2^2 \times 3^3$

(3)

(b) Find the Highest Common Factor (HCF) of 108 and 72.





HCF $= 3 \times 3 \times 2 \times 2$
$= 36$

36

(2)

© CORBETTMATHS 2022

8. Work out the value of

$$\frac{2^{-4} \times 2^{-3}}{2^{-11}}$$

2^{-7} / 2^{-11} $= 2^4$

16

.....

(3)

---

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

$1 / 5^3$

$\frac{1}{125}$

.....

(1)

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

$\sqrt{36} = 6$

$6^3 = 216$

216

.....

(1)

---

10. Work out $(4.5 \times 10^7) \div (5 \times 10^{-2})$
Give your answer in standard form.

0.9×10^9

9×10^8

9×10^8

.....

(2)

© CORBETTMATHS 2022

11. 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.

35% of 3600 = £1260

3600 - 1260 = £2340

2340 ÷ 4 = £585

585 × 2 = £1170

No, Edward paid more than twice

(4)

© CORBETTMATHS 2022

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

Work out her percentage profit

$\frac{96}{120} \times 100$

$\frac{4}{5} \times 100$

80 ..... %

(3)

---

13. Sami invested £400 for 2 years at 5% per year simple interest.

Work out the total interest Sami gets.

5% of £400 = £20

£ 40 .....

(3)

---

14. Natalie invests £600 for 2 years at 5% per year compound interest.
How much interest does she earn?

1st year £630

2nd year £661.50

63 ÷ 2 = £31.50

£ 61.50 .....

(2)

© CORBETTMATHS 2022

15. Write $1.\dot{3}2\dot{5}$ as a fraction.

Give your answer in its simplest form.

$x = 1.325\,325\ldots$

$1000x = 1325.325\ldots$

$999x = 1324$

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

$1\frac{325}{999}$

(3)

16. 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 Charlene.

(b) How much does each woman receive?

$48 \div 2 = 24$

$24 \times 7 = 168$

$24 \times 9 = 216$

Charlene £ 168

Danielle £ 216

(3)

© CORBETTMATHS 2022

17. 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.

$F \propto \frac{1}{d^2}$

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

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

$50 = \frac{k}{4}$

$k = 200$

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)

© CORBETTMATHS 2022

18. 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.

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

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

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

$$= -11+7\sqrt{2}$$

.....

(3)

---

19. Convert $\frac{7}{8}$ to a decimal.

$$8\overline{)7.^{7}0^{6}0^{4}0}$$

0.875

.....

(2)

---

20. Expand and simplify $(y+7)^2-(y-2)(y+7)$

$$y^2+14y+49-(y^2+5y-14)$$

$$9y+63$$

9y+63

.....

(2)

© CORBETTMATHS 2022

21. (a) Expand and simplify $(x + 9)(x - 8)$

$x^2 + x - 72$

(2)

(b) Expand and simplify $(x - 5)(x - 2)(x - 1)$

$(x^2 - 7x + 10)(x - 1)$

$x^3 - 7x^2 + 10x - x^2 + 7x - 10$

$x^3 - 8x^2 + 17x - 10$

(4)

---

22. Factorise fully

$9m^2 - 12mp$

$3m(3m - 4p)$

(2)

---

23. (a) Factorise $2x^2 - x - 10$

$(2x - 5)(x + 2)$

(2)

(b) Solve $2x^2 - x - 10 = 0$

$x = -2$ or $x = 2.5$

(1)

© CORBETTMATHS 2022

24. $M = 4ac^2$

$a = 2 \times 10^{-6}$ and $c = 3 \times 10^4$

Work out the value of M

$4 \times (2 \times 10^{-6}) \times (3 \times 10^4)^2$

$4 \times (2 \times 10^{-6}) \times (9 \times 10^8)$

$4 \times (18 \times 10^2)$

72×10^2

M = 7200

(3)

25. Make m the subject of the formula

$$y = \frac{m + 4}{m + 5}$$

$y(m+5) = m+4$

$my + 5y = m + 4$

$my - m = 4 - 5y$

$m(y-1) = 4-5y$

m = $\frac{4-5y}{y-1}$

(3)

26. A line has a gradient of 8 and passes through the point (2, 3). (x, y)
Find the equation of the line.

$y = 8x + c$

$3 = 16 + c$

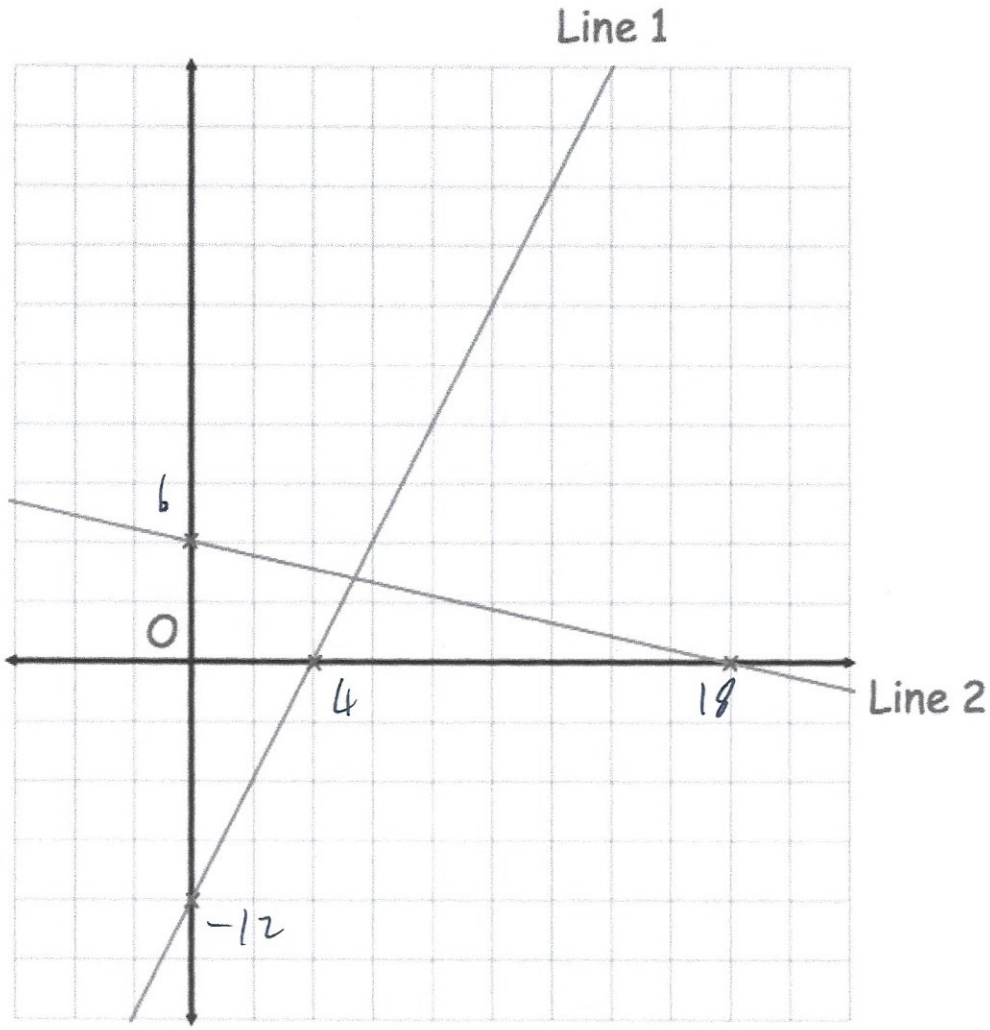
$c = -13$

$y = 8x - 13$

(3)

© CORBETTMATHS 2022

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



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

(a) Find the equation of Line 2

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

(4)

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

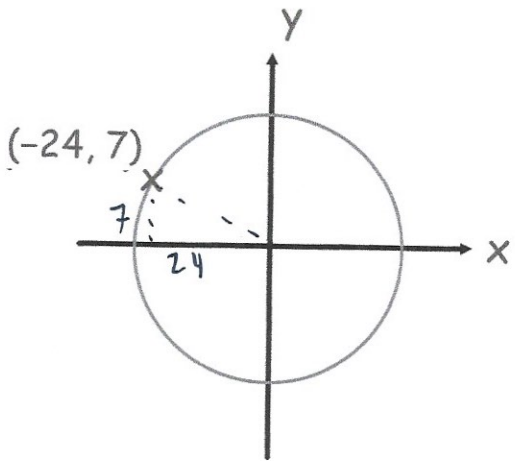
Yes $3x - \frac{1}{3} = -1$

(1)

© CORBETTMATHS 2022

28. The circle below has centre (0, 0).
The point (−24, 7) is a point on the circle.

Find the equation of the circle.



$7^2 + 24^2 = 625$

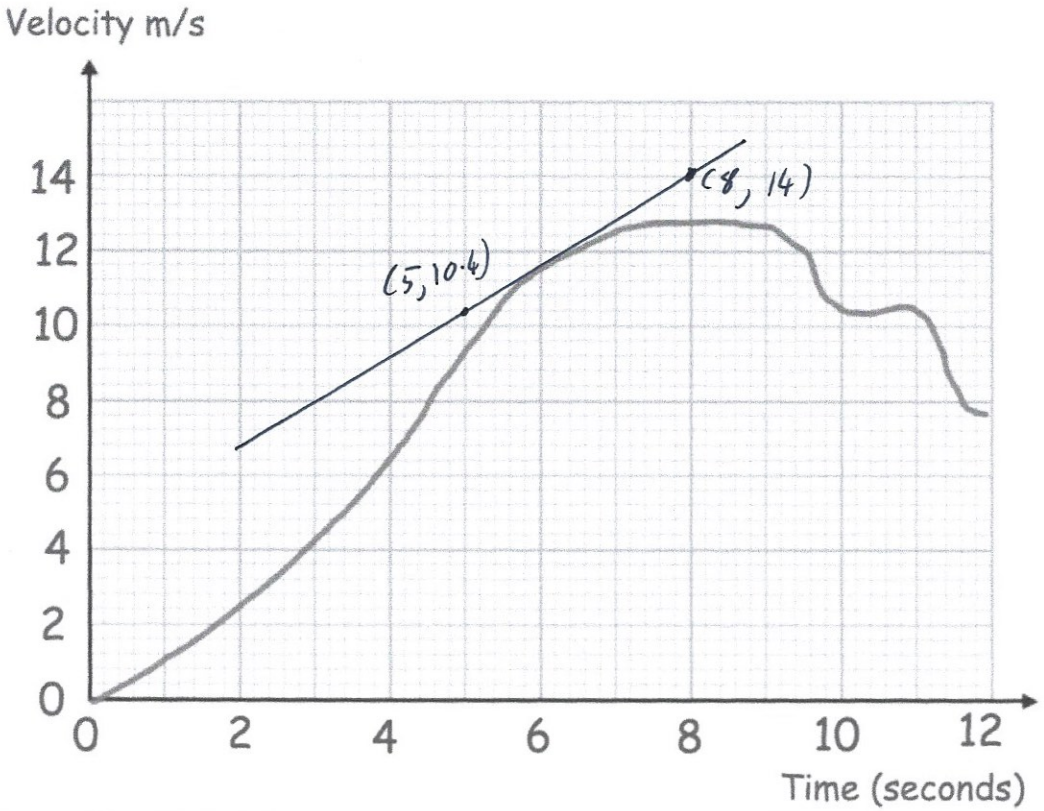
$\sqrt{625} = 25$

$x^2 + y^2 = 625$

(2)

© CORBETTMATHS 2022

29.



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

$$\frac{14 - 10.4}{8 - 5}$$

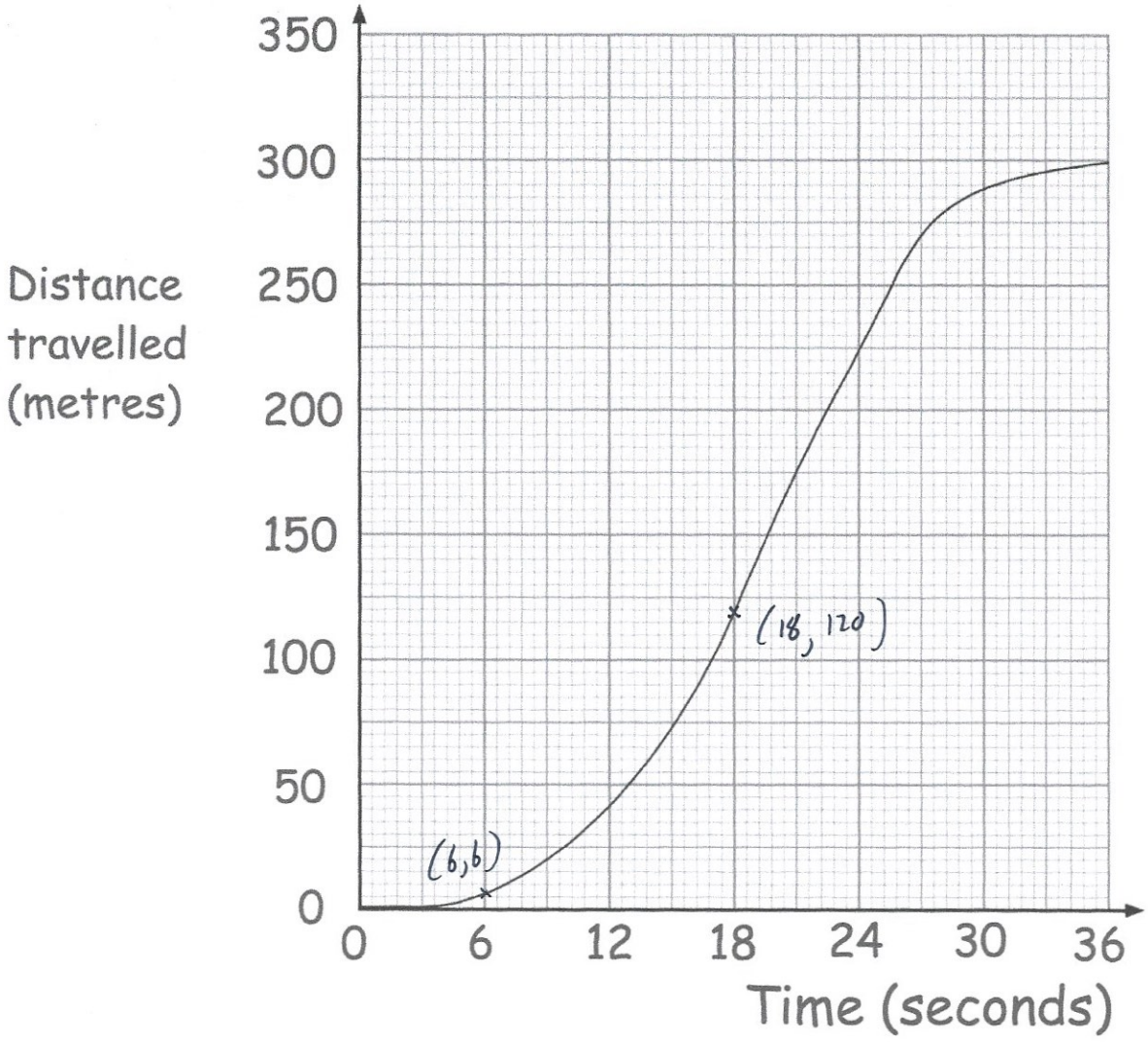
$3.6 \div 3 = 1.2$

$1.2\ m/s^2$

(3)

© CORBETTMATHS 2022

30. 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.

$\frac{120-6}{18-6} = \frac{114}{12}$

9.5

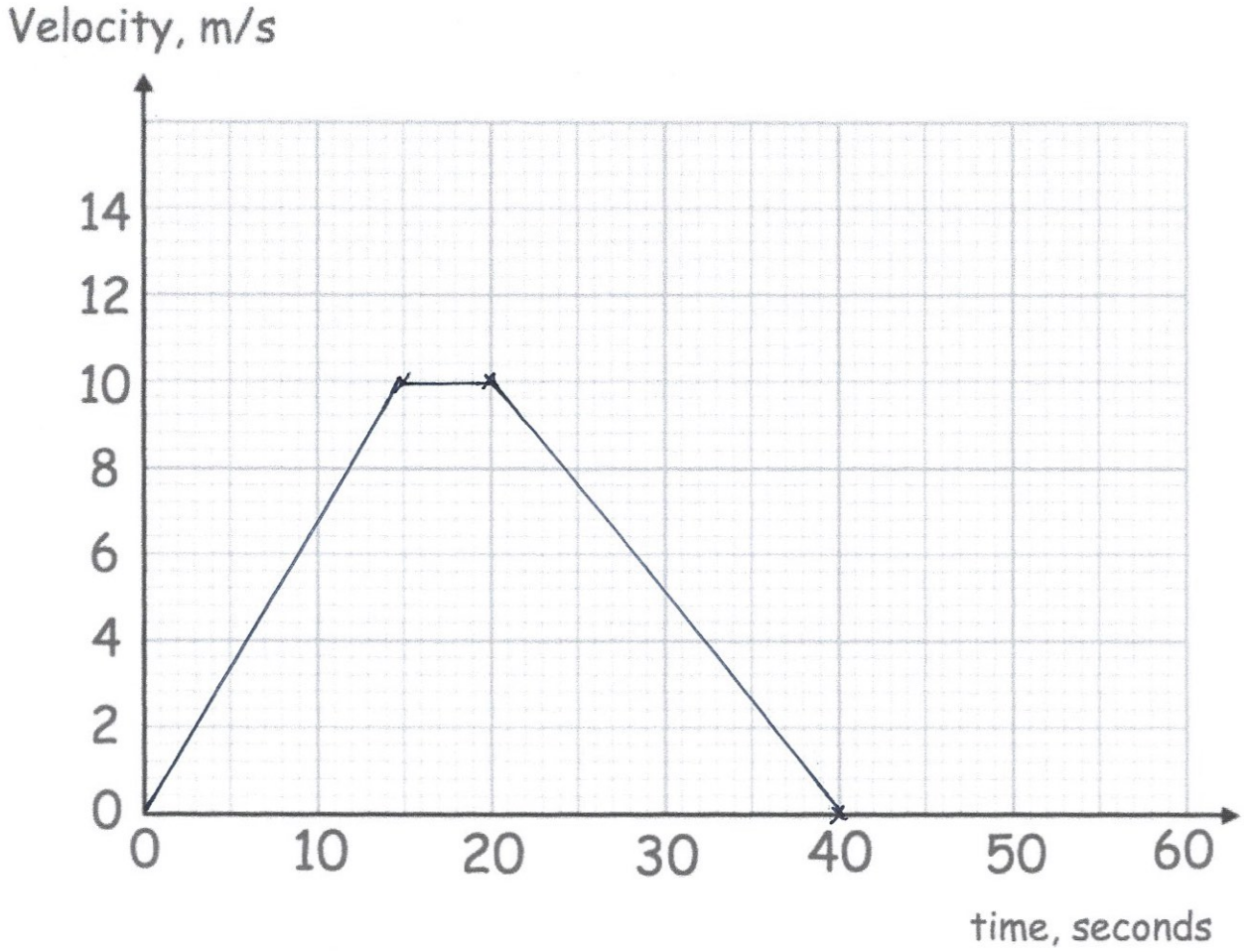
.....m/s

(3)

© CORBETTMATHS 2022

31. 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.

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

$\frac{1}{2}\times 45\times 10$

5×45

.....225.....m

(2)

© CORBETTMATHS 2022

32. 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.

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

$b = -3$

$a = 1$

$b^2 - 4ac = 29$

$9 - 4c = 29$

$4c = -20$

$c = -5$

a = 1

b = -3

c = -5

(3)

---

33. 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)

© CORBETTMATHS 2022

34. (a) The table below shows values of x and y for $y = x^3 - 8x - 10$

x	0	1	2	3	4
y	-10	-17	-18	-7	22

Between which two consecutive integers is there a solution to the equation $x^3 - 8x - 10 = 0$?

Explain your answer.

x = 3 and x = 4

there is a change in sign

(2)

(b) Which of the following iteration formulae cannot be found by rearranging the equation $x^2 - 9x + 2 = 0$?

A $x_{n+1} = 9 - \frac{2}{x_n}$

B $x_{n+1} = \frac{x_n^2}{9} + \frac{2}{9}$

C $x_{n+1} = \frac{9}{2} - \frac{x_n}{2}$

D $x_{n+1} = \sqrt{9x_n - 2}$

$x^2 = 9x - 2$

$x = \sqrt{9x - 2}$

$\therefore$ D is possible

$x^2 + 2 = 9x$

$9x = x^2 + 2$

$x = \frac{x^2}{9} + \frac{2}{9}$

$\therefore$ B is possible

$x^2 = 9x - 2$

$x = 9 - \frac{2}{x}$

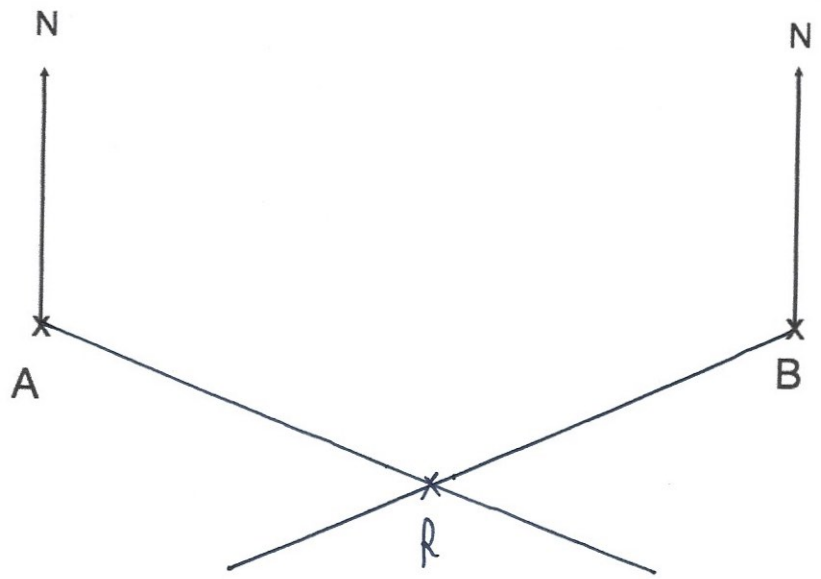
$\therefore$ A is possible

C

(3)

© CORBETTMATHS 2022

35. The diagram shows the position of two towns, A and B.



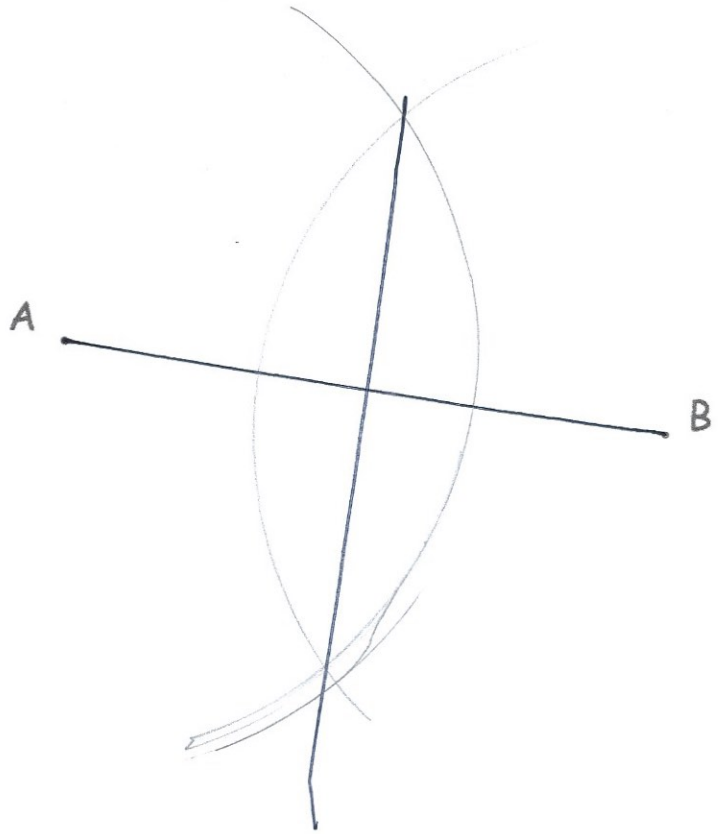
A rugby club, R, has bearing of 110° from town A.
The rugby club, R, has bearing 245° from town B.

In the space above, show the position of the rugby club R.
Mark the position with a cross (x) and label it R.

(3)

© CORBETTMATHS 2022

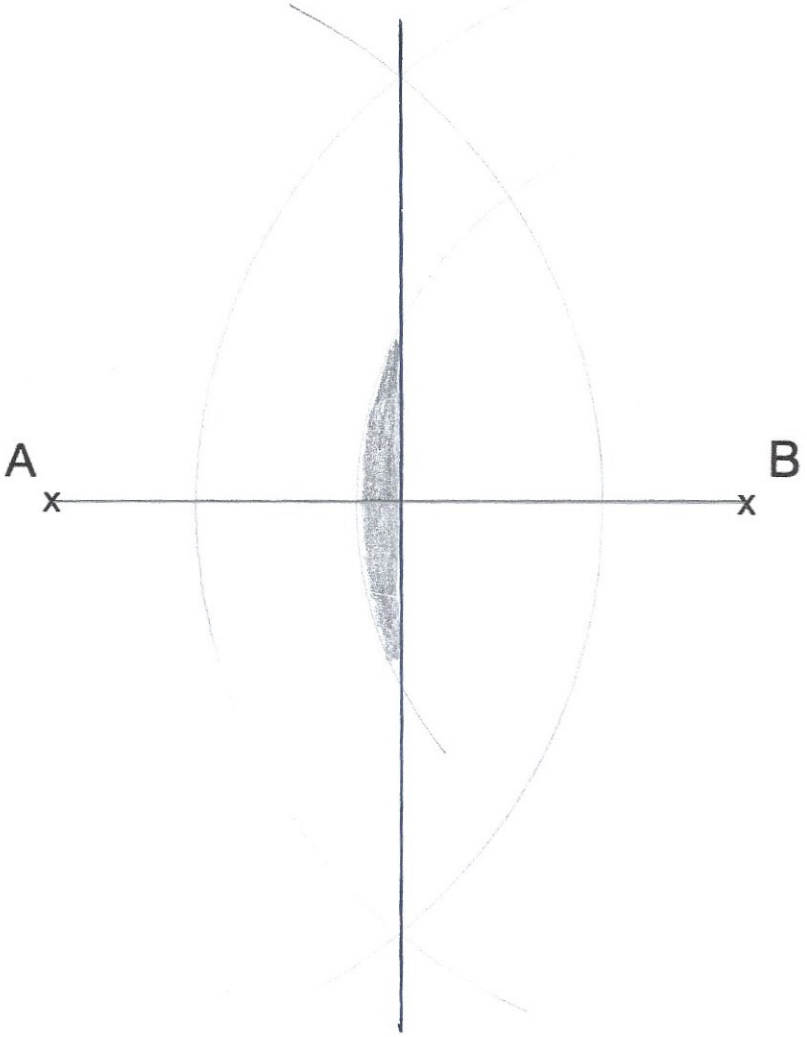
36. Use ruler and compasses to construct the perpendicular bisector of AB.
You **must** show clearly all your construction arcs.



(2)

© CORBETTMATHS 2022

37. A and B are two points.

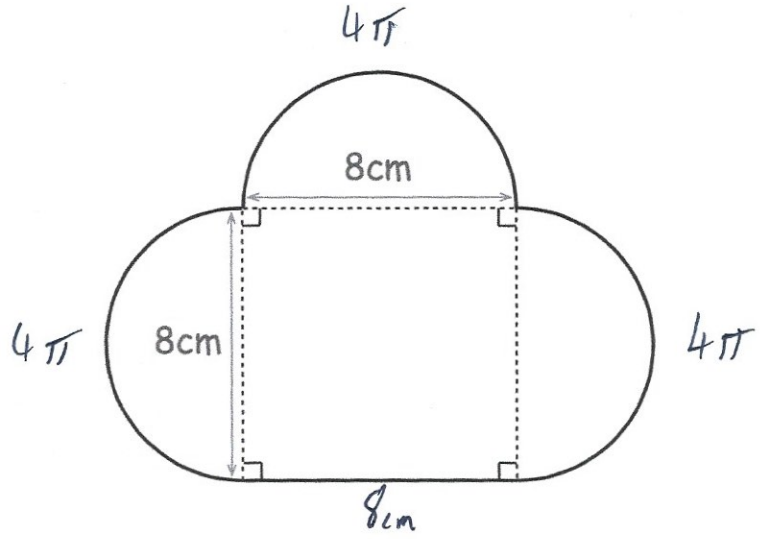


Shade the region which contains those points which are both closer to A than to B, and less than 5cm from B.

(2)

© CORBETTMATHS 2022

38.



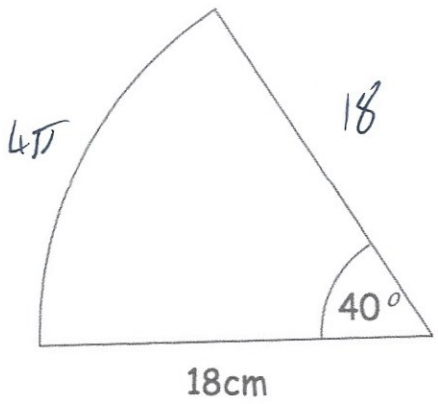
Find the perimeter of this compound shape.
Give your answer in terms of π

$\frac{1}{2} \times \pi \times 8 = 4\pi$

$8 + 12\pi$ .....cm

(3)

39.



Find the perimeter of the sector, giving your answer in terms of π.

$\frac{40}{360} \times \pi \times 36$

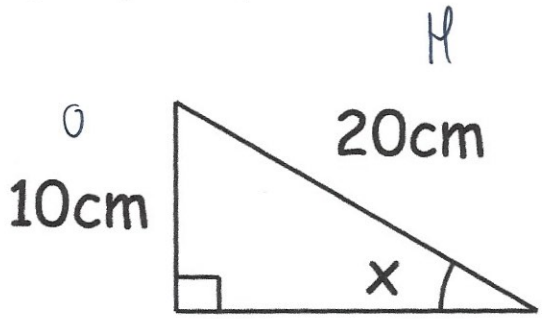
$\frac{4}{36} \times \pi \times 36 = 4\pi$

$36 + 4\pi$ .....cm

(3)

© CORBETTMATHS 2022

40. Shown below is a right angle triangle.



Find the size of angle x.

$\sin x = \frac{10}{20}$

$\sin x = \frac{1}{2}$

30 .....°

(3)

---

41. Write down the exact value of Sin 60°

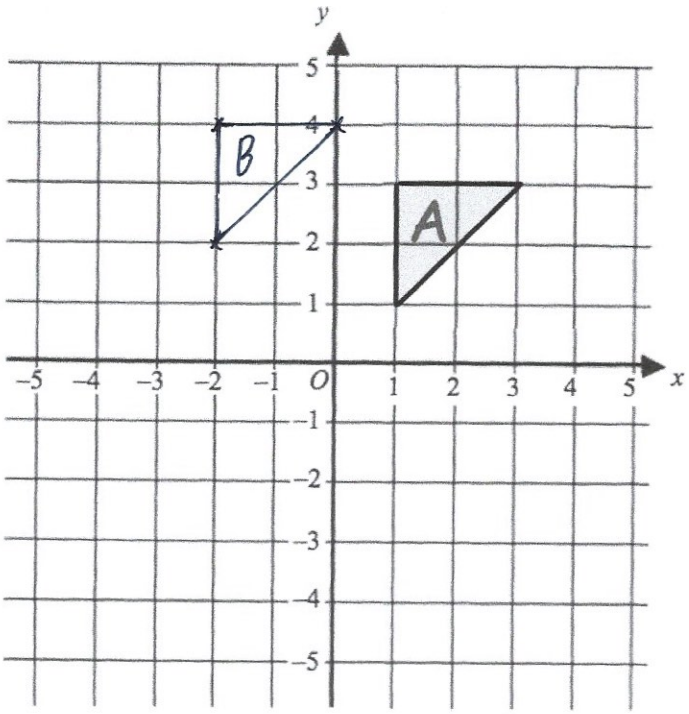
$\frac{\sqrt{3}}{2}$

.....

(1)

© CORBETTMATHS 2022

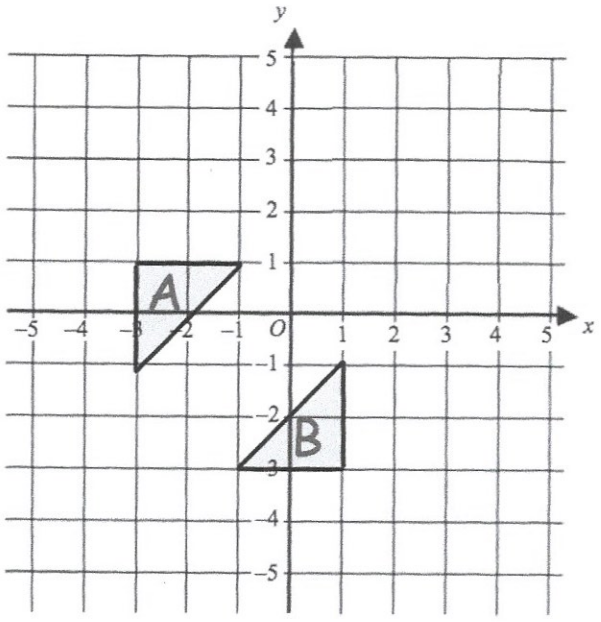
42.



Translate triangle A by the vector $\begin{pmatrix} -3 \\ 1 \end{pmatrix}$

(2)

43.



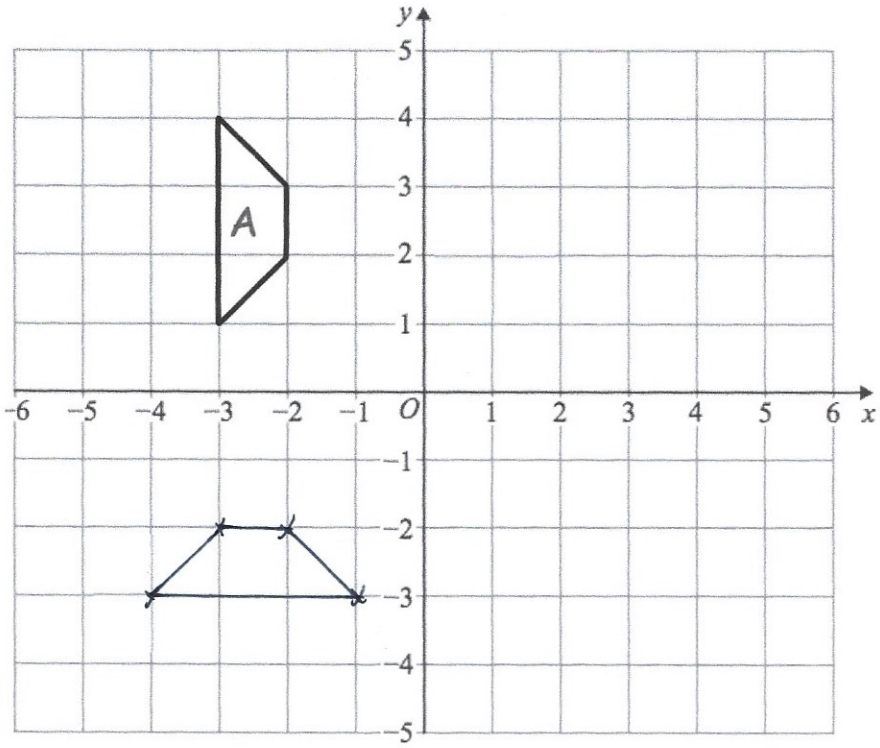
Describe fully the single transformation that maps triangle A onto triangle B.

Reflection mirrot line of $y = x$

(2)

© CORBETTMATHS 2022

44.

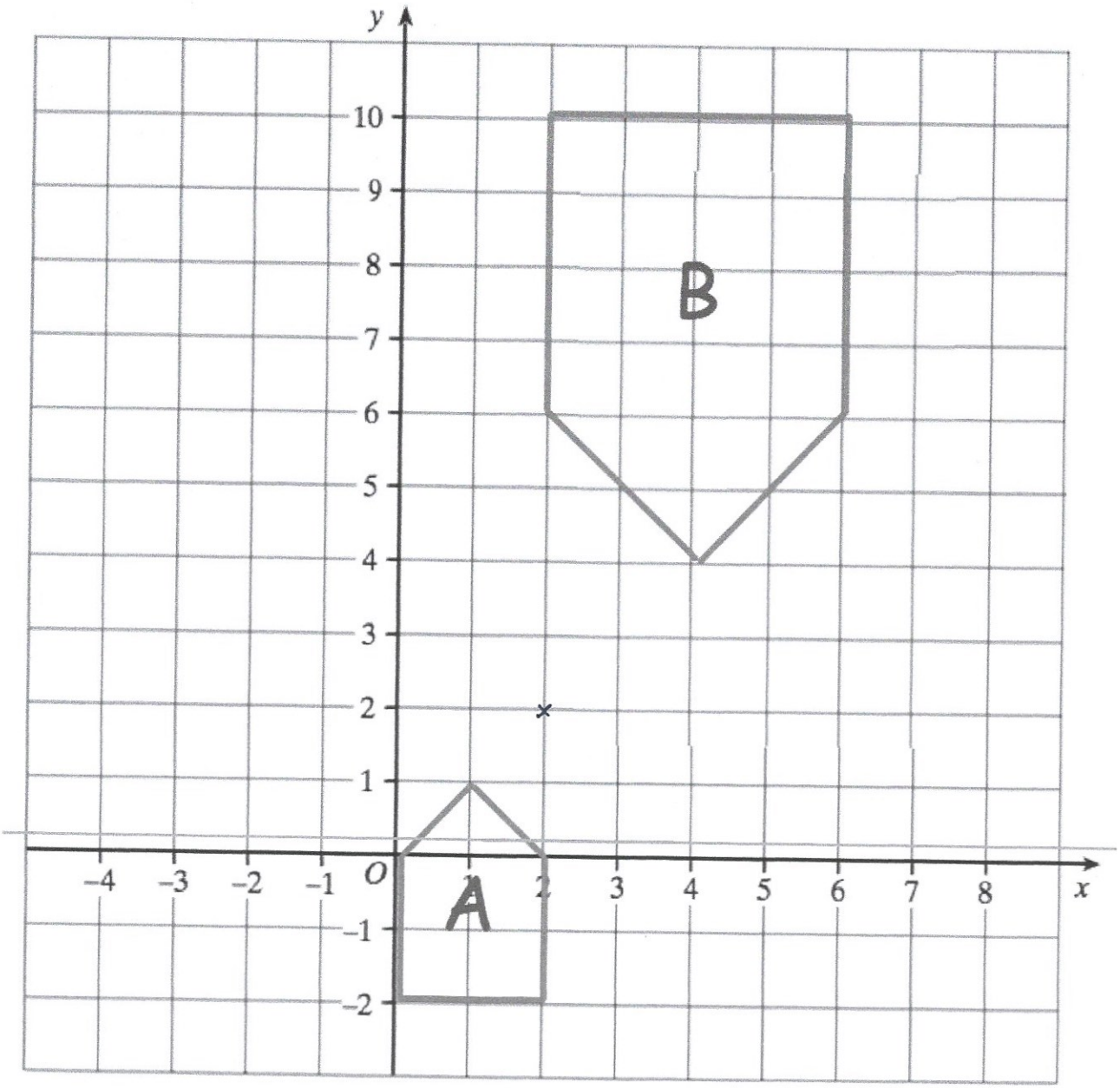


Rotate trapezium A 90° anti-clockwise about the origin.

(3)

© CORBETTMATHS 2022

45.



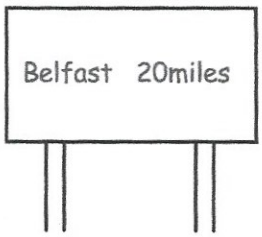
Describe fully the single transformation that maps shape A onto shape B.

Enlargement, scale factor −2, centre of enlargement (2, 2)

(2)

© CORBETTMATHS 2022

46.



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.

$s \quad \overset{d}{\cdot} \quad t$

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

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

$\frac{20}{50} = 0.4$ hour
(24 min)

6 .....minutes
(3)

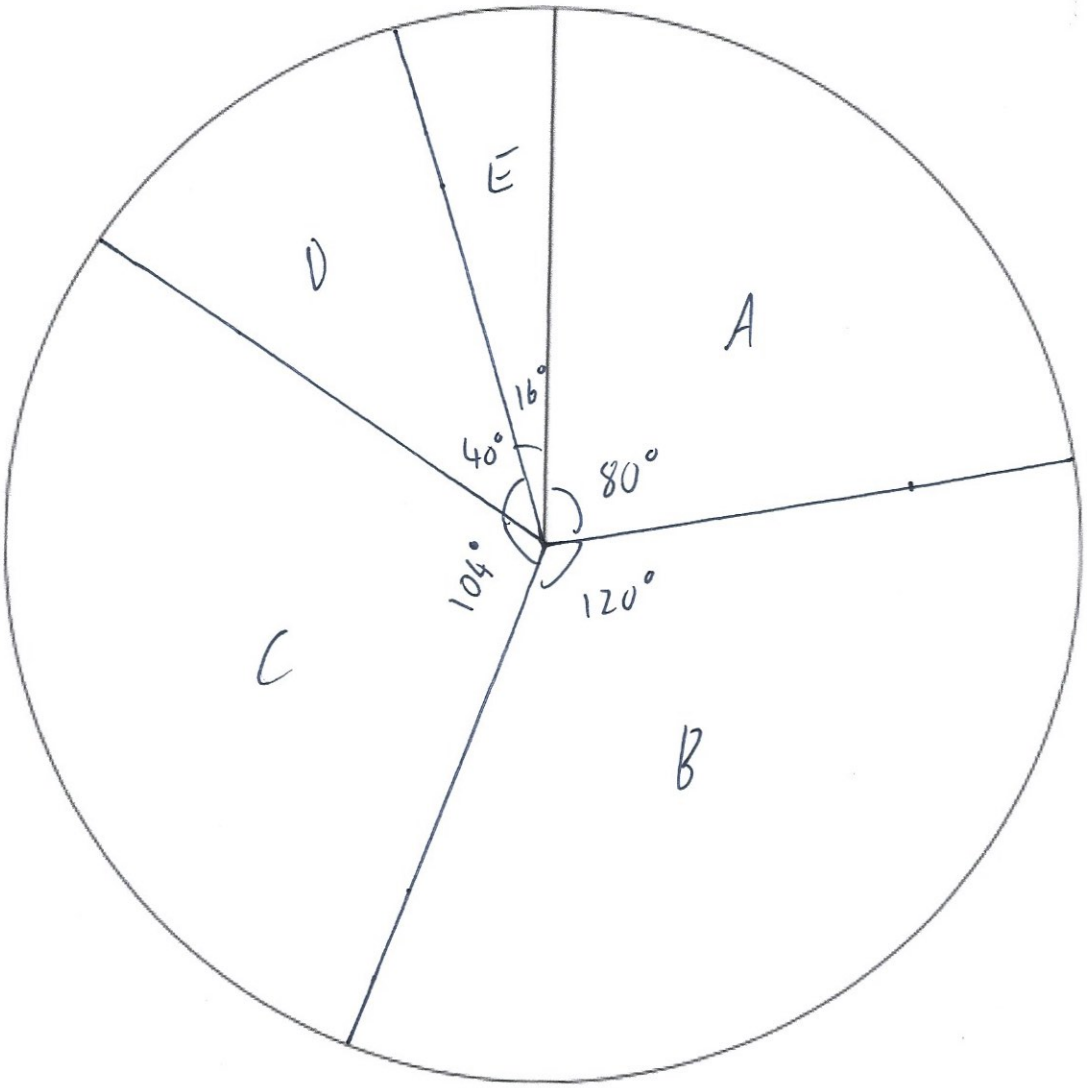
© CORBETTMATHS 2022

47. The table gives information about the grades student got in a test.

Grade	Frequency	
A	10 × 8	80°
B	15 × 8	120°
C	13 × 8	104°
D	5 × 8	40°
E	2 × 8	16°
	45	

360 ÷ 45 = 8

Draw an accurate pie chart to show this information.



(4)

© CORBETTMATHS 2022

48. A bag contains good and bad apples.
n of the apples are good.
The other 5 apples are bad.

Maryam will take at random, an apple from the bag.

Write down an expression, in terms of n, for the probability that Maryam will take a good apple.

$\frac{n}{n+5}$

.....

(2)

---

49. A spinner has a green section and a blue sector.
The spinner is spun 500 times.
The table shows the relative frequency of a green after different numbers of spins.

Number of spins	Relative frequency of a green
100	0.12
200	0.17
300	0.21
400	0.23
500	0.22

How many times was a green obtained after 400 spins?

400×0.23

92

.....

(2)

© CORBETTMATHS 2022

50. A bag contains discs, each with a letter written on it.

One disc is taken at random from the bag.
The disc is not replaced.
Another disc is taken at random from the bag.

Calculate the probability that exactly one M is taken from the bag.

$P(M, \text{Not } M) = \frac{2}{11} \times \frac{9}{10} = \frac{18}{110}$

$P(\text{Not } M, M) = \frac{9}{11} \times \frac{2}{10} = \frac{18}{110}$

$\frac{36}{110}$

$\frac{18}{55}$

.....

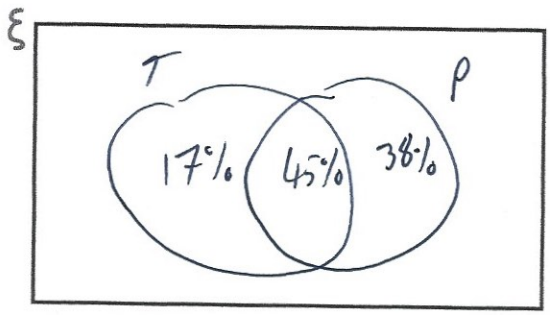
(5)

© CORBETTMATHS 2022

51. A PE test has two sections, theory and practical.

Everyone in a class who took the PE test passed at least one section.
62% passes the theory section and 83% passed the practical section.

(a) Represent this information on a Venn diagram



(3)

A student is selected at random.

Work out the probability that this person

(a) passed the theory section, given they passed the practical section.

45/83

.....

(2)

(b) passed the practical section, given they passed only one section.

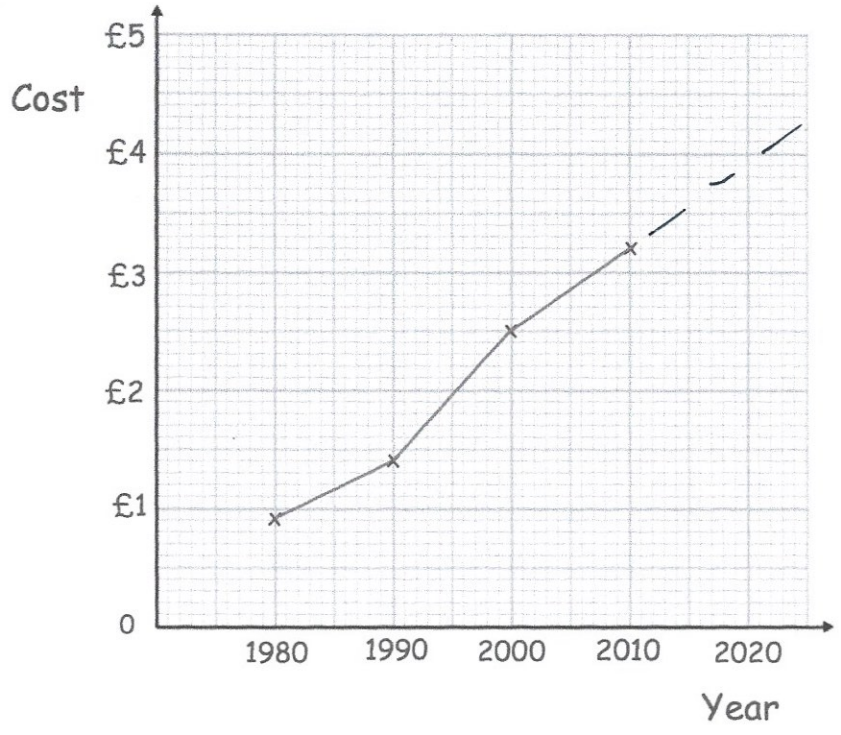
38/55

.....

(2)

© CORBETTMATHS 2022

52. The line graph below shows the cost of a coffee in a shop over 30 years.



(a) In which year was the price £2.50?

2000

(1)

(b) How much was the price of a coffee in 1990?

£1.40

(1)

Carlos says that the price of a coffee will be £6 by 2020.

Do you agree with Carlos?
Explain your answer.

No, the price may rise to around £4 but £6 seems too expensive.

(2)

© CORBETTMATHS 2022