Name:

GCSE Maths 2022
Edexcel Higher Paper 2
Set B
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 2
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

$$\sqrt[3]{9^2 - 1.8^3}$$

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

4.220309794

(2)

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

4.2

(1)

2. Nancy goes to the Post Office to exchange money.

Exchange Rates
£1 : $1.31
£1 : €1.14
*Commission Charged

Nancy changes $759.80 and €342 into pounds sterling.
The Post Office deducts their commission and gives Nancy £827.20

What is the percentage commission?

759.80 ÷ 1.31 = £580

342 ÷ 1.14 = £300

£880

880 − 827.20 = 52.8

$\frac{52.8}{880} \times 100 = 6$

6 %

(4)

3. Work out the value of

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

2^{-7} over 2^{-11}

$-7-(-11)=4$

$2^4=16$

16

.....

(3)

4. The table gives information about the number of people voting for each party at an election.

Party	Number of Votes
Gold Party	12598
Pink Party	9112
Brown Party	20059
Purple Party	4466

46235

There are 52852 people who can vote
The target was that 88% of people would vote.

Was the target met?

$\frac{46235}{52852} \times 100 = 87.48..\%$

No

(3)

5. 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?

500×0.86^{n}

$n = 6$ 202.28 kg

$n = 7$ 173.96 kg

7 .....years

(3)

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6. At Donhampton High School the ratio of Year 10 pupils to Year 11 pupils is 7:5
Each pupil studies one language, Spanish or German.

$\frac{3}{5}$ of the Year 11 pupils studied Spanish.

168 Year 11 pupils studied German.

75% of the Year 10 pupils study Spanish.

How many Year 10 pupils study Spanish?

168 is $\frac{2}{5}$ of number of Year 11 students

420 students in Year 11.

$420 \div 5 = 84$

$84 \times 7 = 588$

75% of 588 = 441

441 .....

(4)

7. The cost of a circular table is directly proportional to the square of the radius.
A circular table with a radius of 40cm cost £50.

What is the cost of a circular table with a radius of 60cm?

$C \propto r^2$

$C = kr^2$

$50 = k \times 40^2$

$50 = k \times 1600$

$k = \frac{1}{32}$

$C = \frac{1}{32} r^2$

$C = \frac{1}{32} \times 60^2$

$= \frac{1}{32} \times 3600$

£ 112.50

(3)

8. y is inversely proportional to x

x	16	8	4
y	5	10	20

Complete the table above

$y \propto \frac{1}{x}$

$y = \frac{k}{x}$

$10 = \frac{k}{8}$

$k = 80$

$y = \frac{80}{x}$

$20 = \frac{80}{x}$

$x = 4$

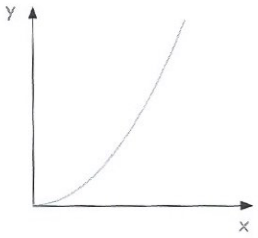
$y = \frac{80}{16}$

$= 5$

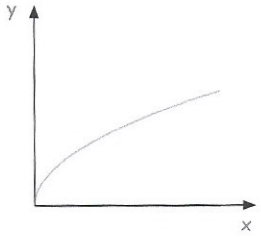
(2)

9. These graphs represent four different types of proportionality.

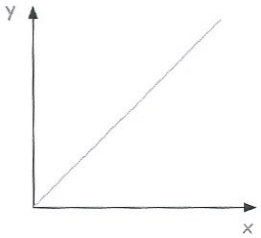
Graph 1



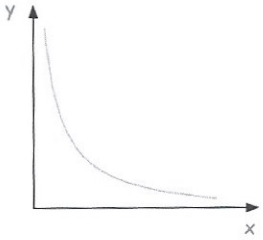
Graph 2



Graph 3



Graph 4



Match each type of proportionality to the correct graph.

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

(2)

10. It would take 48 days for 5 ~~men~~ workers to build a house.

(a) How much longer would it take if only 4 ~~men~~ workers built the house?

$48 \times 5 = 240$

$240 \div 4 = 60$

$60 - 48 = 12$

12 days

(3)

(b) State one assumption you made in working out your answer to (a)

All workers work at the same rate.

(1)

11. A number, y, is truncated to 1 decimal place.
The result is 8.1

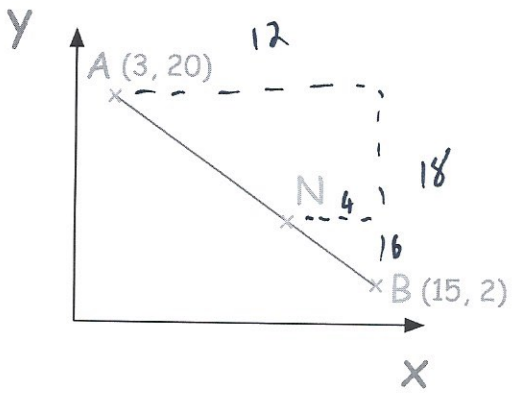
Using inequalities, write down the error interval for y

$8.1 \leq y < 8.2$

(2)

12. A is the point with coordinates (3, 20)
B is the point with coordinates (15, 2)

N is a point of the line AB such that AN : NB = 2 : 1



Find the coordinates of the point N.

(11, 8)

(3)

13. Expand and simplify $5(2y - 3) + 3(y - 2)$

$10y - 15 + 3y - 6$

$13y - 21$

(2)

14. Expand and simplify $(x-1)(3x-1)(x-4)$

$(x-1)(3x^2-13x+4)$

$3x^3-13x^2+4x-3x^2+13x-4$

$3x^3-16x^2+17x-4$

(3)

15. Simplify fully

$$\frac{5x^2-13x-6}{x^2-9}$$

$\frac{(5x+2)(x-3)}{(x-3)(x+3)}$

$\frac{5x+2}{x+3}$

(3)

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

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

(2)

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

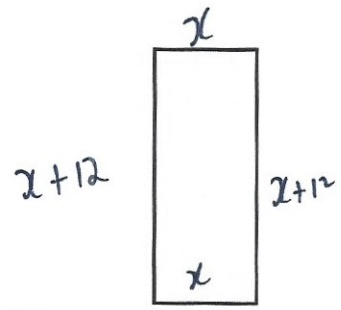
$(2x-5)(x+2)=0$

$x=\frac{5}{2}$ or $x=-2$

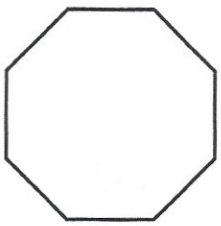
$x=\frac{5}{2}$ or $x=-2$

(1)

17. Here is a rectangle and a regular octagon.



$P = 4x + 24$



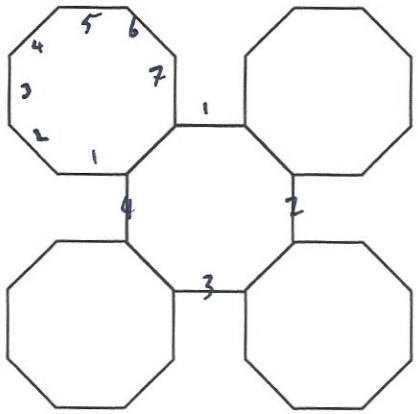
$0.5x+3$

$\frac{4x+24}{8}$

$= 0.5x + 3$

The length of the rectangle is 12cm longer than the width of the rectangle.
The perimeter of the rectangle is equal to the perimeter of the octagon.

5 of the regular octagons are used to make a shape.



The perimeter of this shape is 132cm

Work out the area of the rectangle

$28(0.5x+3) + 4(0.5x+3) = 132$

$32(0.5x+3) = 132$

$16x + 96 = 132$

$16x = 36$

$x = 2.25$

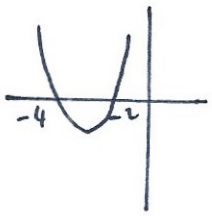
2.25×14.25

32.0625 .....cm²

(6)

18. Solve the inequality $x^2 + 6x + 8 < 0$

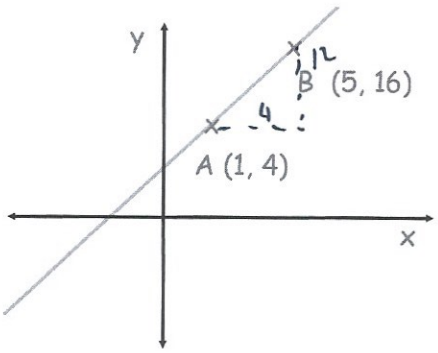
$(x+2)(x+4)$



$-4 < x < -2$

(3)

19. A straight line passes through the point A(1, 4) and B(5, 16)



x y

Find the equation of the line parallel to AB that passes through (–8, 2)

$\frac{12}{4} = 3$

$y = 3x + c$

$2 = -24 + c$

$c = 26$

$y = 3x + 26$

(4)

20. The functions $f(x)$ and $g(x)$ are given by the following:

$$f(x) = 8 - 3x$$
$$g(x) = 4x$$

(a) Calculate the value of $gf(3)$

$f(3) = 8 - 9$
$= -1$

$g(-1) = 4(-1)$
$= -4$

-4

(2)

(b) Solve the equation $gf(x) = 80$

$4(8 - 3x) = 80$
$8 - 3x = 20$
$-12 = 3x$
$x = -4$

$x = -4$

(4)

21. For all values of x

$f(x) = 3x + 2$

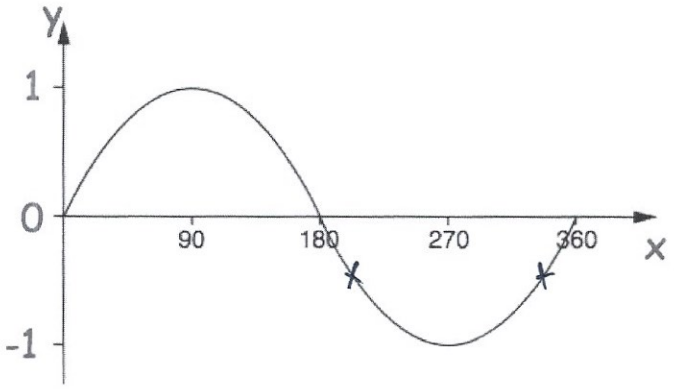
Find $f^{-1}(-12)$

$y = 3x + 2$
$y - 2 = 3x$
$x = \frac{y-2}{3}$
$f^{-1}(x) = \frac{x-2}{3}$
$f^{-1}(-12) = \frac{-12-2}{3}$
$= \frac{-14}{3}$

$-4.\dot{6}$

(2)

22. Here is the graph of $y = sin(x)$ for $0 \leq x \leq 360$



One solution of $sin x = -0.5$ is $x = 330^\circ$
Find another solution of $sin x = -0.5$

x = 210

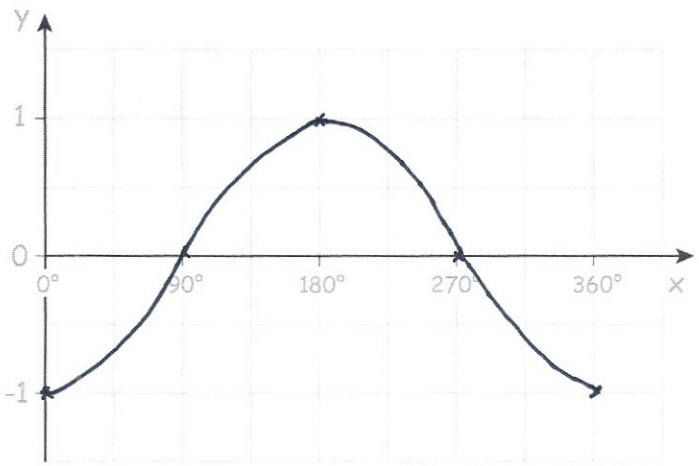
(2)

23. For all the values of x

$f(x) = x - 180$

$g(x) = cos\, x$

Draw the graph of the function $y = gf(x)$ for $0° \leq x \leq 360°$



(2)

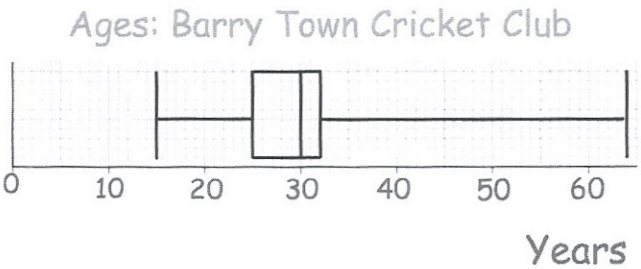
24. The table shows information about the ages of cricketers at Abbeyville Cricket Club.

Youngest	20
Median	35
Upper Quartile	44
Range	32
Interquartile Range	21

(a) Draw a box plot for this information

(3)

The box plot below shows information about the ages of cricketers at Barry Town Cricket Club.



(b) Compare the distribution of ages of cricketers at Abbeyville with the distribution of ages of cricketers at Barry Town

The players at Abbeyville are older, as their median is greater. The ages are more spread out at Barry as their range is larger.

(2)

25. Here are the ages of 11 people.

20 24 29 30 36 37 41 42 50 55 56

Find the upper quartile.

50

(2)

26. 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)

27. Samantha has 10 black socks, 8 white socks and 2 blue socks.
She picks two socks at random, without replacement.

Calculate the probability she chooses two socks of the same colour.

$P(BB) = \frac{10}{20} \times \frac{9}{19} = \frac{90}{380}$

$P(WW) = \frac{8}{20} \times \frac{7}{19} = \frac{56}{380}$

$\frac{148}{380}$

$P(BlBl) = \frac{2}{20} \times \frac{1}{19} = \frac{2}{380}$

$\frac{37}{95}$

(4)

28. Hannah wants to estimate the number of eels in a lake.
She catches and rings 50 eels.
She returns the 50 eels to the lake.
The next day Hannah catches 400 eels.
Of these 400 eels, 10 are ringed.

Work out an estimate for the total number of eels in the lake.

$\frac{50}{N} = \frac{10}{400}$

$10N = 20000$

2000

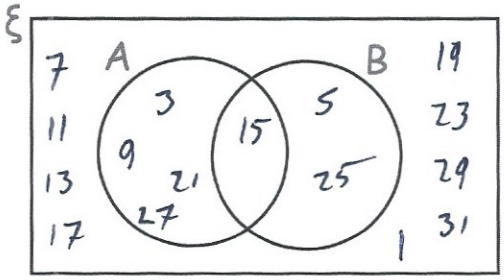
(2)

29. ξ = {odd numbers less than 32}

A = multiples of 3
B = multiples of 5

1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21
23, 25, 27, 29, 31

(a) Complete the Venn diagram



(4)

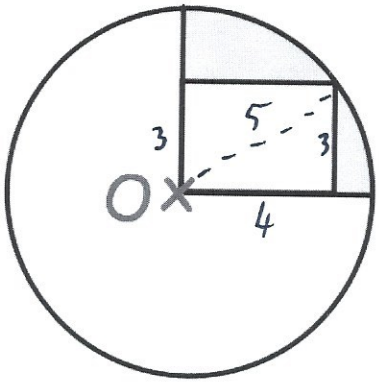
One of the numbers is selected at random.

(b) Write down P (A ∩ B)

$\frac{1}{16}$

(2)

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



$3^2 + 4^2 = x^2$

$x^2 = 25$

$x = 5$

The rectangle is 4cm by 3cm.

Find the shaded area.

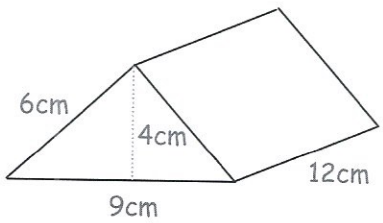
$\pi \times 5^2 = 25\pi$

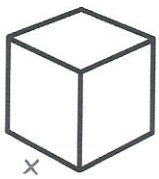
$\frac{25\pi}{4} - 12 =$

7.635 .....cm²

(4)

31. The solid triangular prism shown below is made from metal.





The prism is melted down and the metal is used to create a solid cube.

Find the side length of the cube.

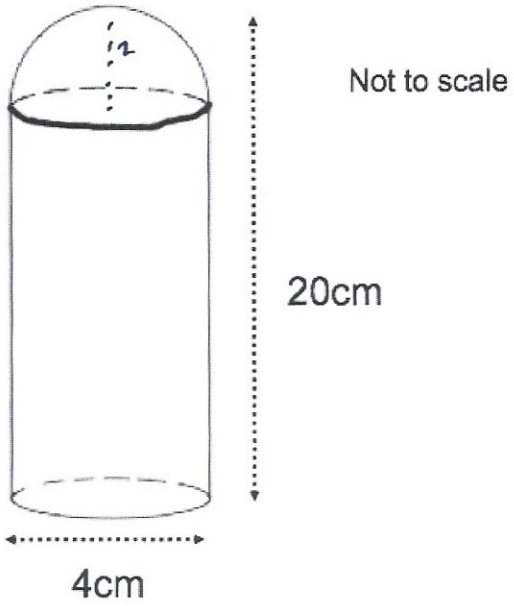
$\frac{1}{2} \times 9 \times 4 \times 12 = 216$

$\sqrt[3]{216} = 6$

6 .....cm

(4)

32. A container is created from a cylinder and a hemisphere.



The height of the container is 20cm.
The diameter of the cylinder is 4cm.

Calculate the volume of the container.

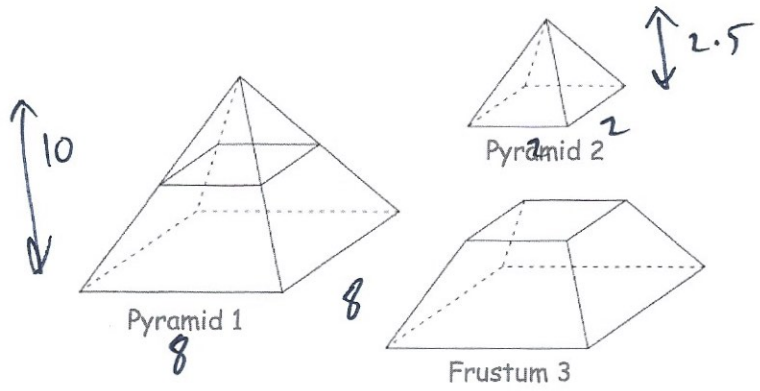
$\pi \times 2^2 \times 18 = 72\pi$ (cylinder)

$\frac{1}{2}\left(\frac{4}{3} \times \pi \times 2^3\right) = \frac{16}{3}\pi$ (hemisphere)

242.95 .....cm³

(3)

33. A solid square based pyramid 1 is divided into two parts:
a square based pyramid 2 and a frustum 3, as shown.



Pyramid 1 has a base of side length 8cm.
Pyramid 2 has a base of side length 2cm.
The perpendicular height of pyramid 1 is 10cm.

Work out the volume of the frustum.

$\frac{1}{3} \times 8^2 \times 10 = \frac{640}{3}$

$\frac{1}{3} \times 2^2 \times 2.5 = \frac{10}{3}$

210 cm^3

(4)

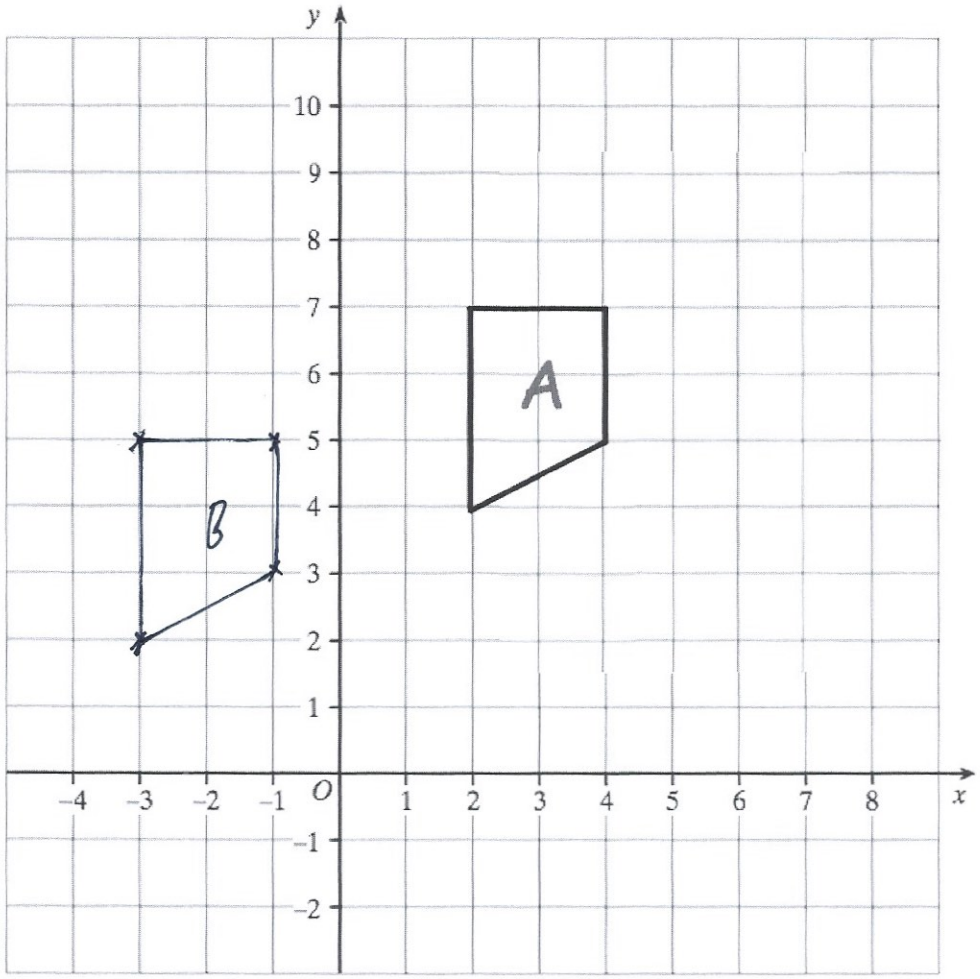
34. Convert 6.3 m^2 to cm^2

6.3×100^2

63000 cm^2

(2)

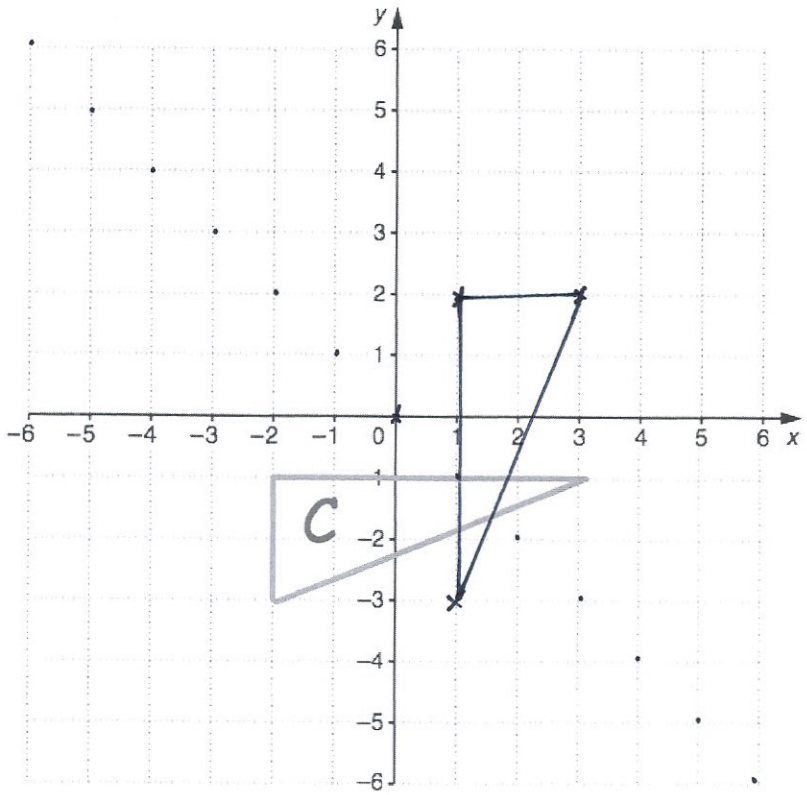
35.



Translate shape A by the vector $\begin{pmatrix} -5 \\ -2 \end{pmatrix}$

(2)

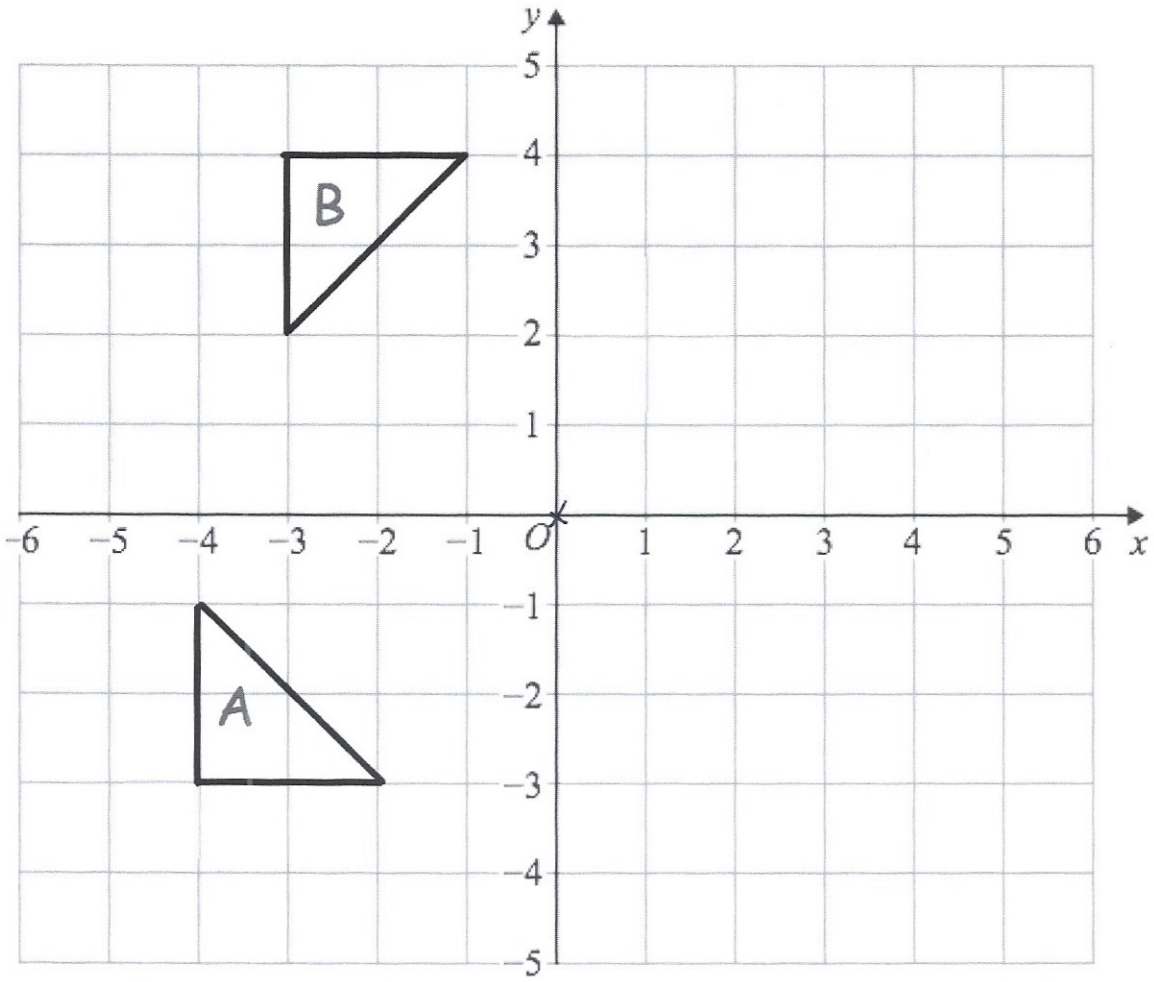
36.



Reflect triangle C in the line $y = -x$

(2)

37.

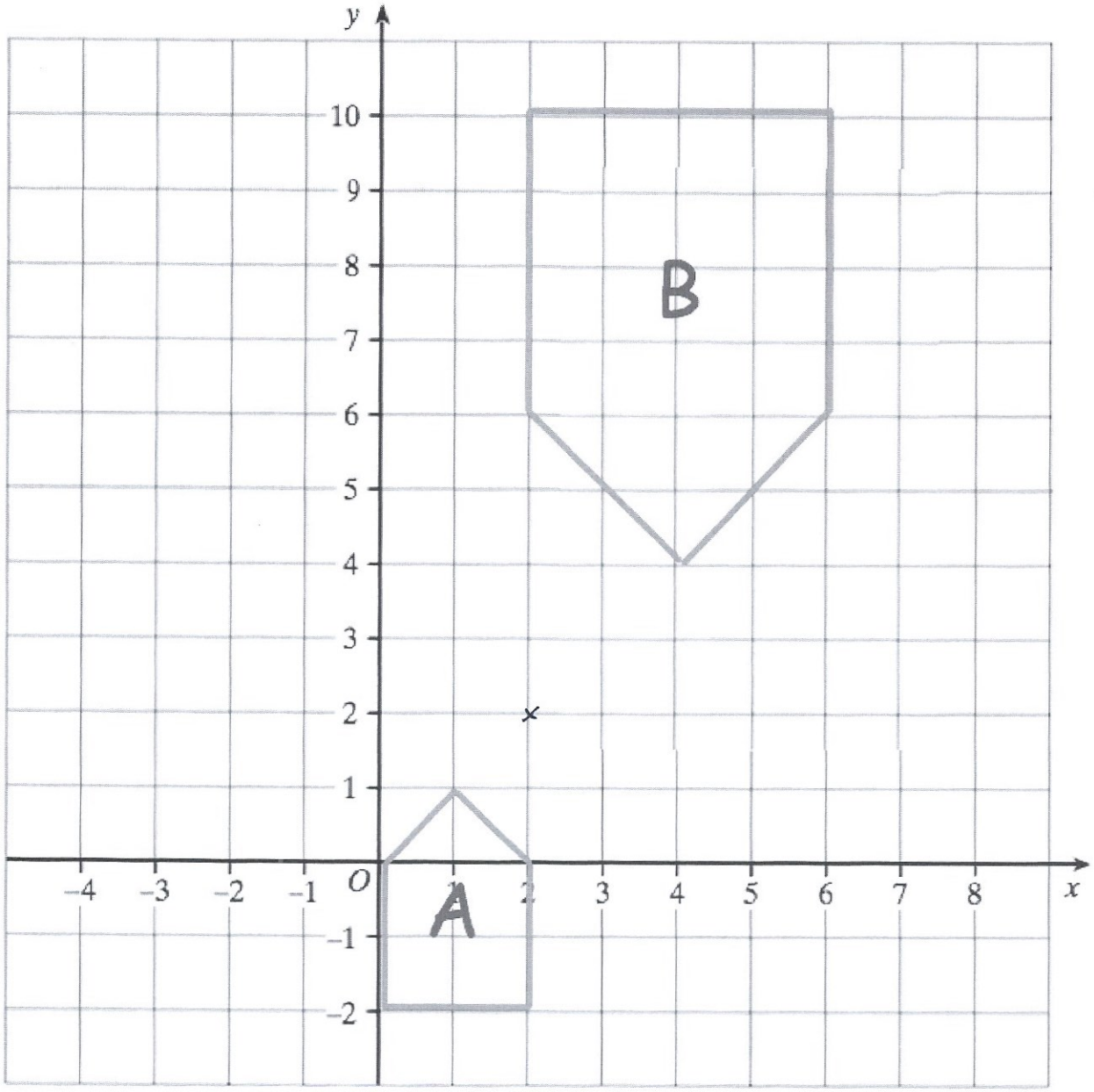


Describe fully the single transformation that maps triangle A onto triangle B.

Rotation, 90° clockwise about the origin.

(2)

38.

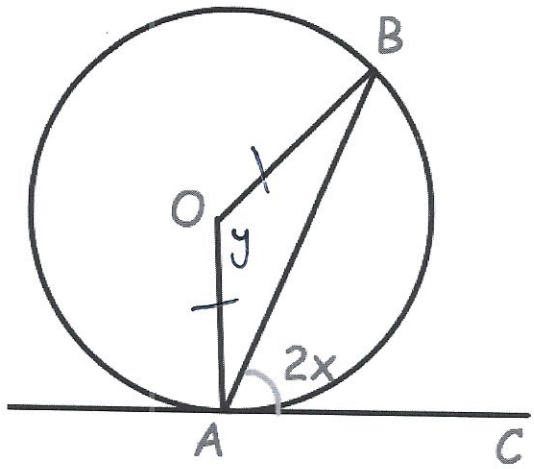


Describe fully the single transformation that maps shape A onto shape B.

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

(2)

39.



A and B are points on the circumference of a circle, centre O.
CA is a tangent to the circle.
Angle CAB = 2x

Prove that angle AOB = 4x
Give reasons for each stage of your working.

$\angle OAB = 90 - 2x$ as radius / tangent meet at 90°

$\angle OBA = 90 - 2x$ $\triangle OAB$ is isosceles

As angles in a triangle add to 180°

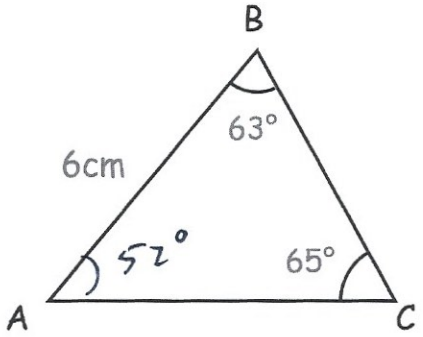
$y + (90 - 2x) + (90 - 2x) = 180$

$y + 180 - 4x = 180$

$y = 4x$

(4)

40.



(a) Calculate the length of AC.

$$\frac{6}{\sin 65} = \frac{AC}{\sin 63}$$

5.899cm

.....

(2)

(b) Calculate the perimeter of ABC

$$\frac{BC}{\sin 52} = \frac{6}{\sin 65}$$

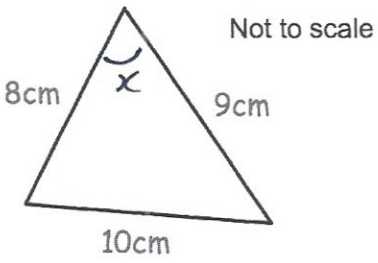
$$BC = 5.217$$

17.116cm

.....

(2)

41.



$$\cos x = \frac{8^2 + 9^2 - 10^2}{2 \times 8 \times 9}$$

$$x = 71.79$$

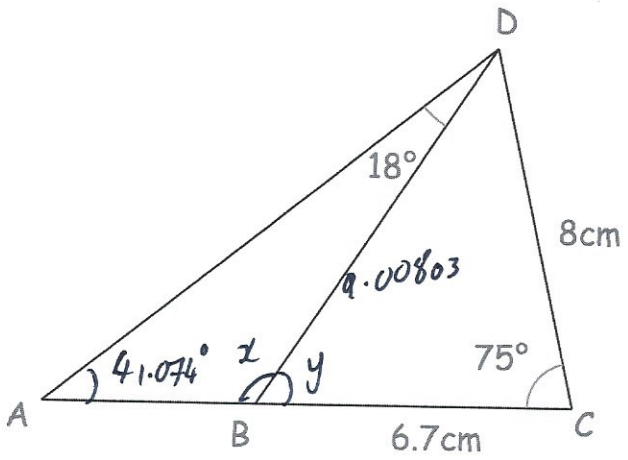
Calculate the size of the largest angle.

71.79 °

.....

(4)

42.



ACD is a triangle.
B is a point on AC

Work out the area of triangle ABD.
Give your answer correct to 3 significant figures.

$BD^2 = 6.7^2 + 8^2 - 2 \times 6.7 \times 8 \times \cos 75$

$BD = 9.00803\text{cm}$

$\frac{\sin y}{8} = \frac{\sin 75}{9.00803}$

$y = 59.074°$

$x = 120.926°$

$\frac{AB}{\sin 18} = \frac{9.00803}{\sin 41.074}$

$AB = 4.23667$

$\text{Area} = \frac{1}{2} \times 4.23667.. \times 9.00803 \times \sin 120.926$

$= 16.37\text{cm}^2$

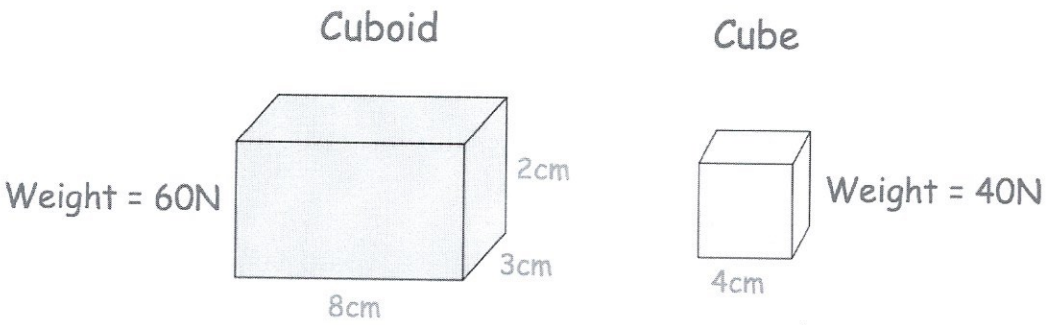
16.4

.....cm²

(6)

43. The cuboid and cube below are placed on the floor.

The cuboid has a weight of 60N
The cube has a weight of 40N



Area = $24cm^2$ Area = $16cm^2$

Jason says that "the cuboid exerts a greater pressure on the ground."

Is Jason correct?
You must show your working.

$P = \frac{F}{A}$

Cuboid $P = \frac{60}{0.0024} = 25000 N/m^2$

Cube $P = \frac{40}{0.0016} = 25000 N/m^2$

No, same pressure.

(4)