

Name: Solutions

GCSE 9-1 Higher
Practice Paper
Set B
Paper 2 - 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.
7. A calculator

Guidance

1. Read each question carefully.
2. Don't spend too long on one question.
3. Attempt every question.
4. Check your answers seem right.
5. Always show your workings

Information

1. Time: 1 hour 30 minutes
2. The maximum mark for this paper is 80.
3. You may use tracing paper.

Question	Mark	Available
1		3
2		3
3		5
4		4
5		4
6		3
7		4
8		4
9		3
10		2
11		2
12		3
13		5
14		2
15		4
16		4
17		4
18		3
19		3
20		5
21		4
22		6
Total		80

1. Kevin is going on holiday to Japan.
He wants to change some money into yen.

The bank only stocks ¥1000 notes.
James wants to change up to £750 into yen.
He wants as many ¥1000 notes as possible.

The exchange rate is £1 = ¥141

How many ¥1000 notes should he get?

$$\begin{aligned} £750 \times 141 &= 105,750 \text{ yens} \\ \div 1000 & \\ &= 105.75 \end{aligned}$$

need 105 notes
(3)

2. Lily has a digital safe.
To open the safe she needs to input a 5 digit code.
The digits may be used more than one.

The first digit is a 8
The third digit is a 0

8		0		
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Lily knows the number is odd.

0 to 9

0 to 9

1, 3, 5, 7 or 9

How many possible codes are there?

$$10 \times 10 \times 5 =$$

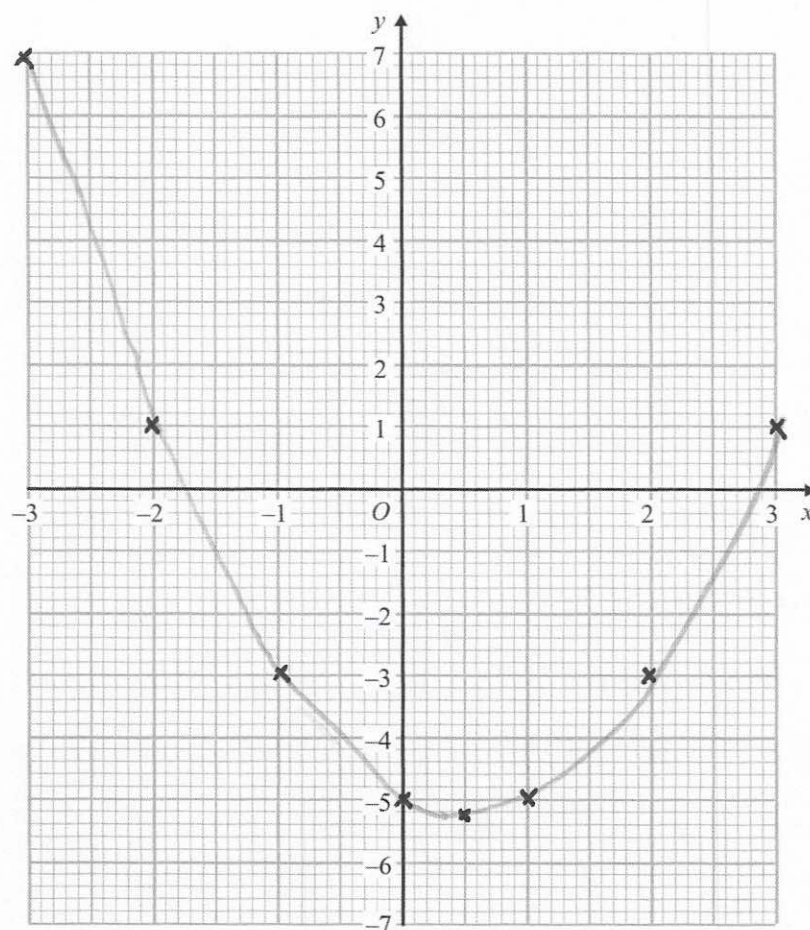
500
(3)

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

x	-3	-2	-1	0	1	2	3
y	7	1	-3	-5	-5	-3	1

(2)

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

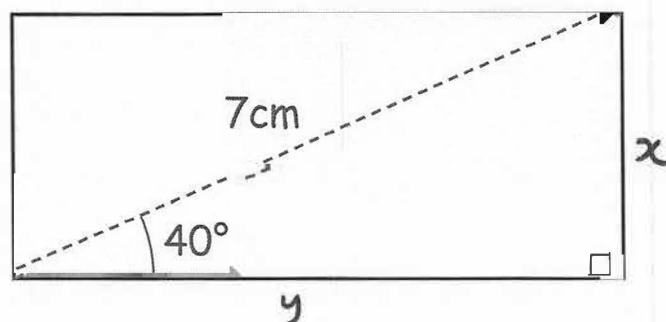


(2)

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

(0.5, -5.25)
(1)

4.



Work out the area of the rectangle

$$c = \sin \theta \times h$$

$$\therefore x = \sin(40) \times 7 = 4.49 \dots$$

$$y = \sqrt{7^2 - 4.49^2} = 5.362 \dots$$

$$\text{Area} = 4.49 \dots \times 5.362 \dots = 24.13 \text{cm}^2$$

(to 2 dp)

(4)

5. 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.

$$\frac{2}{33} = \frac{4}{66} \therefore \text{the total number of beads} = 66$$

$$\therefore 3x - 1 + x + 4 + x + 8 = 66$$

$$5x + 11 = 66$$

$$x = 11$$

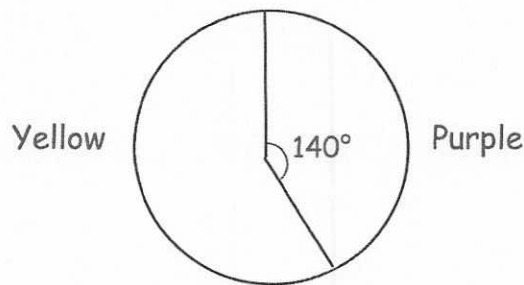
$$\therefore p(\text{red}) = \frac{3 \times 11 - 1}{66} =$$

$$\frac{32}{66}$$

(4)

6. In an election there are two parties to vote for, the Yellow party or the Purple party.

The pie chart below shows how people voted.



1016 more people voted for the Yellow party than the Purple party.

Work out the total number of votes.

$$\text{yellow} = \frac{220}{360} \quad \text{purple} = \frac{140}{360}$$

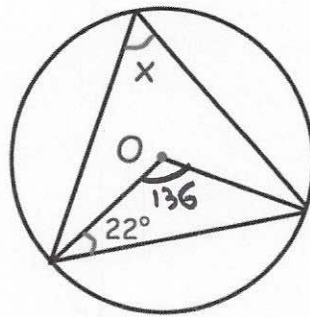
$$\therefore 1016 \text{ is } \frac{80}{360} \text{ of the total}$$

$$\therefore \text{total number} = 1016 \times \frac{360}{80} =$$

4572

(3)

7.



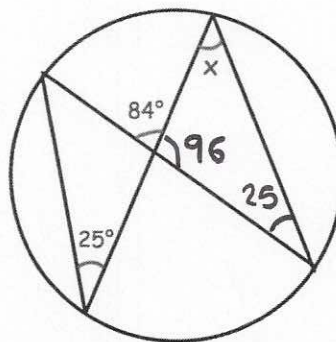
(a) Work out the size of angle x above.

$$180 - (2 \times 22) = 136$$

$$136 \div 2 =$$

$$\underline{68}^{\circ}$$

(2)



(b) Work out the size of angle x above.

$$180 - (96 + 25) =$$

$$\underline{59}^{\circ}$$

(2)

8. To make an omelette, Emily uses three eggs and two cheese slices.

A carton of 10 eggs
£1.95

A pack of 8 cheese slices
£1.30

Emily wants to buy enough eggs and cheese to make **at least** 70 omelettes.
She does not want any eggs or cheese slices left over.

Work out the least amount of money Emily can spend.

minimum number of eggs with no waste = 30
= 10 omelettes, 3 cartons

minimum number of cheese slices with no waste = 8
= 4 omelettes, 1 packet

\therefore minimum number of omelettes = lowest multiple of 4 AND 10 over 70

\therefore 80 omelettes.

need 240 eggs = 24 cartons $24 \times 1.95 = £46.80$

need 160 cheese slices = 20 packs $20 \times 1.30 = £26$

£ 72.80
.....
(4)

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

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

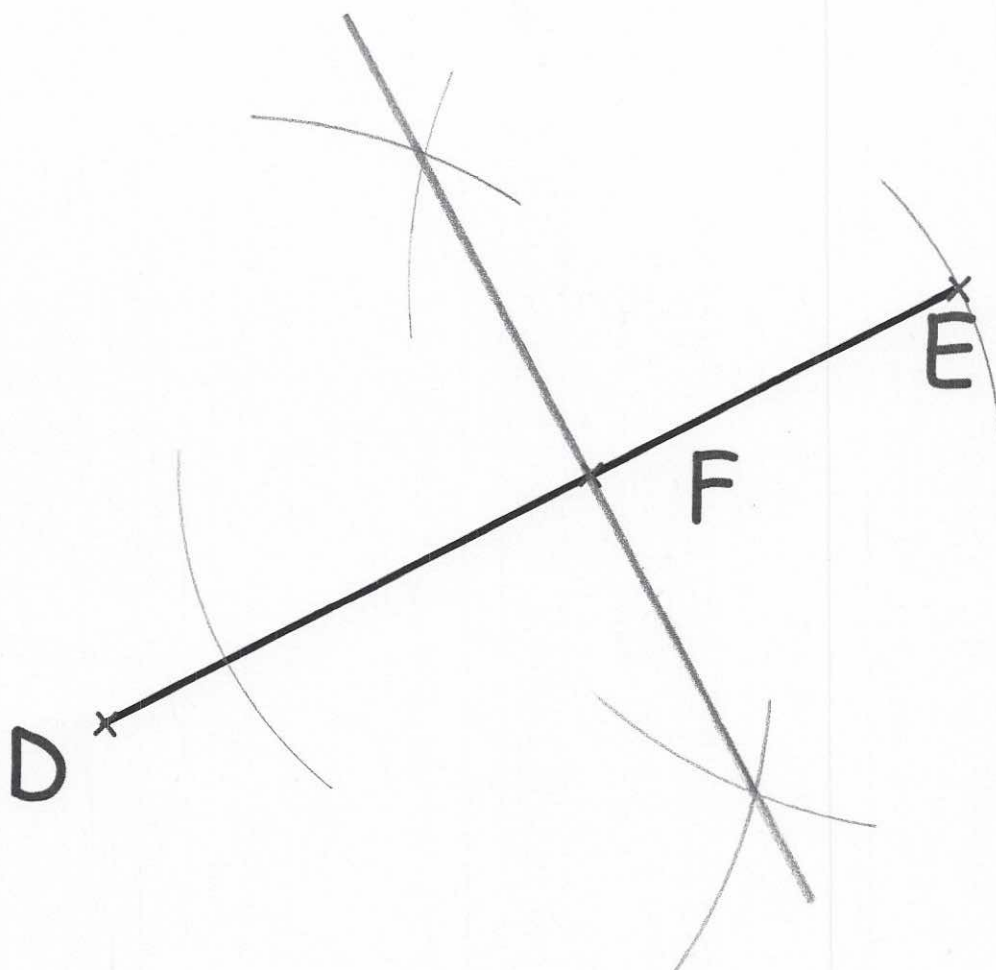
(2)

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

$$2x - 5 = 0 \Rightarrow \underline{x = \frac{5}{2}}$$
$$x + 2 = 0 \Rightarrow \underline{x = -2}$$

(1)

10.



Construct the perpendicular to DE that passes through the point F.

(2)

11. 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.

1500 would have to be 130% of the original,
but $1500 \div 130$ is not an integer (11.538...)

(2)

-
12. Make y the subject

$$4y - 7x = xy + 5$$

$$4y - xy = 7x + 5$$

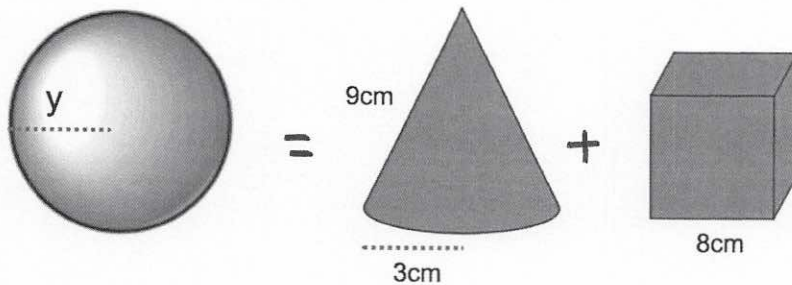
$$y(4 - x) = 7x + 5$$

$$y = \frac{7x + 5}{4 - x}$$

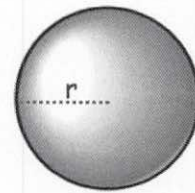
(3)

13. Shown below is a sphere, cone and cube.

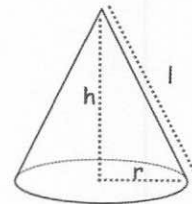
The surface area of the sphere is equal to the sum the surface areas of the cone and cube.



Surface area of a sphere = $4\pi r^2$



Curved surface area of a cone = $\pi r l$



Find the radius of the sphere, y .

$$\text{sphere: } 4\pi y^2$$

$$\text{cone: } \pi \times 3^2 + \pi \times 3 \times 9 = 36\pi$$

$$\text{cube: } 6 \times 8^2 = 384$$

$$\therefore 4\pi y^2 = 36\pi + 384$$

$$y^2 = \frac{36\pi + 384}{4\pi}$$

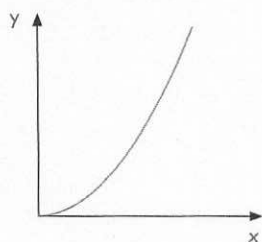
$$y = 6.2894 \dots$$

$$y = 6.29 \dots \text{cm}$$

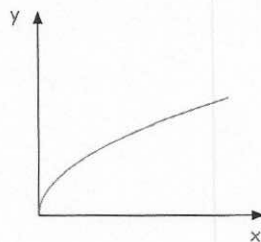
(5)

14. These graphs represent four different types of proportionality.

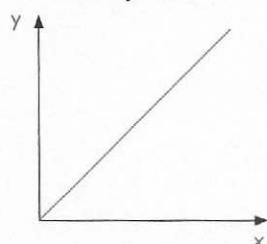
Graph 1



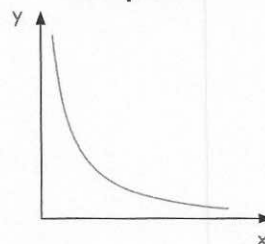
Graph 2



Graph 3



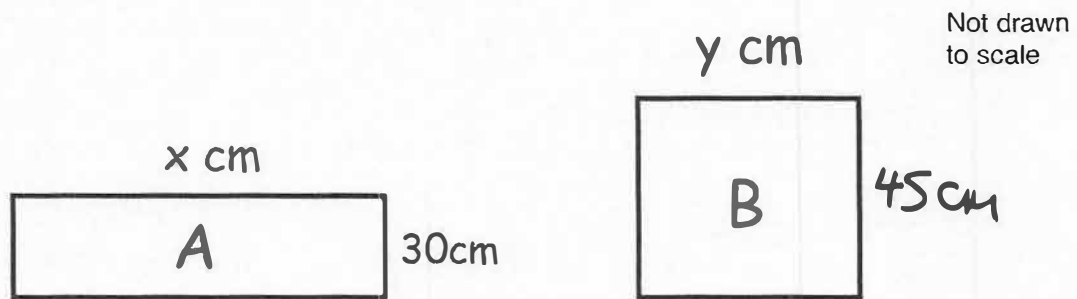
Graph 4



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

15. A is a rectangle with a length x cm and width 30cm
B is a rectangle with length y cm



The width of B is 50% more than the width of A
The area of B is 20% more than the area of A

Work out the ratio $x : y$

Give your answer in its simplest form.

$$30\text{cm} \times 1.5 = 45$$

$$30x \times 1.2 = 45y$$

$$36x = 45y$$

$$4x = 5y$$

$$x : y = \frac{5}{4}$$

(4)

16. Solve $4x^2 = 8x + 7$
Give your answers to 2 decimal places.

$$4x^2 - 8x - 7 = 0$$

$$x = \frac{8 \pm \sqrt{64 - 4 \times 4 \times -7}}{2 \times 4}$$

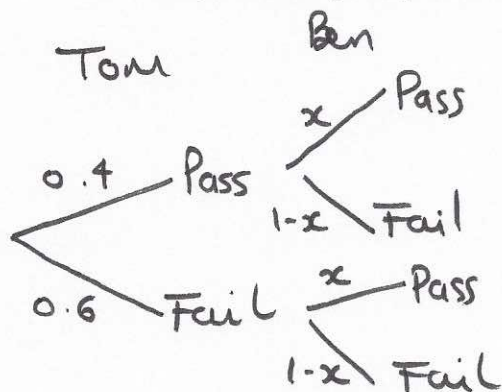
$$x = 2.65831 \dots$$

$$x = -0.658 \dots$$

(4)

17. Tom and Ben sit their driving test.
The probability Tom passes is 0.4.
The probability that only one man passes is 0.56.

Find the probability they both fail.



$$P(\text{one man passes}) = 0.4(1-x) + 0.6x = 0.56$$

$$0.4 + 0.2x = 0.56$$

$$x = 0.8$$

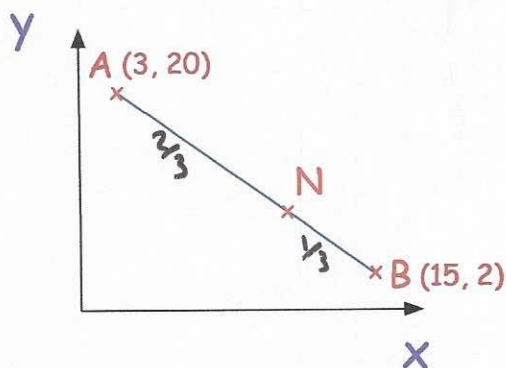
$$\therefore P(\text{both fail}) = 0.6 \times 0.2$$

$$= 0.12$$

(4)

18. 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.

x co-ordinate:

$$15 - 3 = 12$$

$$\frac{2}{3} \text{ of } 12 = 8$$

$$\therefore x \text{ co-ordinate is } 3 + 8 = 11$$

y co-ordinate

$$2 - 20 = -18$$

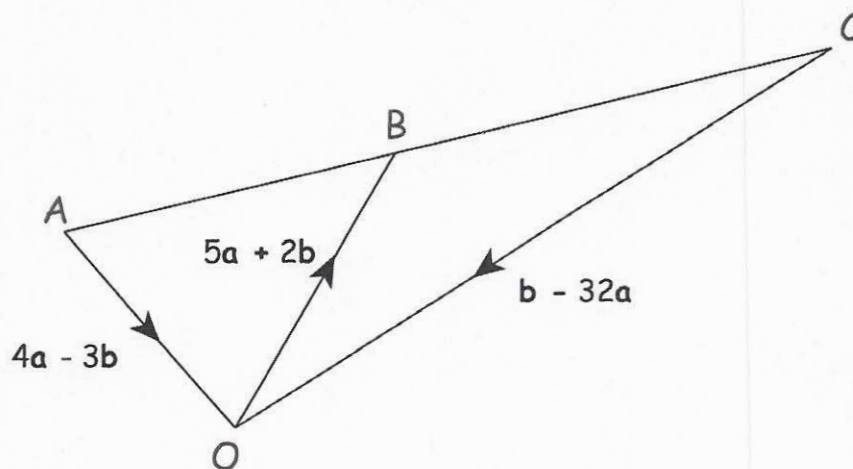
$$\frac{2}{3} \text{ of } -18 = -12$$

$$y \text{ co-ordinate is } 20 - 12 = 8$$

$$(11, 8)$$

(3)

19.



Is ABC a straight line?
Explain your answer

$$\vec{AB} = 4a - 3b + 5a + 2b = 9a - b$$

$$\vec{BC} = -5a - 2b - b + 32a = 27a - 3b$$

$$\vec{BC} = 3 \times \vec{AB}, \text{ hence ABC is a straight line}$$

(3)

20.

$$f(x) = \frac{3x}{5} + 1$$

(a) Find $ff(2)$

$$f(2) = \frac{6}{5} + 1 = \frac{11}{5} \quad f\left(\frac{11}{5}\right) = \frac{3 \times \frac{11}{5}}{5} + 1 =$$

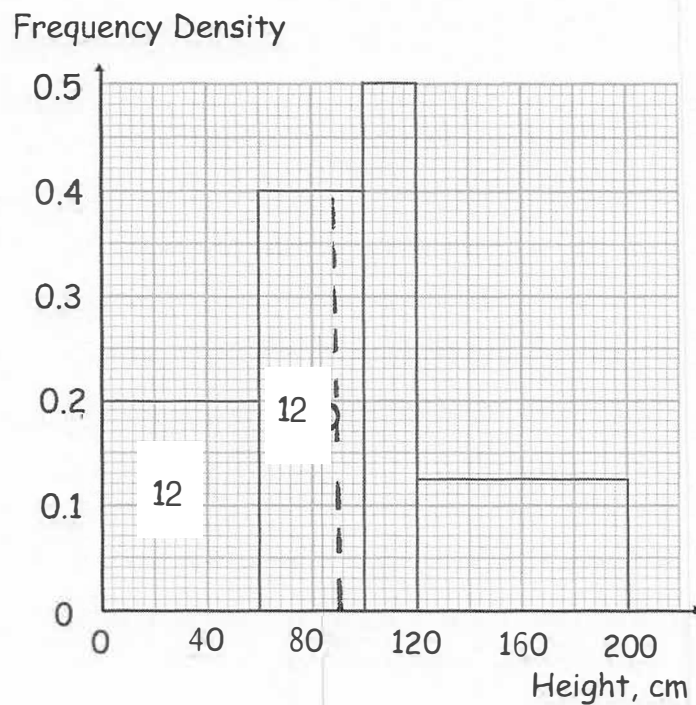
$$\frac{2.32}{(2)}$$

(b) Find $f^{-1}(350)$

$$\frac{3x}{5} + 1 = 350 \quad \frac{3}{5}x = 349 \quad x = 349 \times \frac{5}{3} =$$

$$\frac{1745}{3} \quad (3)$$

21. The heights of some sunflowers are represented in a histogram.



Find an estimate of the median.

total frequency

$$= 60 \times 0.2 + 40 \times 0.4 + 20 \times 0.5 + 80 \times 0.125$$

$$= 48$$

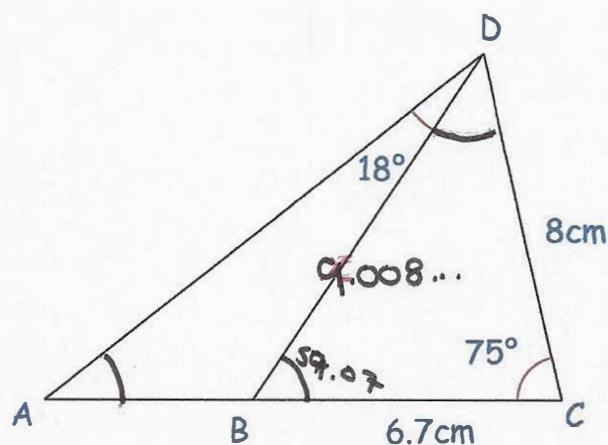
\therefore median is when frequency = 24

$$12 \div 0.4 = 30$$

$$60 + 30 = 90$$

90.....cm
(4)

22.



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.

$$\text{cosine rule in } \triangle BCD \quad BD^2 = 8^2 + 6.7^2 - 2 \times 8 \times 6.7 \times \cos 75 = 81.14 \dots$$

$$\therefore BD = 9.008 \dots$$

$$\text{sine rule } \frac{\sin \hat{CBD}}{8} = \frac{\sin 75}{9.008 \dots} \Rightarrow \hat{CBD} = 59.07 \dots$$

$$\therefore \hat{DBA} = 180 - 59.07 \dots = 120.9 \dots \quad \text{and } \hat{DAB} = 41.07 \dots$$

sine rule

$$\frac{AB}{\sin 18} = \frac{9.008 \dots}{\sin 41.07 \dots} \Rightarrow AB = 4.23 \dots$$

$$\frac{16.4}{\dots} \text{cm}^2 \quad (6)$$

$$\text{area} = \frac{1}{2} \times AB \times BD \times \sin \hat{ABD}$$

$$= \frac{1}{2} \times 4.23 \dots \times 9.008 \dots \times \sin 120.9 \dots$$

$$= 16.4 \dots$$