Name: SOLUTIONS

GCSE 9-1 Higher
Practice Paper
Set C
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. The marks for questions are shown in brackets
4. You may use tracing paper.

Question	Mark	Available
1		3
2		3
3		2
4		4
5		2
6		4
7		4
8		3
9		2
10		5
11		3
12		2
13		5
14		3
15		4
16		2
17		5
18		4
19		4
20		5
21		3
22		4
23		4
Total		80

1. Solve $3(2x - 5) = 4x - 6$

$6x - 15 = 4x - 6$

$2x - 15 = -6$

$2x = 9$

$x = 4 \cdot 5$

x = ...4·5....

(3)

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2. 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.

$\dfrac{1300}{800} \times 100 = 162 \cdot 5$

....160....%

(3)

3. Airport runways have two-digit numbers painted on each end of them. These numbers show the first two digits of the bearing of each direction the runway.

To work out the three-figure bearing, multiply each runway number by 10.

Shown below is a diagram of a runway which has a three-figure bearing of 060° in one direction and 240° in the other direction.

N
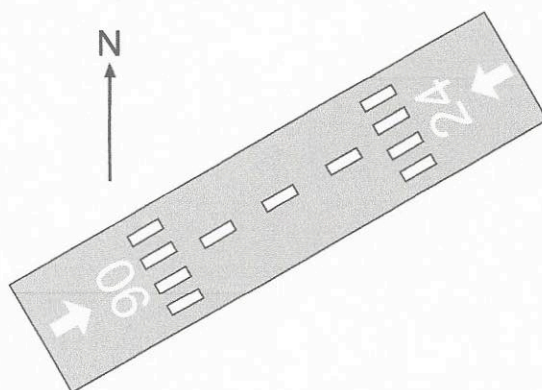
On a different runway, the two-digits on one end of the runway is 19.

Write down the runway number on the other end of the runway.

$19 \times 10 = 190$

$190 - 180 = 10$

01

(2)

4. There are red, green, pink and white counters in a box.

There are an equal number of red and white counters.
There are ten times more green than white counters.
There are twice as many red than pink counters.

Jim takes a counter at random from the box.

Work out the probability than Jim takes a green counter.

red $= x$

white $= x$

$\dfrac{10}{12 \cdot 5} = \dfrac{4}{5}$

Green $= 10x$

Pink $= \dfrac{1}{2}x$

$\dfrac{4}{5}$

(4)

5.
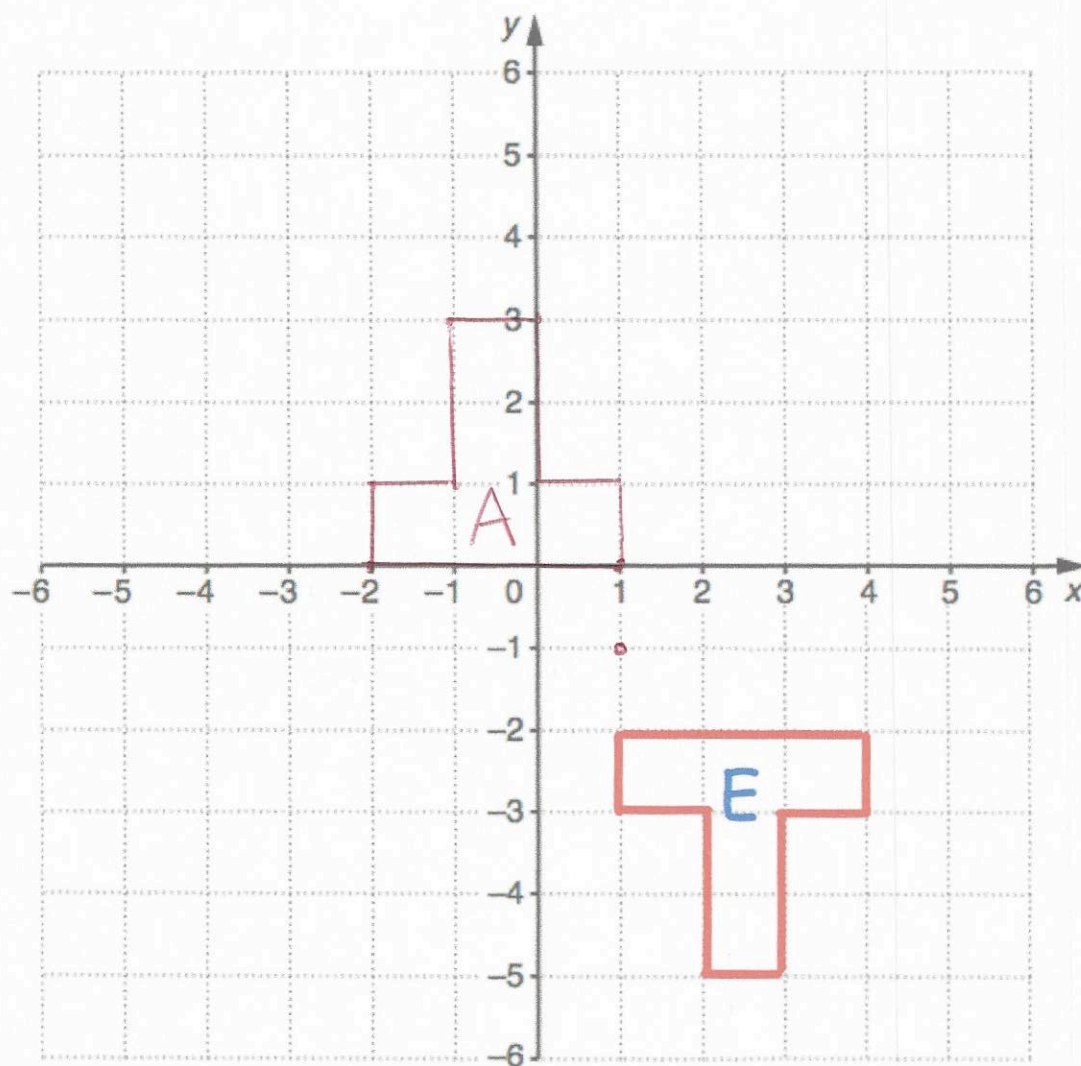
Rotate shape E 180° about the point (1, −1)
Label the new shape A

(2)

6.   (a) Write as a single power of m

$$\frac{m^9 \times m}{m^5}$$

$$\frac{m^{10}}{m^5} = m^5$$

$$\underset{\dotsb}{m^5}$$

(2)

Given $25^y = 125^x$

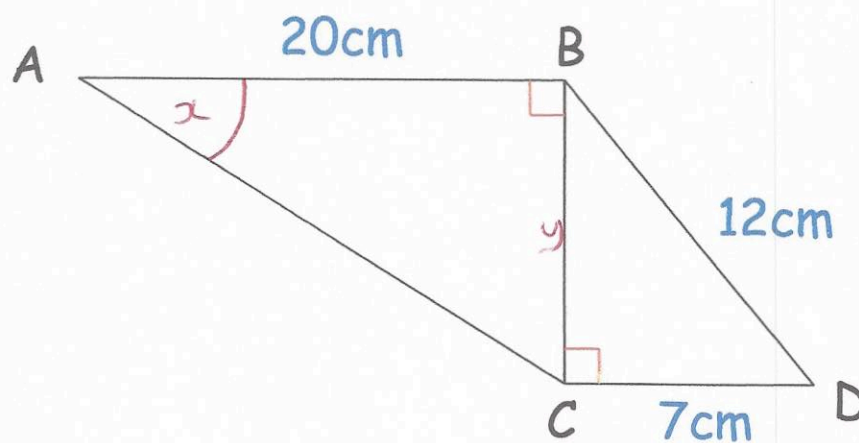(b)   Show $y = \dfrac{3}{2}x$

$$25^y = (5^2)^y = 5^{2y}$$

$$125^x = (5^3)^x = 5^{3x}$$

$$\therefore \ 2y = 3x$$

$$y = \frac{3}{2}x$$

(2)

7.

A ——— 20cm ——— B

12cm

y

C — 7cm — D

x

Work out the size of angle CAB

$$12^2 - 7^2 = 95$$

$$y = \sqrt{95}$$

$$\tan x = \frac{\sqrt{95}}{20} = 0.487...$$

$$\tan^{-1}(0.487...) = 25.98$$

25.98

(4)

8. Use your calculator to work out

$$\frac{\sqrt{39.75 + 24.44}}{0.55 \times \sqrt[3]{1.2} \times 1.9}$$

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

.... 11·06775107 ....

(2)

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

.... 11 ....

(1)

9. It takes 6 hours for 20 workers to seed 40 acres.

How long would it take 15 people to seed 25 acres?
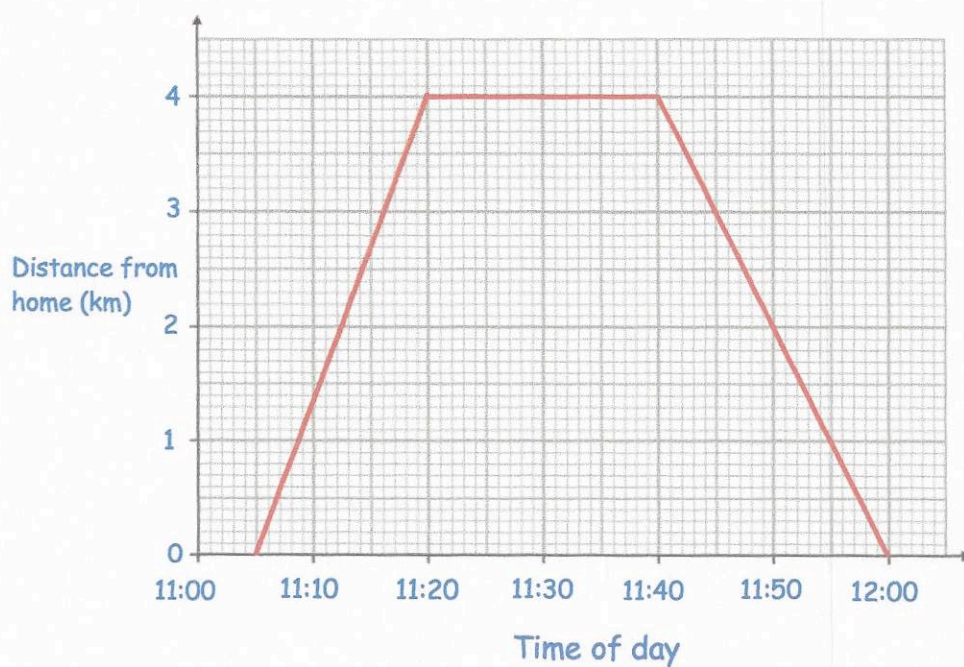
120 hours   for 40 acres

3 hours = 1 acre

25 acres = 75 hours

75 ÷ 15 = 5

5 hours
....

(2)

10. Laura cycles from her home to the post office and back.

(a) Work out Laura's speed cycling from her home to the post office.
Give your answer in kilometres per hour.

4 Km   in 15 mins

$\frac{4}{0.25} = 16$

.............16.............km/h

(2)

(b) Work out Laura's speed cycling from the post office to her home.
Give your answer in metres per second.

4km = 4000m

20 mins = 1200 s
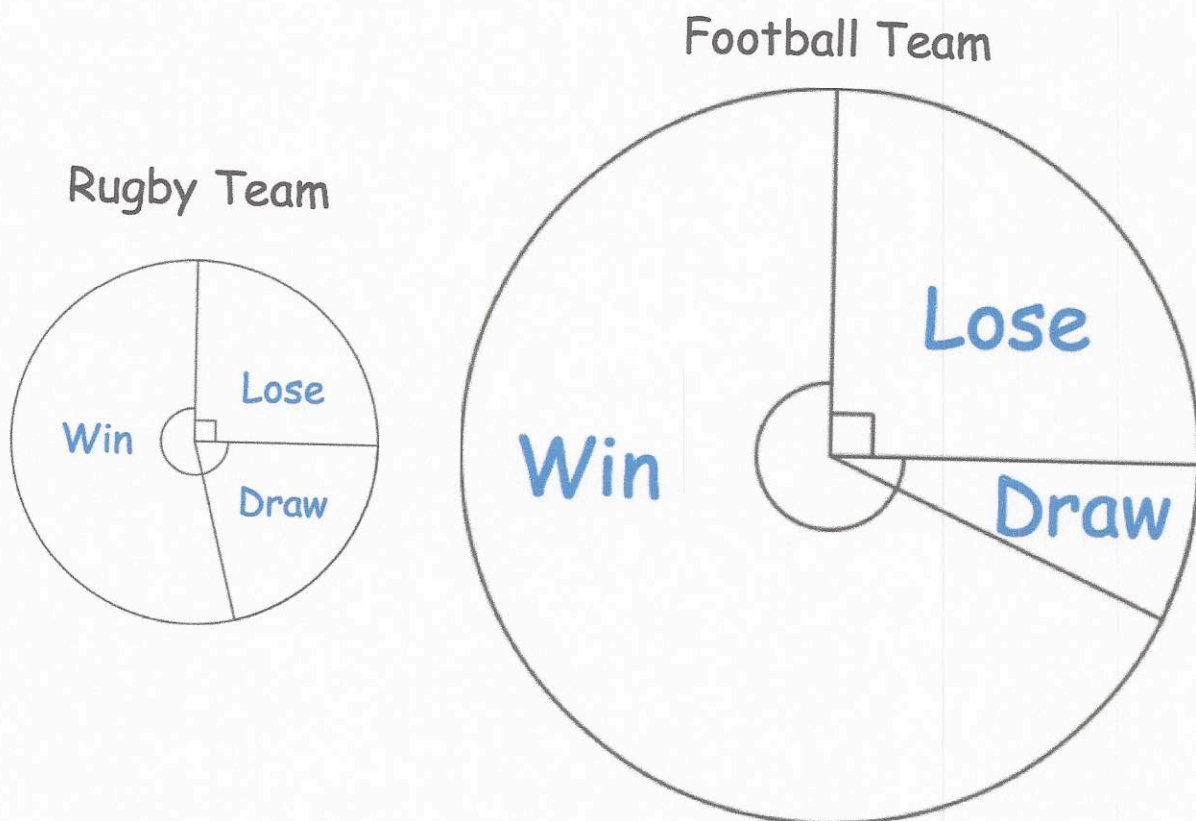
$\frac{4000}{1200} =$

.............3·3.............m/s

(3)

11. The pie charts give information about the results of the Year 11 rugby and football teams.

Football Team

Rugby Team

The ratio of the number of matches the rugby team played to the number of matches that the football team played is given by the ratio of the areas of the pie charts.

What proportion of the total matches played by both teams were wins by the rugby team?

Give your answer to 3 significant figures

$\frac{143}{360} \times \pi \times 2.4^2 = 9.701 \ cm^2$ Area of rugby win

$\pi \times 2.4^2 + \pi \times 4.9^2 = 93.525$ Total Area.

$\frac{9.701}{93.525} = 0.104$

......0.104......

(3)

12. Shown is one interior angle from a regular polygon.

172.5°

Calculate how many sides the polygon has.

$180 - 172.5 = 7.5$

$\dfrac{360}{7.5} = 48$

..............48..............

(2)

13. The population of a country at the beginning of 2013 was 5,340,000.
Each year the population increased by 6%.

(a) Work out the population of the country at the beginning of 2017.
Give your answer correct to the nearest 1000.

$$5\,340\,000 \times 1.06^4 = 6741626.96$$

6742000
....
(2)

The population of a different country increases by x % each year.

At the beginning of 2014 the population of the country was 24,000,000
At the beginning of 2017 the population was 26,996,736

(b) Find the value of x

$$24\,000\,000 \times x^3 = 26\,996\,736$$

$$x^3 = 1.124864$$

$$x = 1.04$$

4 %
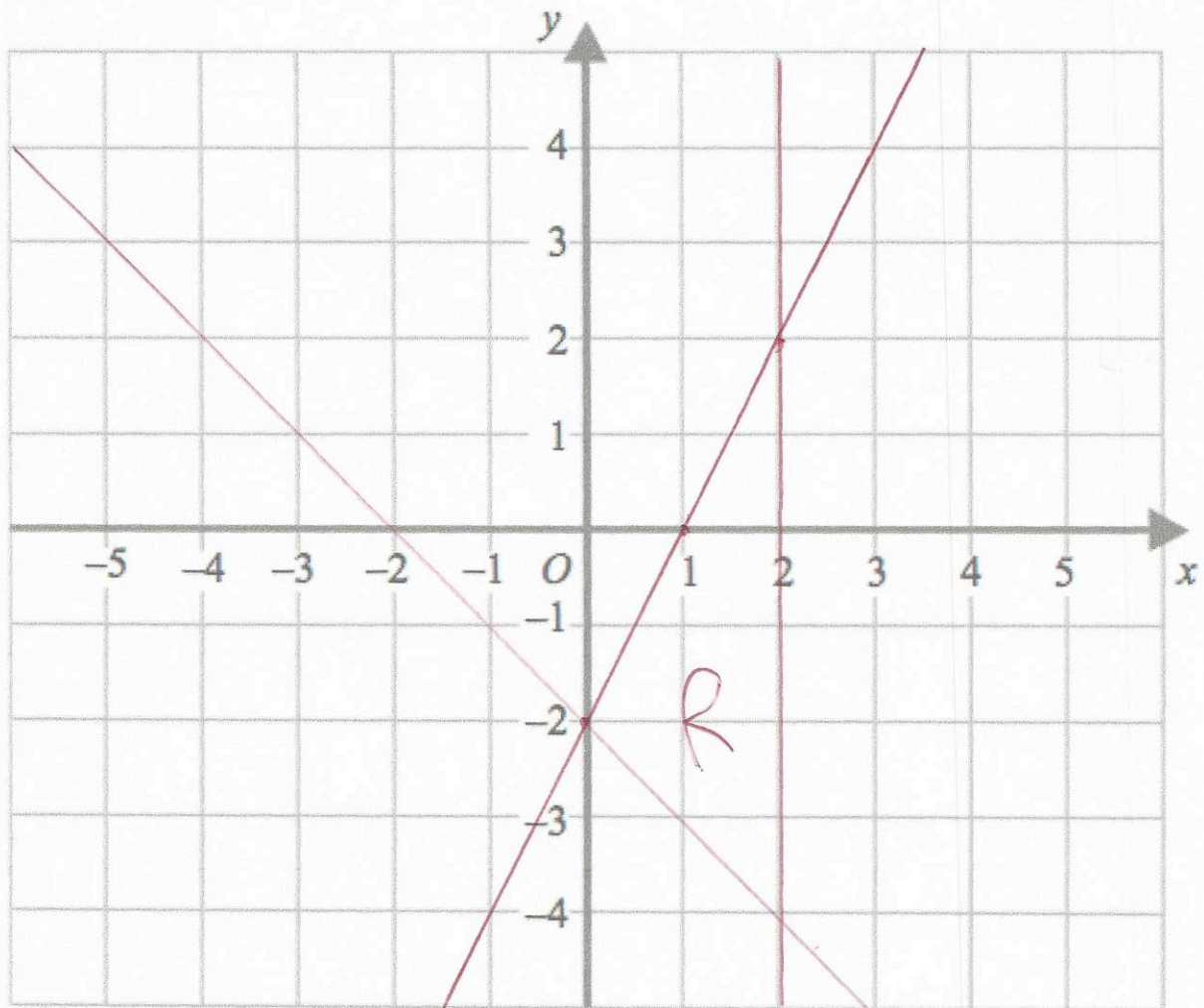........................
(3)

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

$x < 2$

$y < 2x - 2$

$x + y + 2 > 0$

(3)

15. In a netball league there are 14 teams.
Each team plays each other team once.

(a) Work out the total number of matches played.

$$\frac{14 \times 13}{2} = 91$$

........91........

(2)

Jenson is buying a pizza.
He creates a pizza with 2 toppings from a list of 9 possible toppings.

(b) How many different possible pizzas can he create?

$$\frac{9 \times 8}{2} = 36$$

........36........

(2)

16. Solve $(x + 1)^2 = 10$

$$x + 1 = \pm\sqrt{10}$$
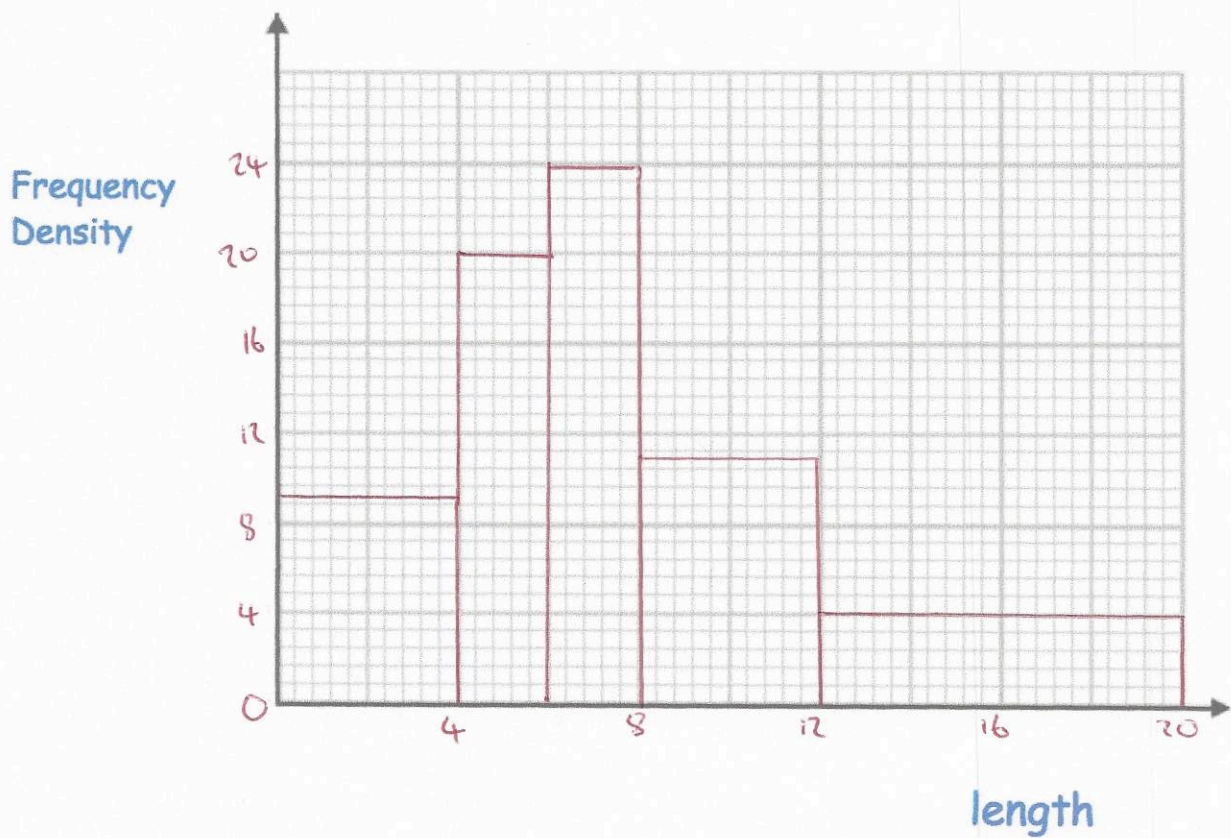
$$x = -1 \pm \sqrt{10}$$

$$x = 2.16$$
$$x = -4.16$$

....

(2)

17. The lengths of 200 fish in a pond, *l* centimetres, are recorded below.

Length, l	Frequency	FD
0 < l ≤ 4	36	9
4 < l ≤ 6	40	20
6 < l ≤ 8	48	24
8 < l ≤ 12	44	11
12 < l ≤ 20	32	4

(a) Draw a histogram for this data.

Frequency Density

length

(3)

(b) Work out an estimate for the fraction of the fish that have a length between 5cm and 11cm.

5 - 6   20 $\dfrac{101}{200}$

6 - 8   48

8 - 11   33 $\dfrac{101}{200}$

....

(2)

18. The line L passes through the points (−4, 0) and (2, −2)
The line M passes through the points (3, 8) and (2, 2)

Are the lines L and M perpendicular?
Show your workings
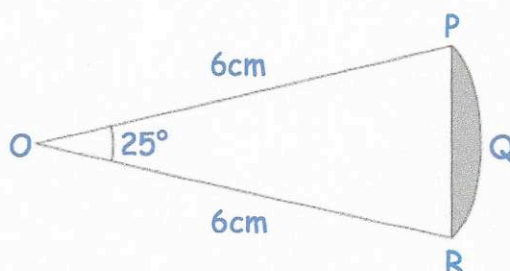
$$\frac{-2-0}{2--4} = \frac{-2}{6} = -\frac{1}{3}$$

$$\frac{2-8}{2-3} = \frac{-6}{-1} = 6$$

No

(4)

19.

PQR is an arc of a circle centre O with radius 6cm.
PR is a chord of the circle.
Angle POR = 25°.

Calculate the area of the shaded region.
Give your answer to 4 significant figures.

$$\frac{25}{360} \times \pi \times 6^2 = \frac{5}{2}\pi$$

$$\frac{5}{2}\pi - 7.6071$$
$$= 0.2469$$

$$\frac{1}{2} \times 6 \times 6 \times \sin 25 = 7.6071\ldots$$

0.2469
.........................cm²

(4)

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20. 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 $^1/_{11}$

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

$$\frac{4}{x} \times \frac{3}{x-1} = \frac{1}{11}$$

$$\frac{12}{x(x-1)} = \frac{1}{11}$$

$$\frac{132}{x(x-1)} = 1 \qquad 132 = x^2 - x$$

$$0 = x^2 - x - 132$$

(3)

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

$$(x+11)(x-12) = 0$$

$$x = -11, \ 12$$

✓

Can't be negative

$\boxed{12}$

(2)

21. The function f is such that $f(x) = kx + 3$

The function g is such that $g(x) = 2x - 4$

Given that $gf(2) = 34$

work out the value of k

$$f(2) = 2k + 3$$

$$g(2k+3) = 2(2k+3) - 4$$

$$= 4k + 6 - 4$$

$$4k + 2 = 34$$

$$4k = 32$$

$$k = 8$$

k = 8

(3)

22. Find the coordinates of the turning point of the graph $y = x^2 - 8x + 1$

$$(x-4)^2 - 16 + 1$$

$$(x-4)^2 - 15$$

$$(4, -15)$$

(4)

23. S is a geometric sequence

The first three terms of S are (x + 18), x and (2x - 15), where x is positive.

(a) Find the value of x.

$$\frac{2x-15}{x} = \frac{x}{x+18}$$

$$2x^2 - 15x + 36x - 270 = x^2$$

$$x^2 + 21x - 270 = 0$$

$$(x+30)(x-9) = 0$$

$$x = 9$$

.... **9**

(3)

(b) Find the 5th term of S

$$27, 9, 3, 1, \frac{1}{3}$$

.... $\frac{1}{3}$

(1)