Write your name here

Surname	Other Names

Mathematics
Paper 1 (Non-Calculator)
Foundation Tier

Time: 1 hour 30 minutes

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser.

Total Marks

Instructions

• Use **black** ink or ball-point pen.
• **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
• Answer **all** questions.
• Answer the questions in the spaces provided
– there may be more space than you need.
• **Calculators may not be used**.
• Diagrams are **NOT** accurately drawn, unless otherwise indicated.
• You must **show all your working out.**

Information

• The total mark for this paper is 80
• The marks for **each** question are shown in brackets
– use this as a guide as to how much time to spend on each question.

Advice

• Read each question carefully before you start to answer it.
• Keep an eye on the time.
• Try to answer every question.
• Check your answers if you have time at the end.

Foundation Tier Formulae Sheet

Perimeter, area and volume

Where a and b are the lengths of the parallel sides and h is their perpendicular separation:
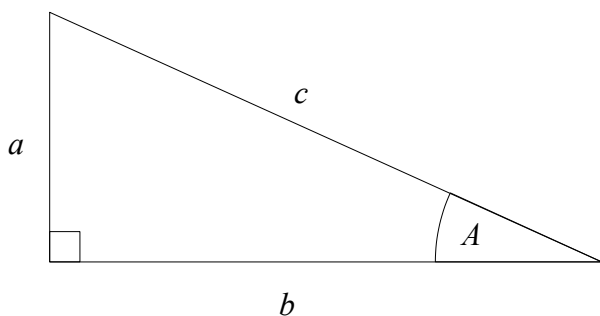
Area of a trapezium = $\frac{1}{2}(a + b)\, h$

Volume of a prism = area of cross section × length

Where r is the radius and d is the diameter:

Circumference of a circle = $2\pi r = \pi d$

Area of a circle = πr^2

Pythagoras' Theorem and Trigonometry

In any right-angled triangle where a, b and c are the length of the sides and c is the hypotenuse:

$$a^2 + b^2 = c^2$$

In any right-angled triangle ABC where a, b and c are the length of the sides and c is the hypotenuse:

$$\sin A = \frac{a}{c} \qquad \cos A = \frac{b}{c} \qquad \tan A = \frac{a}{b}$$

Compound Interest

Where P is the principal amount, r is the interest rate over a given period and n is number of times that the interest is compounded:

Total accrued = $P\left(1 + \dfrac{r}{100}\right)^{n}$

Probability

Where P (A) is the probability of outcome A and P (B) is the probability of outcome B:

P $(A$ or $B)$ = P (A) + P (B) − P $(A$ and $B)$

END OF EXAM AID

1 Write 0.9 as a fraction

$$\frac{9}{10}$$

(Total for Question 1 is 1 mark)

2 Change 45 centimetres into millimetres

1cm = 10mm

450 ....millimetres

(Total for Question 2 is 1 mark)

3 Simplify $5 \times a \times 2$

10a

(Total for Question 3 is 1 mark)

4 Work out $\frac{1}{6}$ of 300

$300 \div 6 = 50$

50

(Total for Question 4 is 1 mark)

5 30 children were asked which sport they wanted to play.

Here are the results.

Football	Cricket	Football	Netball	Rounders
Rounders	Football	Cricket	Netball	Netball
Netball	Rounders	Rounders	Football	Rounders
Cricket	Rounders	Football	Football	Cricket
Football	Rounders	Rounders	Netball	Football
Football	Football	Cricket	Rounders	Netball

(a) Complete the frequency table.

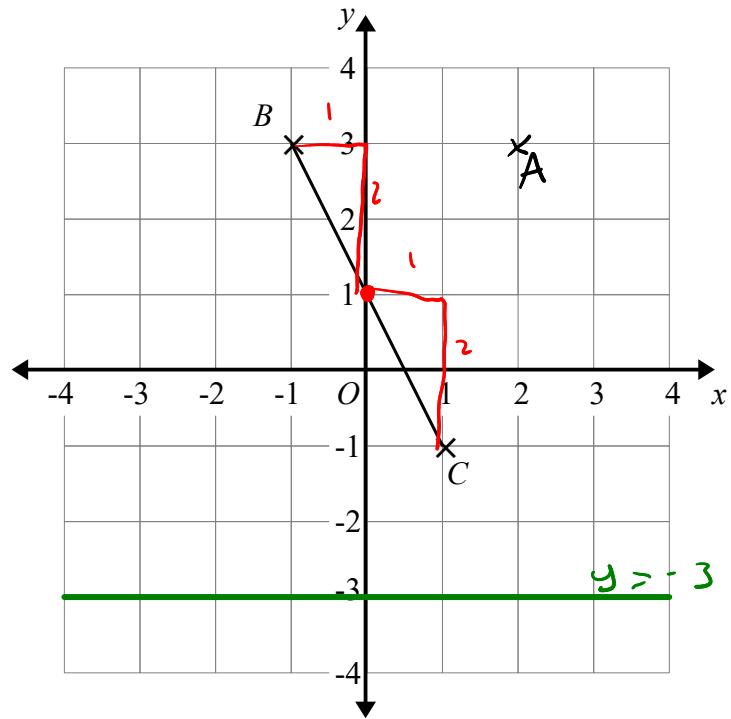| Sport	Tally	Frequency
Football	ЖЖ ЖЖ	10
Cricket	ЖЖ	5
Netball	ЖЖ I	6
Rounders	ЖЖ IIII	9

(2)

(b) Draw a bar chart to show the results.
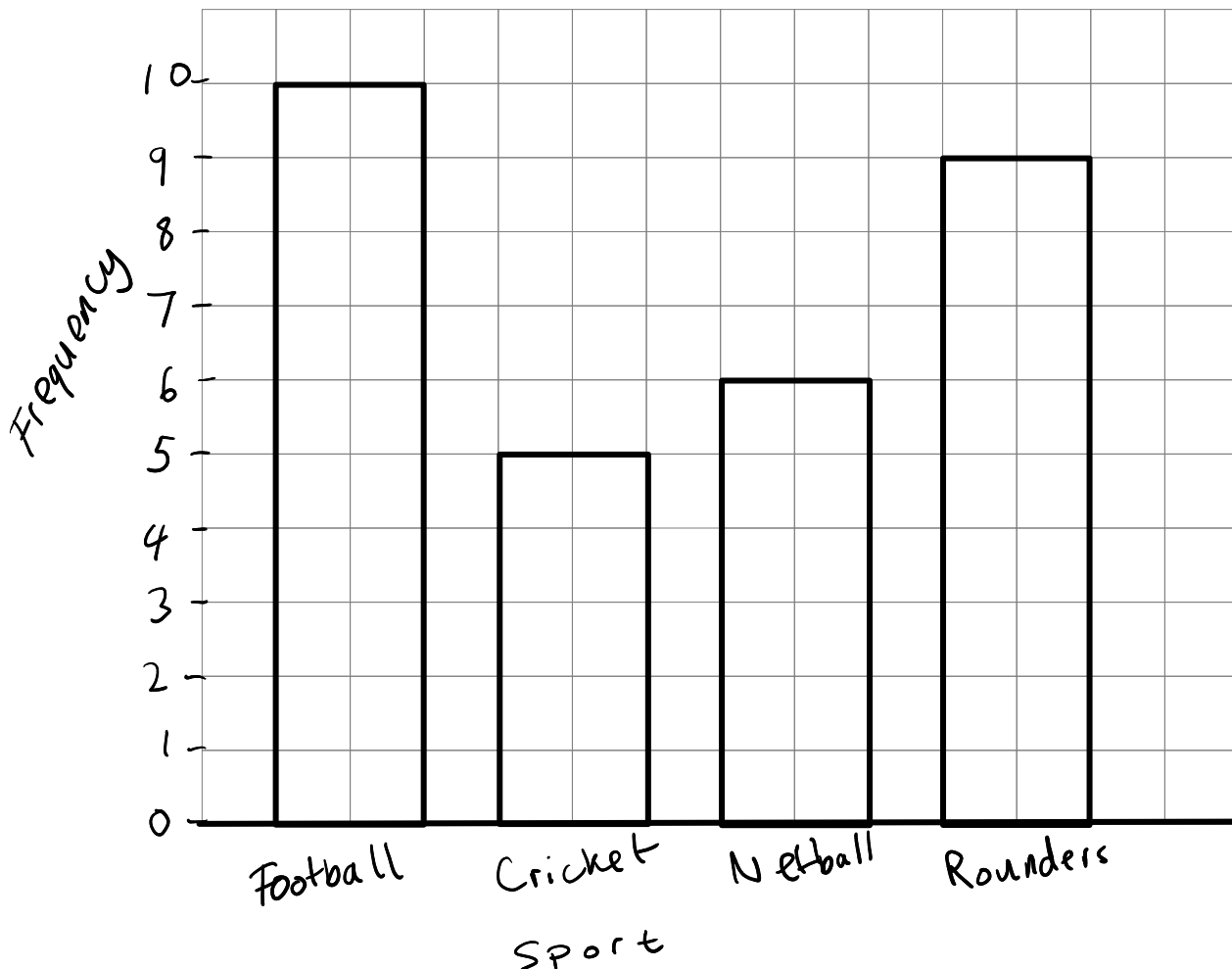
(3)

(Total for Question 5 is 5 marks)

6

(a) Plot the point with coordinates (2, 3)
Label this point *A*.

(1)
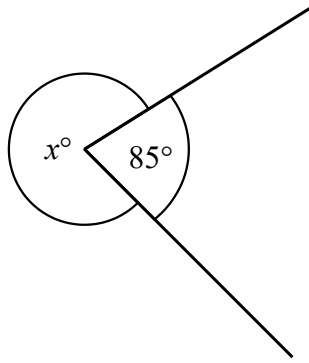
(b) Write down the coordinates of the midpoint of *BC*.

(__0__ , __1__)

(1)

(c) Draw the line with equation $y = -3$

(1)

(Total for Question 6 is 3 marks)

7

$$\begin{array}{r} {}^{2}\cancel{3}\overset{15}{\cancel{6}}\overset{1}{0} \\ -85 \\ \hline 275 \end{array}$$

(a) Find the value of *x*.

$$x = \underline{275^{\circ}}$$

(1)

(b) Give a reason for your answer.

Angles around a point add to 360°

(1)

(Total for Question 7 is 2 marks)

8   A total of 1400 tickets were on sale for a show.

819 of the tickets were sold.

How many tickets were not sold.

$$\begin{array}{r} 1\,{}^{3}\cancel{4}\,{}^{9}\cancel{8}\,{}^{1}0 \\ -8\,1\,9 \\ \hline 5\,8\,1 \end{array}$$

$$\underline{581}$$

(Total for Question 8 is 2 marks)

9 $A = 3b - 2c$

(i) Work out the value of A when $b = 6$ and $c = 2$

$$A = 3(6) - 2(2)$$
$$= 18 - 4$$
$$= 14$$

$A = $ ....14........
(2)

(ii) Work out the value of A when $b = -3$ and $c = 4$

$$A = 3(-3) - 2(4)$$
$$= -9 - 8$$

$A = $ ....-17........
(2)

(iii) Work out the value of b when $A = 11$ and $c = 5$

$$11 = 3b - 2(5)$$
$$11 = 3b - 10$$
$$21 = 3b$$
$$b = 21 \div 3$$

$b = $ ....7........
(2)

(Total for Question 9 is 6 marks)

10   Here are two triangles on a grid.
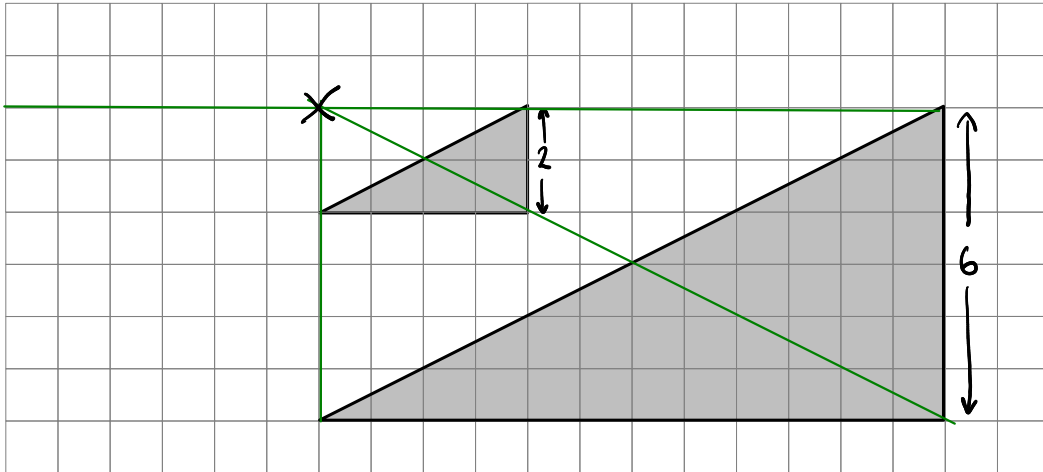
Triangle **B** is an enlargement of triangle **A**.

(a) (i) Write down the scale factor of the enlargement.
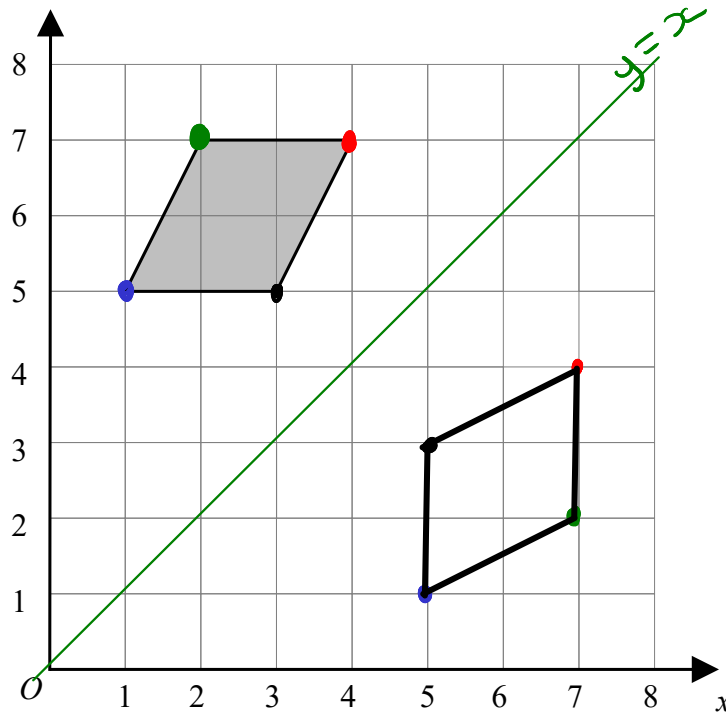
$$6 \div 2 = 3$$

................................**3**................................

(1)

(ii) On the grid, mark with a cross (×) the centre of enlargement

(1)

Here is a parallelogram on a coordinate grid.

(b) On the grid reflect the parallelogram in the line $y = x$

(2)

(Total for Question 10 is 4 marks)

11 There are 32 cubes in a bag.

10 of the cubes are red.
13 of the cubes are blue.
The rest of the cubes are green.

A cube is picked at random from the bag.

Write down the probability that

(i) the cube is green,

$10 + 13 = 23$

$32 - 23 = 9$

............$\dfrac{9}{32}$............
(1)

(ii) the cube is **not** red,

10 Red   22 Not Red

............$\dfrac{22}{32}$............
(1)

(iii) the cube is yellow

0 Yellow cubes

............0............
(1)

(Total for Question 12 is 3 marks)

12 In company A there are 98 full time workers and 70 part time workers.

In company B $\frac{7}{12}$ of the workers are full time workers and the rest are part time workers.

Show that the ratio of full time workers to part time workers is the same for both companies.

Company A

98 : 70

49 : 35

7 : 5

Company B

$\frac{7}{12}$: $\frac{5}{12}$

7 : 5

both ratios
are 7:5

(Total for Question 12 is 3 marks)

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13 (a) Work out an estimate for the value of 91×1.73

You must show all your working.

$90 \times 2 = 180$

180

(2)

Given that
$$3.14 \times 1.6 = 5.024$$

×100 ÷10

(b) find the value of 314×0.16

×100 and ÷10

$5.024 \times 100 \div 10$

50.24

(1)

(Total for Question 15 is 3 marks)

14   Here is the list of ingredients for making 20 muffins.

Ingredients for 20 muffins
400g Flour
250g Sugar
150g Butter

10 muffins
200g
125g
75g

Gary wants to make 50 muffins.
How much sugar does Gary need?

$$\begin{array}{r} 125 \\ \times\quad 5 \\ \hline {}^1{}^2 \\ 625 \end{array}$$

625 g

(Total for Question 14 is 2 marks)

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15   Phil is buying a boat.
The car costs £18000

Steve pays 20% of the cost as a deposit.
He pays the rest of the cost in 20 equal monthly payments.

How much is each monthly payment?

$$\frac{18000}{10} = 1800 \quad (10\%)$$

$$1800 \times 2 = 3600 \quad 20\%$$

$$\begin{array}{r} {}^7\!\!\!1 \\ 18000 \\ -\quad 3600 \\ \hline 14400 \end{array}$$

20
40
60
80
100
120
140

$$20\overline{)14400} = 00720$$

£ 720

(Total for Question 15 is 4 marks)

16 Here is a triangle *ABC*.
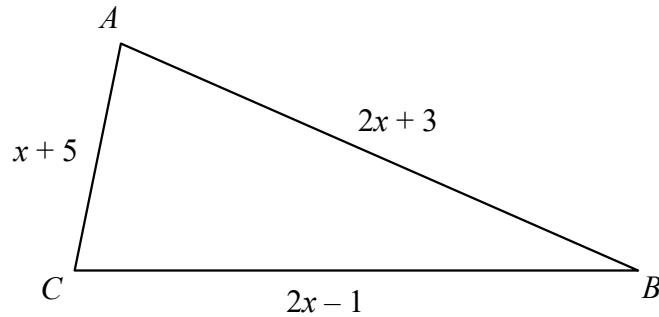
All the measurements are in centimetres.

The perimeter of *ABC* is 62 centimetres.

Work out the length of *AB*.

$$2x + 3 + x + 5 + 2x - 1 = 62$$
$$5x + 7 = 62$$
$$5x = 55$$
$$x = 11$$

AB

$$2(11) + 3$$
$$22 + 3$$
$$25$$

........................**25**........................ centimetres
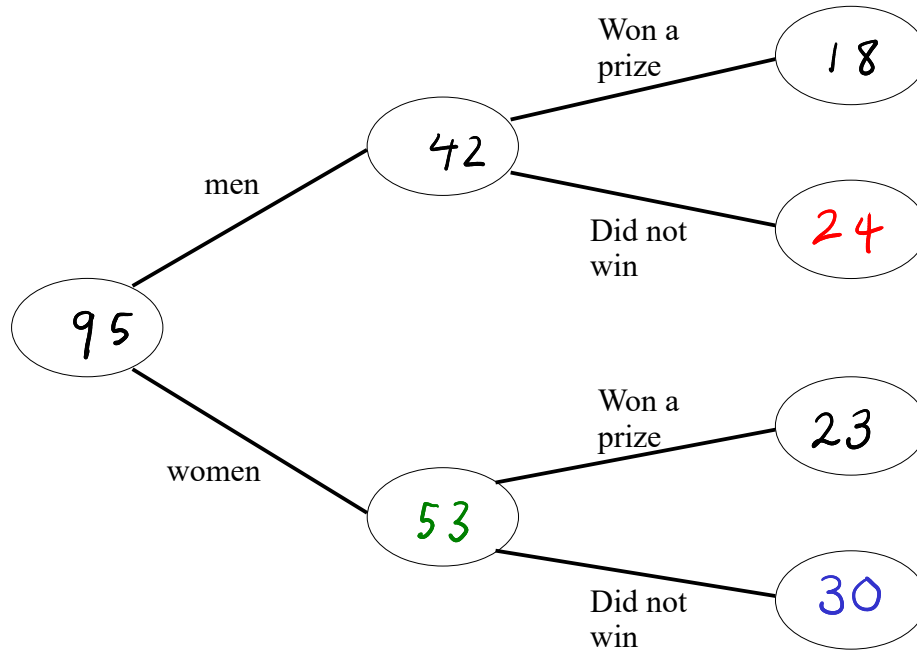
(Total for Question 16 is 4 marks)

17 95 people bought raffle tickets.

18 out of the 42 men who bought a raffle ticket won a prize.
23 of the women who bought a ticket won a prize.

Use this information to complete the frequency tree.

$$\overset{3}{\cancel{4}}\overset{1}{2}$$
$$-18$$
$$\overline{24}$$

$$95$$
$$-42$$
$$\overline{53}$$

```
                                      Won a
                                      prize        ( 18 )
                          ( 42 )
                  men            
                                      Did not      ( 24 )
                                      win
        ( 95 )
                                      Won a
                                      prize        ( 23 )
                  women
                          ( 53 )
                                      Did not      ( 30 )
                                      win
```

(Total for Question 17 is 3 marks)

18 Increase 320 by 15%

$$\frac{320}{10} = 32 \quad (10\%)$$

$$32 \div 2 = 16 \quad (5\%)$$

$$15\% \text{ of } 320 = 32 + 16$$
$$= 48$$

$$\begin{array}{r} 320 \\ + \ \ 48 \\ \hline 368 \end{array}$$

368

(Total for Question 18 is 3 marks)

19 Work out $5.92 \div 0.16$
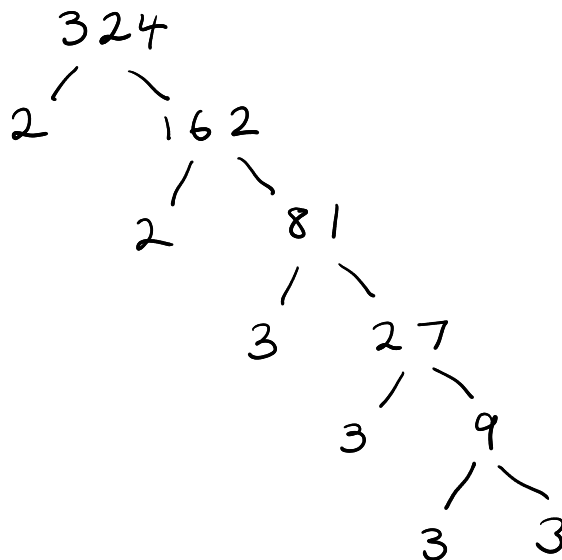
$$\frac{5.92}{0.16} = \frac{592}{16}$$

16
32
48
64
80
96
112

$$16 \overline{\smash{\big)}\, 5\,^5 9\,^{11} 2} = 037$$

37

(Total for Question 19 is 3 marks)

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20 Write 324 as a product of powers of its prime factors.

324
2 ⟍ 162
2 ⟍ 81
3 ⟍ 27
3 ⟍ 9
3   3

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

(Total for Question 20 is 3 marks)

21 (a) Work out $2\frac{2}{3} + 1\frac{3}{5}$

Give your answer as a mixed number.

$2\frac{2}{3} = \frac{8}{3}$ $1\frac{3}{5} = \frac{8}{5}$

$\frac{5 \times 8}{5 \times 3} + \frac{8 \times 3}{5 \times 3}$

$\frac{40}{15} + \frac{24}{15} = \frac{64}{15} = 4\frac{4}{15}$

$4\frac{4}{15}$

(2)

(b) Work out $\frac{2}{3} \div \frac{3}{4}$

$\frac{2}{3} \times \frac{4}{3} = \frac{8}{9}$

$\frac{8}{9}$

(2)

(Total for Question 21 is 4 marks)

22 Work out the value of $\frac{5^{-3} \times 5^7}{5}$

$-3 + 7 = 4$

$\frac{5^4}{5^1} = 5^3 = 125$

125

(Total for Question 22 is 2 marks)

23 Tracey writes down three numbers a, b and c.

$$a : b = 3 : 5 \qquad \times 4$$
$$a : c = 4 : 7 \qquad \times 3$$

(a) Find $a : b : c$

$a : b$ $a : c$

$12 : 20$ $12 : 21$

$12 : 20 : 21$

(2)

Jamie writes down three numbers d, e and f.

$$d = 2e$$
$$f = 3d$$

(b) Find $e : d : f$

Let $e = 1$

$d = 2 \times 1 = 2$

$f = 3 \times d = 6$

$1 : 2 : 6$

(2)

(Total for Question 23 is 4 marks)

24 The diagram shows a cuboid.
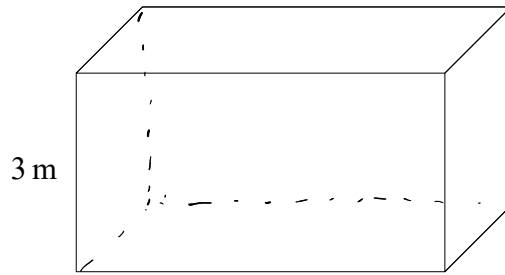
pressure = force / area

3 m

The cuboid has height 3 m
The volume of the cuboid is 21 m³
The pressure on the floor due to the cuboid is 25 newtons/m² *(pressure)*

Work out the force exerted by the cuboid on the floor.

Area of base = 21 ÷ 3
= 7 m²   (area)

25 = Force / 7

Force = 25 × 7

_____175_____ newtons

(Total for Question 24 is 3 marks)

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25 In a bag there are counters.
The counters are all either red or blue or yellow.

| The number of red counters | : | The number of blue counters | : | The number of yellow counters | = 4 : 5 : 8 |

The number of yellow counters is 24 more than the numbers of blue counters.

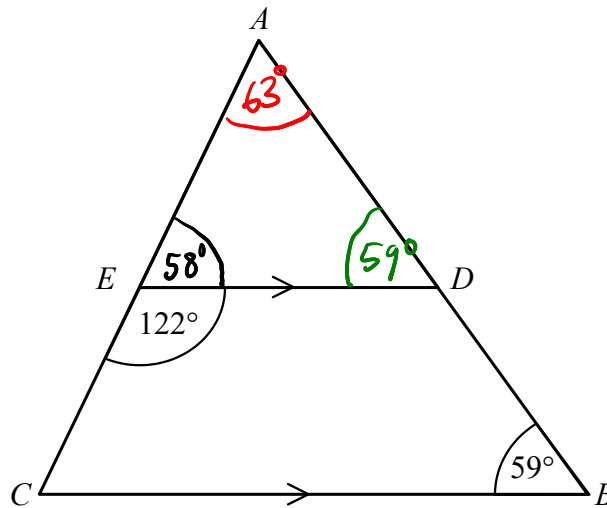Work out the total number of counters in the bag.

Red   8 8 8 8   32

Blue 8 8 8 8 8   40

Yellow 8 8 8 8 8 (8 8 8) 64

24 ÷ 3 = 8   ↓24

32
40
64

136

_____136_____

(Total for Question 25 is 3 marks)

26 *ABC* is a triangle.

AEC and *ADB* are straight lines.
ED is parallel to *CB*.
Angle *CED* = 122°
Angle *ABC* = 59°

Work out the size of angle *CAB*.
You must give a reason for each stage of your working.

$AED = 58°$ Angles on a straight line add to 180°

$ADE = 59°$ Corresponding angles are equal

$180 - (59 + 58) = \underline{\underline{63°}}$
$180 - 117$

Angles in a triangle add to 180°

(Total for Question 26 is 5 marks)

27 $\mathbf{a} = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} -1 \\ 5 \end{pmatrix}$

Work out $3\mathbf{a} + \mathbf{b}$ as a column vector.

$$3a = 3\begin{pmatrix} 3 \\ 2 \end{pmatrix}$$

$$= \begin{pmatrix} 9 \\ 6 \end{pmatrix}$$

$$\begin{pmatrix} 9 \\ 6 \end{pmatrix} + \begin{pmatrix} -1 \\ 5 \end{pmatrix} = \begin{pmatrix} 8 \\ 11 \end{pmatrix}$$

$$\begin{pmatrix} 8 \\ 11 \end{pmatrix}$$

(Total for Question 27 is 2 marks)

TOTAL FOR PAPER IS 80 MARKS