

Write your name here

Surname

Other Names

# Mathematics

## 2018 Practice Paper 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.

1 Simplify  $x+x+x+y$

..... $3x + y$ .....

(Total for question 1 is 1 mark)

2 Simplify  $2 \times a \times b \times 5$

..... $10ab$ .....

(Total for question 2 is 1 mark)

3 Write 23 860 correct to the nearest 1000.

..... $24000$ .....

(Total for question 3 is 1 mark)

4 Write  $\frac{1}{4}$  as a percentage.

..... $25\%$ .....

(Total for question 4 is 1 mark)

5 Change 2500 millilitres into litres.

..... $2.5$ .....litres

(Total for question 5 is 1 mark)

6 Solve  $2y + 3 = 17$   
 $\quad -3 \quad -3$

$$2y = 14$$

$$y = 7$$

$$y = \dots\dots\dots 7$$

(Total for question 6 is 2 marks)

7 There are 20 chocolates in a tin and 10 chocolates in a box.  
Abe buys  $t$  tins and  $b$  boxes.  
Write an expression for the total number of chocolates Abe buys.

$$\dots\dots\dots 20t + 10b$$

(Total for question 7 is 2 marks)

8 (a) Write these numbers in order of size.  
Start with the smallest number.

2.47                  2.047                  2.407                  2.4

$$\dots\dots\dots 2.047, 2.4, 2.407, 2.47$$

(1)

(b) Write these numbers in order of size.  
Start with the smallest number.

-3                  2                  -7                  4                  1

$$\dots\dots\dots -7, -3, 1, 2, 4$$

(1)

(Total for question 8 is 2 marks)

9 Here are the first 5 terms of a sequence.

2                      7                      12                      17                      22

(a) Find the next term of this sequence.

$$\begin{array}{r} 27 \\ \hline (1) \end{array}$$

The  $n$ th term of a different sequence is  $2n^2 - 3$

(b) Work out the 5<sup>th</sup> term of this sequence.

$$\begin{aligned} 2(5)^2 - 3 \\ 2(25) - 3 \\ 50 - 3 \end{aligned}$$

$$\begin{array}{r} 47 \\ \hline (1) \end{array}$$

(Total for question 9 is 2 marks)

10 Here are four fractions.

$$\frac{4 \times 2}{15 \times 2} \quad \frac{1 \times 6}{5 \times 6} \quad \frac{7}{30} \quad \frac{1 \times 5}{6 \times 5}$$

Write these fractions in order of size.  
Start with the smallest fraction.

$$\begin{array}{cccc} \textcircled{4} & \textcircled{2} & \textcircled{3} & \textcircled{1} \\ \frac{8}{30} & \frac{6}{30} & \frac{7}{30} & \frac{5}{30} \end{array}$$

$$\frac{1}{6}, \frac{1}{5}, \frac{7}{30}, \frac{4}{15}$$

(Total for question 10 is 2 marks)

11 Liam goes to a Cafe.

He buys

2 coffees for £1.60 each

3 teas for £1.10 each

2 cakes for £2.15 each

$$2 \times 1.60 = 3.20$$

$$3 \times 1.10 = 3.30$$

$$2 \times 2.15 = 4.30$$

Work out the total amount that Liam spends.

---

$$10.80$$

£ 10.80

(Total for question 11 is 2 marks)

12 Work out 252% of 120.

$$\begin{array}{r} \uparrow 100\% = 120 \\ \times 2 \quad \downarrow \times 2 \\ \star 200\% = 240 \\ + \quad + \\ 50\% = 60 \end{array}$$

$$\begin{array}{r} 250\% = 300 \\ + \quad + \\ 2\% = 2.4 \\ 10\% = 12 \\ 1\% = 1.2 \\ 2\% = 2.4 \\ 252\% = 302.4 \end{array}$$

302.4

(Total for question 12 is 2 marks)

13 Work out  $5.23 \times 3.7$

$$523 \times 37$$

	500	20	3
30	15000	600	90
7	3500	140	21

$$\begin{array}{r} 15000 \\ 3500 \\ 600 \\ 140 \\ 90 \\ + 21 \\ \hline 19351 \end{array}$$

19.351

(Total for question 13 is 3 marks)

14 A model car has the length of 8cm.

The scale of the model is 1:50

Work out the length of the real car.

Give your answer in metres.

$$8 \times 50 = 400 \text{ cm}$$

$$400 \text{ cm} = 4 \text{ m}$$

4

.....m  
(Total for question 14 is 2 marks)

- 15 David buys 3 pens and 5 pencils from the stationary shop.  
The total cost is £1.15.

James buys 4 pens for £1.20.

Work out how much it would cost to buy 1 pen and 2 pencils.

$$4 \text{ pens} = \pounds 1.20$$

$$\underline{1 \text{ pen} = 30p}$$

$$3 \text{ pens} = 90p$$

$$\pounds 1.15 - 90p = 25p \text{ (for 5 pencils)}$$

$$\underline{5p \text{ for 1 pencil}}$$

$$30p + 5p + 5p = 40p \quad \pounds \dots 0.40$$

(Total for question 15 is 3 marks)

- 16 In a bag there are blue sweets and red sweets. The ratio of blue sweets to red sweets is 5:3.

What fraction of the sweets are blue?

B B B B B R R R

$$\frac{5}{8}$$

(Total for question 16 is 2 marks)

17 In a box there are 5 red pens, 3 blue pens and 1 green pen.

George takes at random a pen from the box.

Write down the probability George takes a blue pen.

$$\frac{3}{9} \text{ or } \frac{1}{3}$$

$$\frac{3}{9}$$

(Total for question 17 is 1 mark)

18 Here are seven cards. Each card has a number on it.

12	5	10	18	12	11	9
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(a) Work out the range of the numbers on the cards.

$$18 - 5 = 13$$

$$13$$

(1)

(b) Work out the mean of the numbers on the cards.

$$\frac{12 + 5 + 10 + 18 + 12 + 11 + 9}{7}$$

$$\frac{77}{7}$$

$$11$$

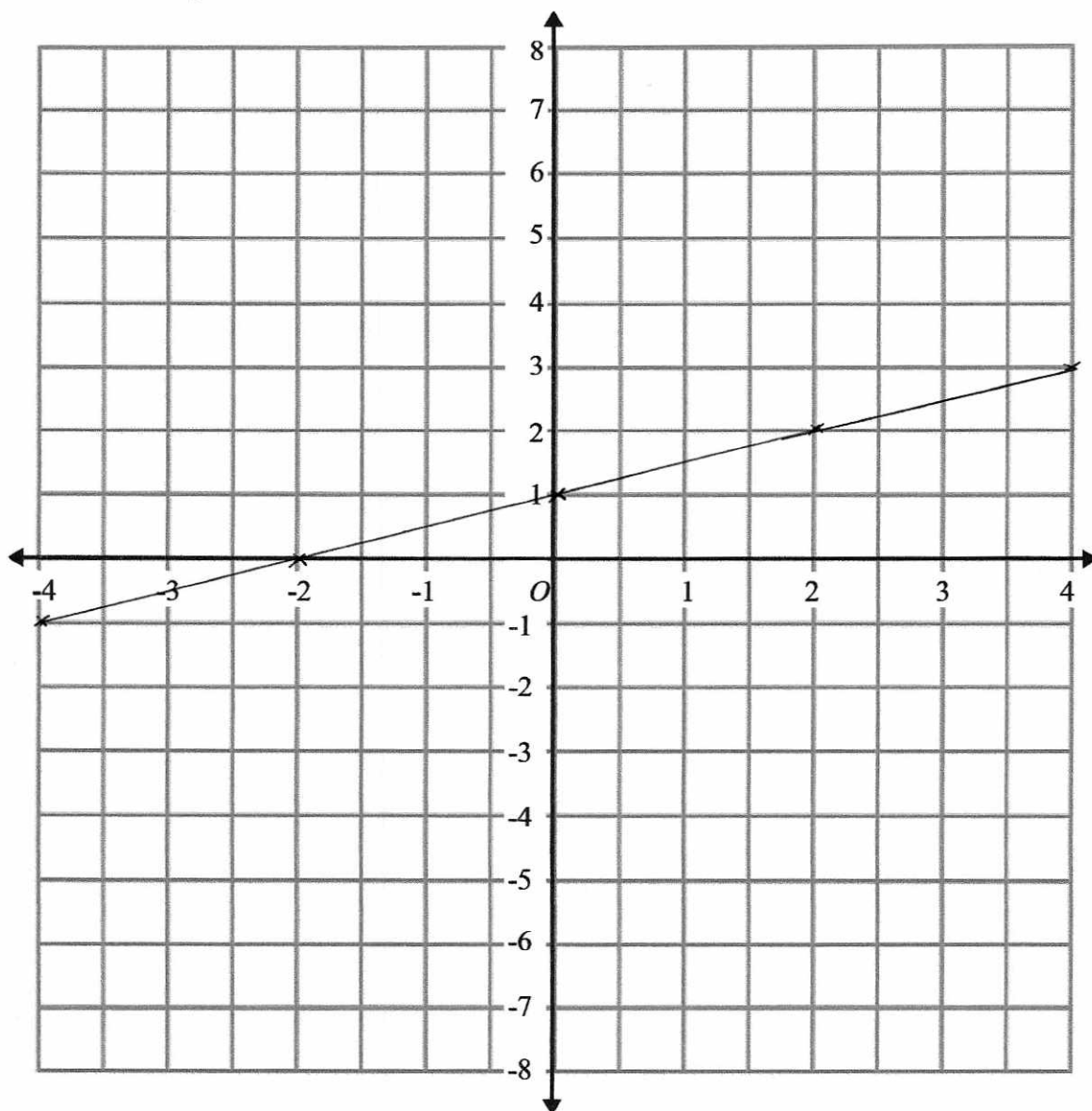
(2)

(Total for question 18 is 3 marks)



19 On the grid, draw the graph of  $y = \frac{1}{2}x + 1$  for  $x$  values from -4 to 4

$x$	-4	-2	0	2	4
$y$	-1	0	1	2	3



(Total for question 19 is 3 marks)



21 100 students attended a revision lesson at the weekend.

Each student went to Maths or English or Science.

55 of these students attended on Saturday.

Over the weekend a total of 40 students went to Maths.

12 of the 27 students that went to Science went on Sunday.

10 students went to English on Saturday.

How many students went to the Maths revision lesson on Saturday?

	Sat	Sun	Total
Maths	30	10	40
English	10	23	33
Science	15	12	27
Total	55	45	100

.....30.....

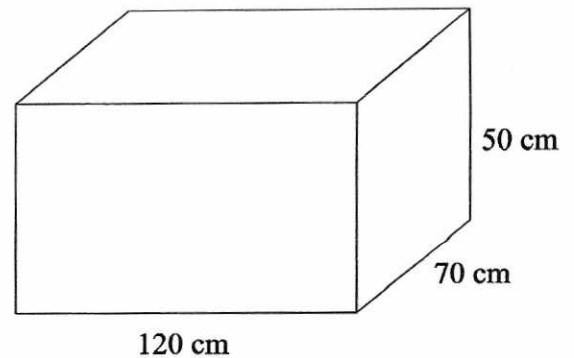
(Total for question 21 is 4 marks)

22 The diagram shows an empty water container.

The container is going to be filled using a hose pipe.

The water will flow into the container at a rate of 2 litres per second.

How long will it take for the container to be filled completely?



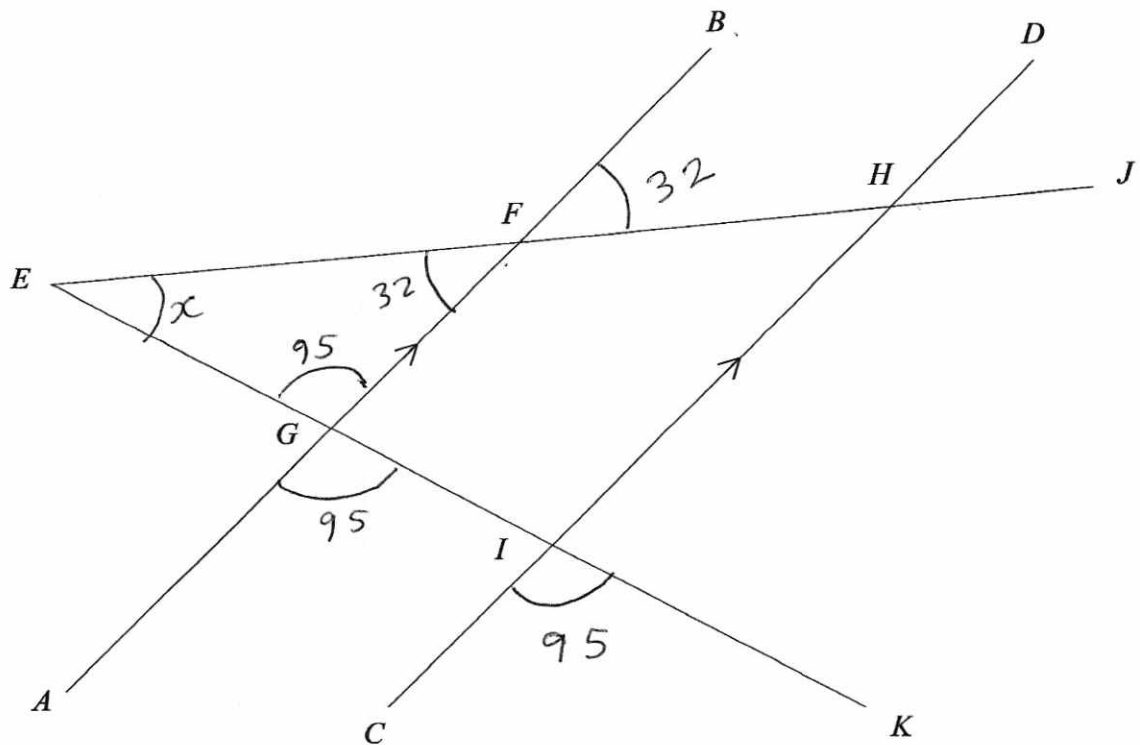
$$\begin{aligned}\text{Volume} &= 120 \times 70 \times 50 \\ &= 8400 \times 50 \\ &= 420000 \text{ cm}^3 \\ &= 420 \text{ litres}\end{aligned}$$

2 litres per second

$$\frac{420}{2} = 210 \text{ seconds}$$

.....210.....seconds

(Total for question 22 is 4 marks)



AB and CD are parallel.

Angle CIK =  $95^\circ$

Angle BFH =  $32^\circ$

Find the size of angle FEG.

You must show how you got your answer.

$\angle EFG = 32^\circ$  vertically opposite angles are equal

$\angle AGI = \angle EGF = 95^\circ$  Corresponding angles are equal  
+ vertically opposite angles are equal.

$$95 + 32 = 127^\circ$$

$$180 - 127 = 53^\circ$$

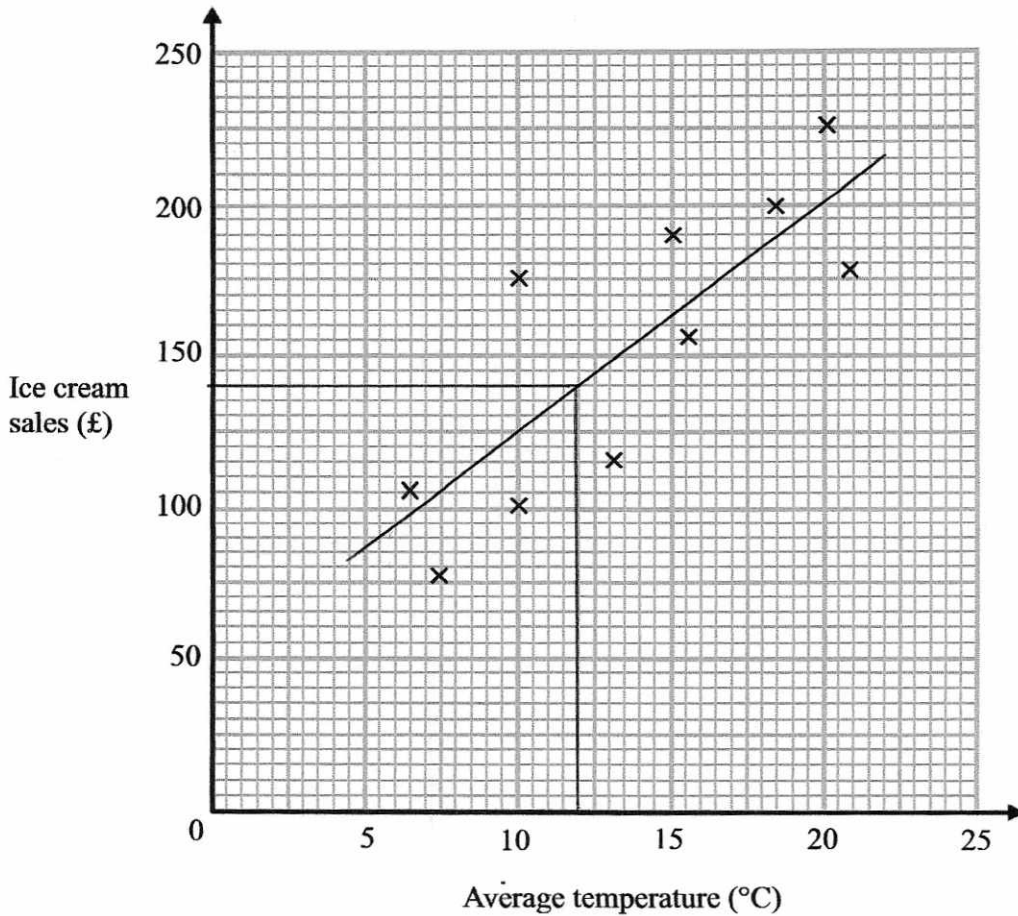
Angles in a triangle sum to  $180^\circ$

53<sup>°</sup>

(Total for question 23 is 3 marks)

24 The average daytime temperature for 10 days is recorded.  
A shop also records its ice cream sales for each of the 10 days.

The scatter graph shows this information.



(a) What type of correlation does the scatter graph show?

..... positive ..... (1)

(b) On the 11<sup>th</sup> day the temperature was 12°. Estimate the ice cream sales on the 11th day.

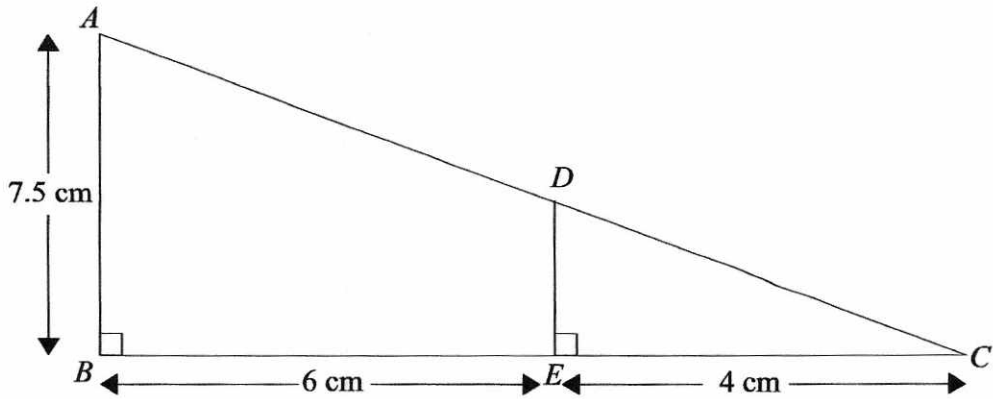
..... £140 .....  
..... £125 - £145 ..... (2)

(c) The shop's manager wants to use the scatter graph to predict the ice cream sales for a day with an average temperature of 2°. Comment on the reliability of this prediction.

..... It is not reliable. 2°C is not within range of .....  
..... data we have .....  
.....

(1)

(Total for question 24 is 5 marks)



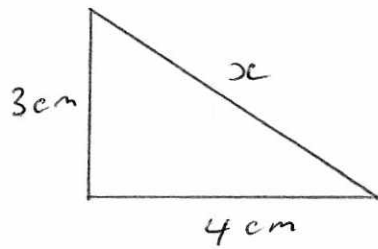
(a) Find the length of DE

$\times 2.5$   
 $\xrightarrow{\hspace{2cm}}$   
 $\xleftarrow{\hspace{2cm}} \div 2.5$

Scale factor =  $\frac{10}{4}$   
 $= \frac{5}{2}$   
 $= 2.5$

$7.5 \div 2.5 = 3$  ..... 3 ..... cm

(b) Find the length of DC



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

$$9 + 16 = x^2$$

$$25 = x^2$$

$$x = 5$$

..... 5 ..... cm  
(2)

- 26 Stevie has some marbles.  $x$  (10)  
Freddie has twice as many marbles as Stevie.  $2x$  (20)  
Danny has 5 more marbles than Freddie.  $2x + 5$  (25)

In total they have 55 marbles.

How many marbles does Danny have?

$$x + 2x + 2x + 5 = 55$$

$$5x + 5 = 55$$

$$5x = 50$$

$$\underline{\underline{x = 10}}$$

.....  
25

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(Total for question 26 is 3 marks)



27 Rachel drives 300 miles from London to Newcastle.  
 She drives the first 165 miles at an average speed of 60 mph.  
 From this point it takes Rachel 3 hours and 15 minutes to complete her journey.



What was Rachel's average speed for the whole journey?

$$\text{Average Speed} = \frac{\text{Total Distance}}{\text{Total Time}}$$

First part:  $D = 165$   
 $S = 60$

$$\text{Time} = \frac{165}{60} = 2 \text{ hrs } 45 \text{ mins}$$

$$\therefore \text{Total time} = 3 \text{ hrs } 15 \text{ mins} + 2 \text{ hrs } 45 \text{ mins} \\ = 6 \text{ hours.}$$

$$\text{Average Speed} = \frac{300}{6} = 50 \text{ mph}$$

.....50.....mph

(Total for question 27 is 4 marks)

28 In a sale, normal prices are reduced by 25%.  
 Freddie bought a car in the sale.  
 The sale price of the car was £7500.  
 Work out the normal price of the car.

$$\begin{array}{l} \pounds 7500 = 75\% \\ \pounds 2500 = 25\% \\ \pounds 10000 = 100\% \end{array} \quad \left. \begin{array}{l} \downarrow \div 3 \\ \downarrow \times 4 \end{array} \right\}$$

£ 10000 .....

(Total for question 28 is 2 marks)

- 29 The distance from Earth to Mars is approximately  $7.834 \times 10^{10}$  m.  
The distance from Earth to Neptune is approximately  $4.3514 \times 10^{12}$  m.

(a) Estimate how many times further away Neptune is from Earth than Mars is from Earth.

$$\frac{4 \times 10^{12}}{8 \times 10^{10}} = 0.5 \times 10^2$$

$$= 50 \text{ times}$$

$$\frac{50}{(3)}$$

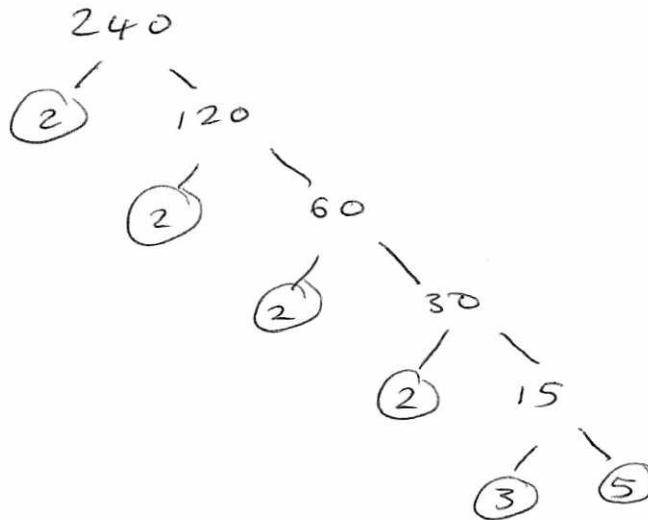
(b) Is your answer to part (a) an underestimate or an overestimate?  
Give a reason for your answer.

Under estimate. I rounded down the numerator and rounded up the denominator.

(1)

(Total for question 29 is 4 marks)

- 30 Write 240 as a product of its prime factors.



$$2 \times 2 \times 2 \times 2 \times 3 \times 5$$

$$\frac{2^4 \times 3 \times 5}{(3)}$$

(Total for question 30 is 3 marks)

31

$$a = \begin{pmatrix} 2 \\ 3 \end{pmatrix} \text{ and } b = \begin{pmatrix} 1 \\ 5 \end{pmatrix}$$

Write down as a column vector

(a)  $a + b$ 

$$\begin{pmatrix} 2 \\ 3 \end{pmatrix} + \begin{pmatrix} 1 \\ 5 \end{pmatrix} = \begin{pmatrix} 3 \\ 8 \end{pmatrix}$$

$$\begin{array}{c} \begin{pmatrix} 3 \\ 8 \end{pmatrix} \\ \hline (1) \end{array}$$

(b)  $2a + 3b$ 

$$2 \begin{pmatrix} 2 \\ 3 \end{pmatrix} + 3 \begin{pmatrix} 1 \\ 5 \end{pmatrix}$$

$$\begin{pmatrix} 4 \\ 6 \end{pmatrix} + \begin{pmatrix} 3 \\ 15 \end{pmatrix}$$

$$\begin{array}{c} \begin{pmatrix} 7 \\ 21 \end{pmatrix} \\ \hline (2) \end{array}$$

**(Total for question 31 is 3 marks)**

32 Solve the simultaneous equations

$$5x + 2y = 4 \quad \times 1$$

$$x - 3y = -23 \quad \times 5$$

$$5x + 2y = 4$$

$$5x - 15y = -115$$

$$17y = 119$$

$$\underline{\underline{y = 7}}$$

$$5x + 2(7) = 4$$

$$5x + 14 = 4$$

$$5x = -10$$

$$\underline{\underline{x = -2}}$$

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

$$y = 7$$

**(Total for question 32 is 3 marks)**