Model Solutions F

OCR
Oxford Cambridge and RSA

GCSE (9–1) Mathematics

J560/01 Paper 1 (Foundation Tier)

Tuesday 6 November 2018 – Morning

Time allowed: 1 hour 30 minutes

70715740 37

You may use:
- a scientific or graphical calculator
- geometrical instruments
- tracing paper

J560/01

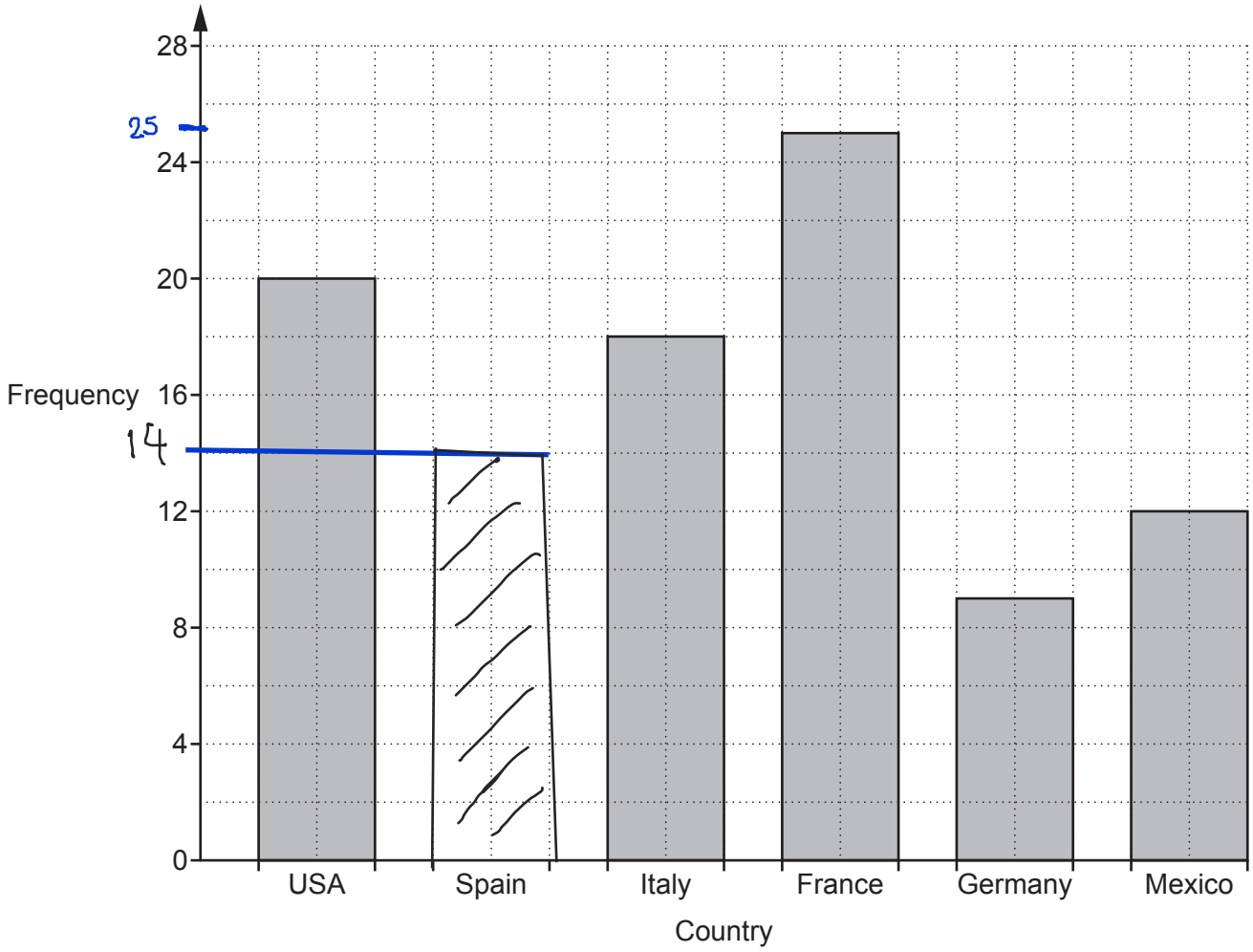
First name									
Last name									
Centre number						Candidate number				

INSTRUCTIONS
- Use black ink. You may use an HB pencil for graphs and diagrams.
- Complete the boxes above with your name, centre number and candidate number.
- Answer **all** the questions.
- Read each question carefully before you start to write your answer.
- Where appropriate, your answers should be supported with working. Marks may be given for a correct method even if the answer is incorrect.
- Write your answer to each question in the space provided. If additional space is required, use the lined page(s) at the end of this booklet. The question number(s) must be clearly shown.
- Do **not** write in the barcodes.

INFORMATION
- The total mark for this paper is **100**.
- The marks for each question are shown in brackets **[ ]**.
- Use the π button on your calculator or take π to be 3.142 unless the question says otherwise.
- This document consists of **20** pages.

Answer **all** the questions.

1 Jodie asked some people to choose from six countries where they would most like to go on holiday. The bar chart shows her results for five of the countries.



(a) 14 people answered Spain.

Show this information on the bar chart. **[1]**

(b) Complete these sentences.

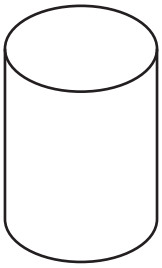
(i) Germany was chosen by the fewest people. – smallest bar **[1]**

(ii) 25 people chose France. **[1]**

(iii) 6 **more** people chose Italy than Mexico. **[1]**

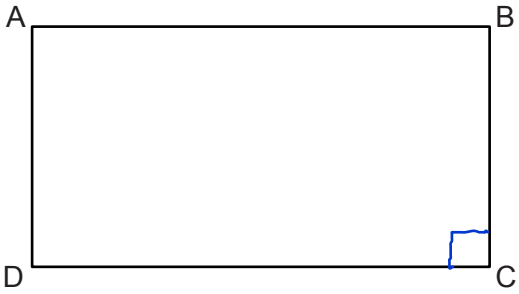
18 − 12 = 6

2 **(a)** Write down the mathematical name of this solid.



(a) cyclinder ..... **[1]**

(b) ABCD is a rectangle.



Not to scale

Add the correct mathematical symbol to the diagram to show that angle BCD is a right angle. **[1]**

3 Louiza changes £320 into euros.
£1 is worth 1.14 euros.

How many euros does she receive?

£1 = €1.14

x320 ↓ ↓ x320

£320 = €364.80

364.80 ..... euros **[2]**

4 **(a)** Write down each of the following.

(i) An even number.

A multiple of 2.

(a)(i) 4 **[1]**

(ii) A factor of 25.

1, 5, 25

(ii) 25 **[1]**

(iii) A prime number between 10 and 20.

only divisible by 1 and itself

(iii) 11, 13, 17, 19 **[1]**

(iv) A cube number.

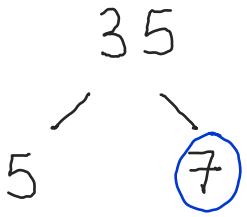
$1 \times 1 \times 1 = 1$

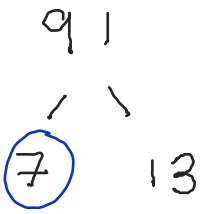
$2 \times 2 \times 2 = 8$

...

(iv) 1 **[1]**

(b) Find the highest common factor (HCF) of 35 and 91.

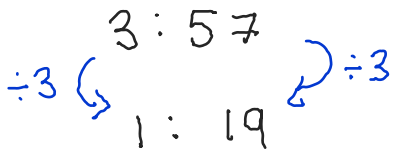




7 is a factor of 35 and 91 and is the largest

(b) 7 **[2]**

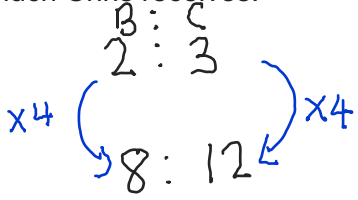
5 **(a)** Write 3 : 57 as a ratio in its simplest form.



(a) 1 : 19 **[1]**

(b) Bob and Chris share some money in the ratio 2 : 3.
Bob receives £8.

Work out how much Chris receives.



(b) £ 12 **[2]**

6 Solve.

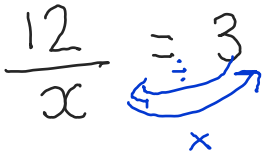
(a) $x - 6 = 4$

+6

$x = 4 + 6$

(a) $x =$ 10 **[1]**

(b) $\frac{12}{x} = 3$



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

(b) $x =$ 4 **[1]**

7 **(a)** Round 81.469 to 1 decimal place.

6 > 5 round up

(a) 81.5 **[1]**

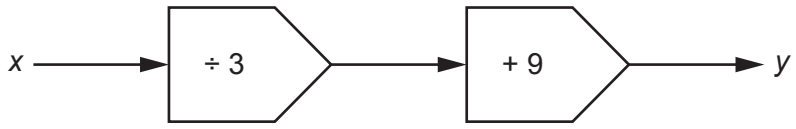
(b) Round 0.005 694 to 3 significant figures.

1 2 3

4 < 5 round down

(b) 0.00569 **[1]**

8 Here is a function.
The input is x and the output is y.



Write an algebraic expression for y in terms x.

$x \div 3 = \frac{x}{3}$

$+9 = \frac{x}{3} + 9$

$y = \frac{x}{3} + 9$ **[2]**

9 Liu wants to decorate some cakes with shapes.

She has 140 shapes.
Each shape is a star or a heart.
The ratio of the number of stars : number of hearts is 4 : 3.
She wants to put 5 stars and 4 hearts on each cake.

How many cakes can Liu decorate?
Show full working to support your answer.

Stars	:	Hearts	Total
4	:	3	7
80	:	60	140

×20 (4 : 3 → 80 : 60) ×20 (7 → 140)

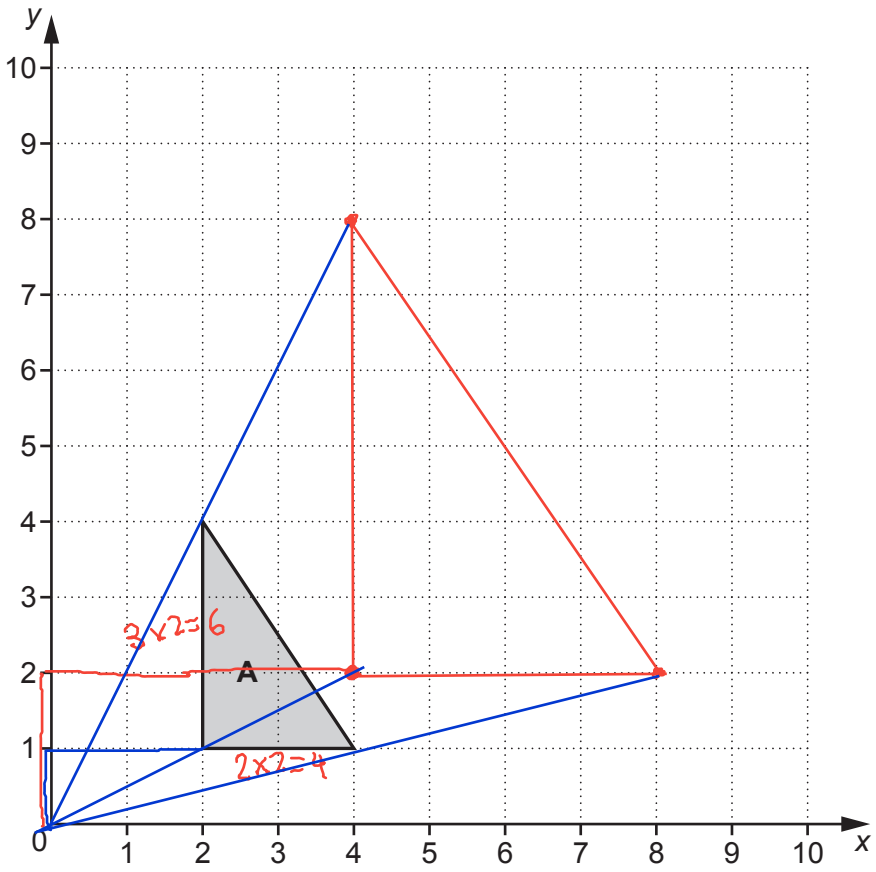
$80 \div 5 = 16$

$60 \div 4 = 15$

can only make 15

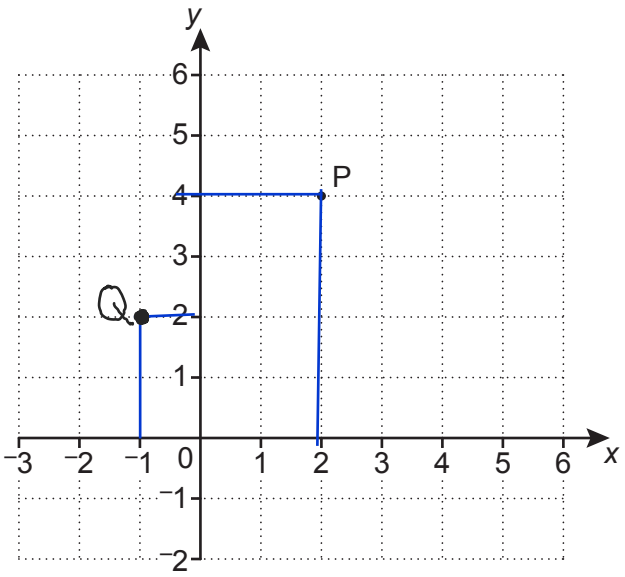
15 **[5]**

10 Triangle **A** is drawn on the grid below.



Enlarge triangle **A** with scale factor 2 and centre of enlargement (0, 0). **[3]**

11 Point P is shown on this grid.



(a) Write down the coordinates of point P.

(a) (.....2..... , ...4.....) **[1]**

(b) Plot point Q at (-1, 2). x = -1 y = 2 **[1]**

12 Use the formula

$$v = u + at$$

to find the final velocity, when

- the initial velocity is 8 m/s
- the acceleration is 3 m/s^2
- the time is 5 seconds.

u = 8
a = 3
t = 5

v = 8 + 3 × 5
= 8 + 15 = 23

..... m/s **[2]**

13 Calculate the circumference of a circle with diameter 10 cm.

Circumference = $\pi \times d$

$= \pi \times 10 = 10\pi$

$= 31.415...$

..... 31.4 ..... cm **[2]**

14 **(a)** Find the value of x in each of the following.

(i) $a^4 \times a^3 = a^x$

$a^{4+3} = a^7$

(a)(i) $x =$ ..... 7 ..... **[1]**

(ii) $(b^4)^3 = b^x$

$b^{4\times3} = b^{12}$

(ii) $x =$ ..... 12 ..... **[1]**

(b) Factorise fully.

$18x^2 + 9x$ → 9x is the Highest Factor

$9x(2x+1)$

$\frac{18x^2}{9x}$ $\quad$ $\frac{9x}{9x}$

(b) ..... 9x(2x+1) ..... **[2]**

15 Tea bags of similar quality are sold in three different sized packs:

Small Pack	Medium pack	Large pack
80 tea bags for £2.10	150 tea bags for £3.55	220 tea bags for £5.25

(a) Which pack is the best value for money?
Show how you decide.

small: 80 bags = £2.10
÷8
10 bags = £0.02625

medium: 150 bags = £3.55
÷15
10 bags = £0.02366...

large: 220 bags = £5.25
÷22
10 bags = £0.02386...

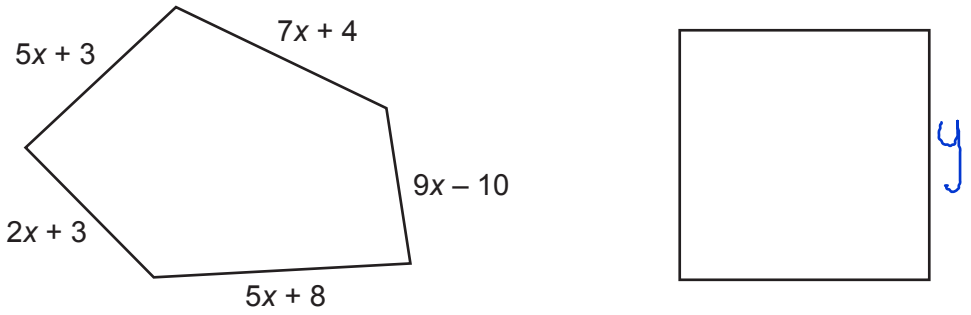
Medium because it is the cheapest for 10 bags out of the options **[4]**

(b) Explain why someone may buy a pack which is not the best value for money.

Because they may not need as many tea bags **[1]**

16 The perimeter of the pentagon is equal to the perimeter of the square.

Not to scale



Find an expression for the length of one side of the square.
Give your answer in terms of x in its simplest form.

Perimeter of Pentagon:

$5x+3+7x+4+9x-10+5x+8+2x+3$

$= 28x + 8 =$ 4 side lengths $= 4y$

1 side length $(y) = \frac{28x+8}{4}$

$7x + 2$ ..... **[4]**

17 James works from 2pm until 8.30pm on both Thursday and Friday.
He is paid £12 per hour.

On Saturday he is paid $1\frac{1}{2}$ times this hourly pay.

He works for 5 hours on Saturday.

Calculate how much James earns **in total** for these three days.

Hours worked: 2 - 8:30 = 6.5 hours

Thursday: $6.5 \times 12 = £78$

Friday: $6.5 \times 12 = £78$

Saturday Rate: $12 \times 1.5 = £18$ per hour

Saturday: $5 \times 18 = £90$

Total = $78 + 78 + 90 = 246$

£ 246 **[6]**

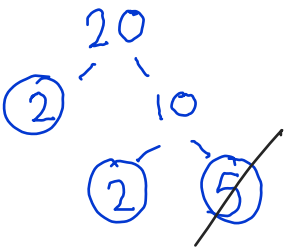
18 Doctor Jones starts an appointment every 20 minutes.
Doctor Warholm starts an appointment every 35 minutes.

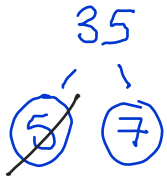
The first appointment for both doctors starts at 8.30 am.

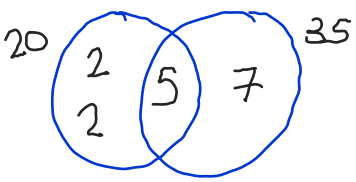
What is the next time that they have an appointment start at the same time?

Dr J : every 20 Dr W: every 35

LCM:







LCM = $2 \times 2 \times 5 \times 7$
= 140

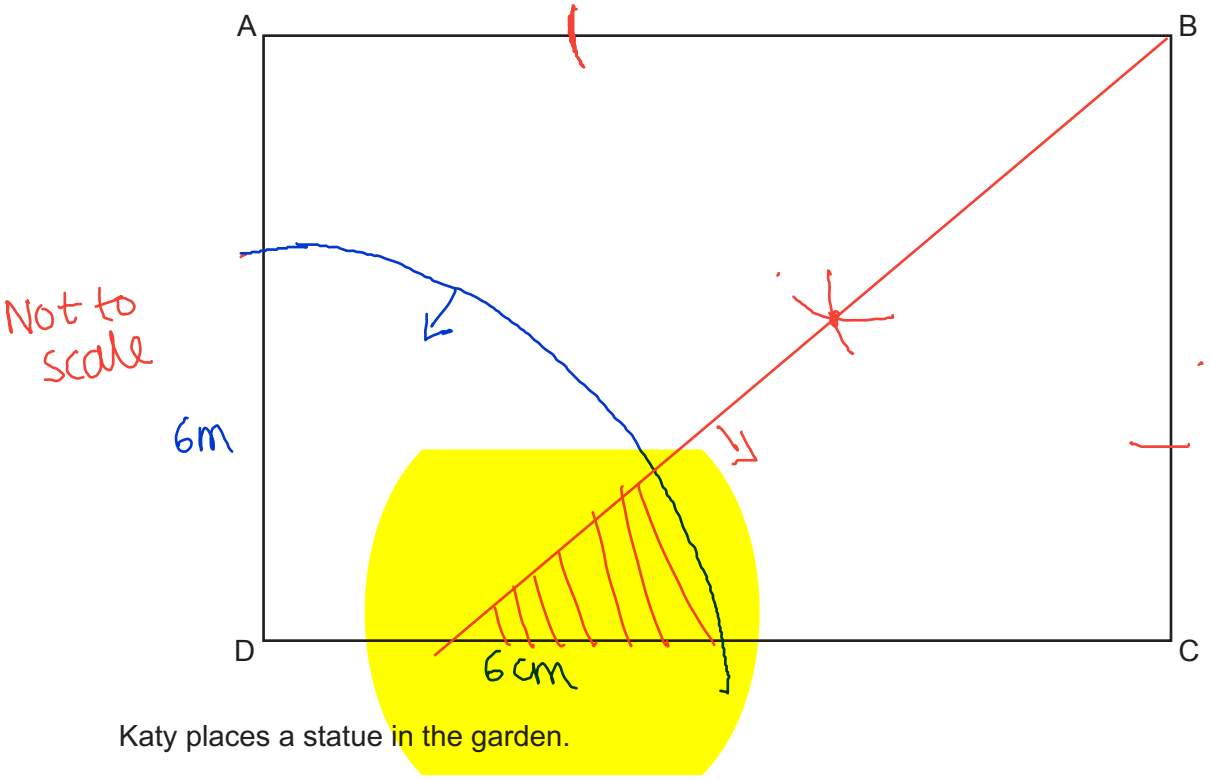
After 140min = 2h 20min

8:30 + 2h 20min

= 10:50 am **[4]**

19 The scale drawing shows Katy's garden ABCD.

Scale: 1 cm represents 5 m



Katy places a statue in the garden.

The statue is

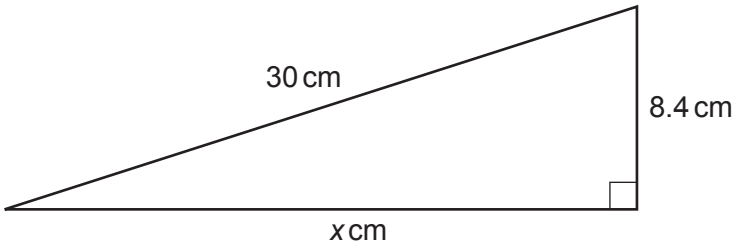
- more than 30 m from D
- closer to CB than AB.

1cm : 5m
6cm : 30m
bisector

Construct and shade the region where the statue could be placed.
Show all your construction lines. **[5]**

20 Here is a right-angled triangle.

Not to scale



Work out the value of x.

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

$c^2 - b^2 = a^2$

$30^2 - 8.4^2 = x^2$

$829.44 = x^2$

$x = \sqrt{28.8}$

$x =$ 28.8 **[3]**

21 Shari buys a box of 60 candles for £125.
She sells the candles for £2.25 each.

Calculate her percentage profit.

Total Rev: $2.25 \times 60 = 135$

$$\text{Profit} = \frac{\text{change}}{\text{original}} \times 100$$

$$= \frac{135 - 125}{125} \times 100$$

$$= \frac{10}{125} \times 100 =$$

.....8..... % **[4]**

22 Hector can run 400 metres in 66 seconds.

(a) Use this information to show that he could run 5 kilometres in less than 14 minutes. **[4]**

400 m : 66 sec $\times 12.5$

$\div 12.5$

5000m : 825 sec

$825 \text{ sec} \div 60 = 13.75 \text{ min}$

He can run 5000m (5km) in 13.75min, which is less than 14min

(b) Hector tries to run 5 kilometres in less than 14 minutes.

Give one reason why he might not achieve this.

.....He may not be able to maintain this rate..... **[1]**

23 Here are the interest rates for two bank accounts.

2.5+100=102.5
=×1.025

Northern Savings Bank (NSB)	Central Alliance Bank (CAB)
2.5% per year **compound interest**	2.7% per year **simple interest**

(1) (2)

Mia puts £6400 in each account.

Calculate the difference in value between the two accounts after 8 years.
Give your answer correct to the nearest penny.

(1) After 8 years: 6400×1.025^8

$= £7797.7785544$

(2) After 8 years:

2.7% of 6400 = £172.80 per year

×8

£1382.40 for 8 years

Total = 6400 + 1382.40 = 7782.40

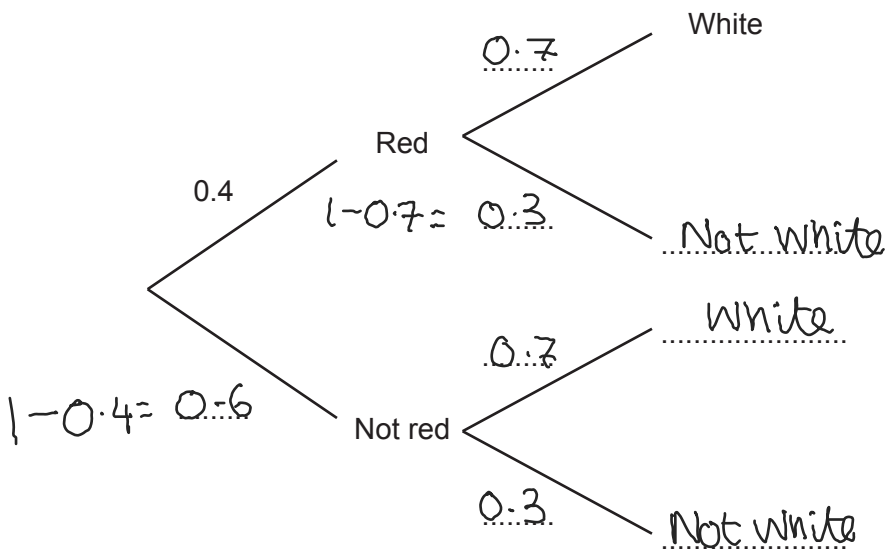
Difference: 7797.78 − 7782.40

= £15.38

£ 15.38 **[6]**

24 Romelu picks a shirt and shorts.
The probability he picks a red shirt is 0.4.
The probability he picks white shorts is 0.7.

(a) Complete the tree diagram.



[3]

(b) Calculate the probability that Romelu picks a red shirt but does not pick white shorts.

P (Red and Not white)

= 0.4 × 0.3 = 0.12

(b) ..... 0.12 ..... **[2]**

25 Marcin buys 7 rulers and 15 crayons for £7.
A ruler costs 12p more than a crayon.

Find the cost of one crayon.

$7r + 15c = £7$

$r = c + £0{\cdot}12$

↓ substitute

$7(c + 0{\cdot}12) + 15c = £7$

$7c + £0{\cdot}84 + 15c = £7$

collect like terms

$22c + £0{\cdot}84 = £7$

$-0{\cdot}84$

$22c = £6{\cdot}16$

$\div 22$

$c = £0{\cdot}28$

cost of one crayon = ... 28 ..... p **[5]**

26 Here are the first four terms of a sequence.

33 28 23 18 13

(+5) (−5) (−5)

Find the *n*th term of the sequence.

Di Difference −5

N xn n

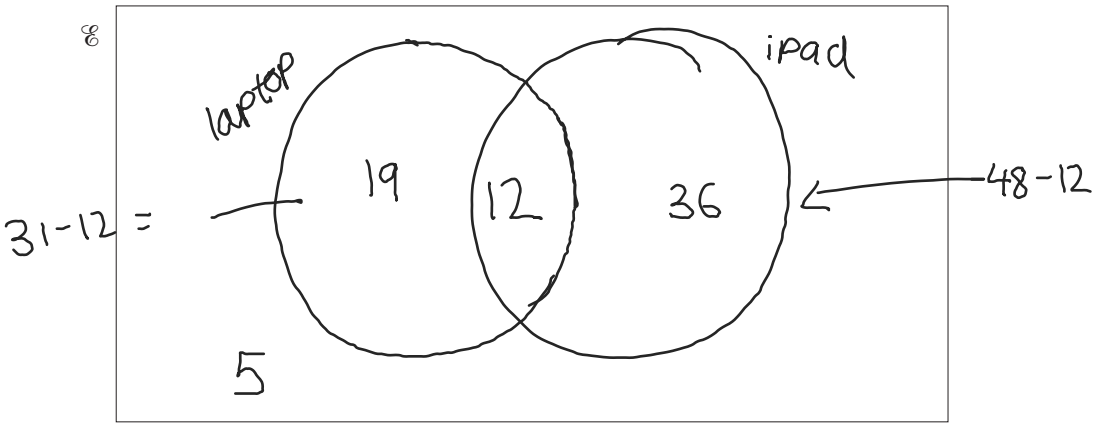
0 + 0th term +33

−5n + 33 ..... **[2]**

27 72 children are asked whether they have a laptop or an iPad.

- 31 have a laptop.
- 48 have an iPad.
- 12 have both.
- 5 have neither.

(a) Represent this information on a Venn diagram.



[3]

(b) One of the children is chosen at random.

Write down the probability that they have an iPad but not a laptop.

36

$P = \frac{36}{72}$

(b) 1/2 ..... **[2]**

END OF QUESTION PAPER

ADDITIONAL ANSWER SPACE

If additional space is required, you should use the following lined page(s). The question number(s) must be clearly shown in the margin(s).