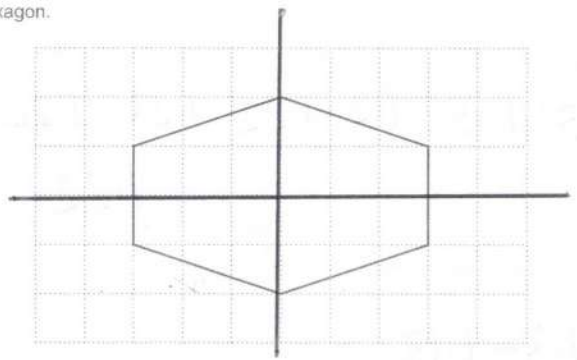
Answer **all** the questions.

1 Here is a hexagon.



(a) On the diagram, draw the hexagon's two lines of symmetry. [1]

(b) Write down the order of rotation symmetry of the hexagon.

(b) ..... [1]

2 Work out.

(a) $\frac{1}{2}$ of 12

$12 \div 2 = 6$

(a) ..... [2]

(b) $8 \times \frac{1}{5}$

Give your answer as a mixed number.

$\frac{8}{5}$

(b) ..... [2]

(c) Isaac and Maya eat part of a pizza.

Isaac eats $\frac{1}{6}$ of the pizza.

Maya then eats $\frac{3}{5}$ of the **remaining** pizza.

What fraction of the original pizza is left?

$M = \frac{5}{6} \times \frac{3}{5} = \frac{15}{30} = \frac{3}{6}$ OE

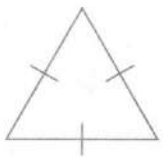
$\frac{6}{6} - \frac{1}{6} - \frac{3}{6}$

$\frac{2}{6}$ OE

(c) ..... [4]

OCR-F Nov '18 P2

3 (a) Complete the statement using a term from the list.



isosceles | equilateral | right-angled | scalene

The triangle is equilateral ✓ [1]

(b) These are the names of some special quadrilaterals.

rectangle	parallelogram	
trapezium	kite	rhombus

Choose a quadrilateral from the list that satisfies each set of conditions.

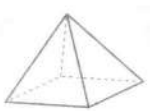
(i) • All four sides are the same length.
• Opposite angles are equal.

(b)(i) rhombus ✓ [1]

(ii) • All four angles are right angles.
• Opposite sides are equal.

(ii) rectangle ✓ [1]

(c) This is a square based pyramid.



Complete the following.

A square based pyramid has 5 ✓ faces and 8 ✓ edges. [2]

4 These are the heights, in metres, of the players in a netball team.

1.30 1.13 1.20 1.23 1.22 1.24 1.15

(a) (i) Find the median height of the 7 players.

1·13 1·15 1·2 1·22 1·23 1·24 1·3 ✓

1·22 ✓

(a)(i) ..... m [2]

(ii) Work out the range of the heights of the 7 players.

1·3 − 1·13 ✓ = 0·17 ✓

(ii) ..... m [2]

(iii) The sum of the heights of the 7 players is 8.47 m.

Calculate the mean height of the 7 players.

8·47 ÷ 7 ✓

= 1·21 ✓

(iii) ..... m [2]

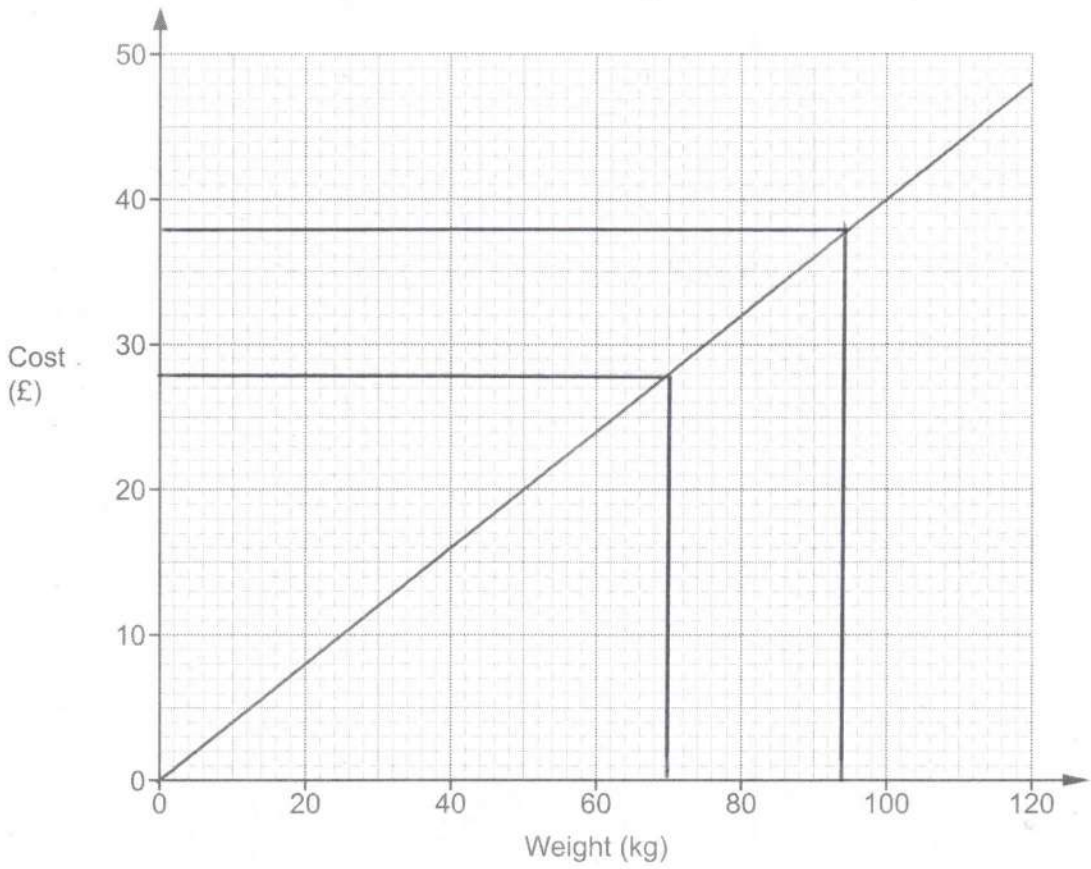
(b) The tallest player is replaced by a substitute.
The median height of the players is unchanged.
The mean height of the players becomes smaller.

Write down a possible height for the substitute.

(b) eg 1·25 ✓✓ m [2]

[ms $1.22 \leqslant x < 1.3$]

5 This graph shows the cost of buying potatoes from a farm.



(a) (i) How much does it cost to buy 70 kg of potatoes?

(a)(i) £ 28 ✓ (±0.5) [1]

(ii) What weight of potatoes can be bought for £38?

(ii) 94 → 96 ✓ kg [1]

(iii) The cost per kilogram of potatoes is the same for any weight of potatoes.

How much will it cost to buy 180 kg of potatoes from the farm?

70kg = £28

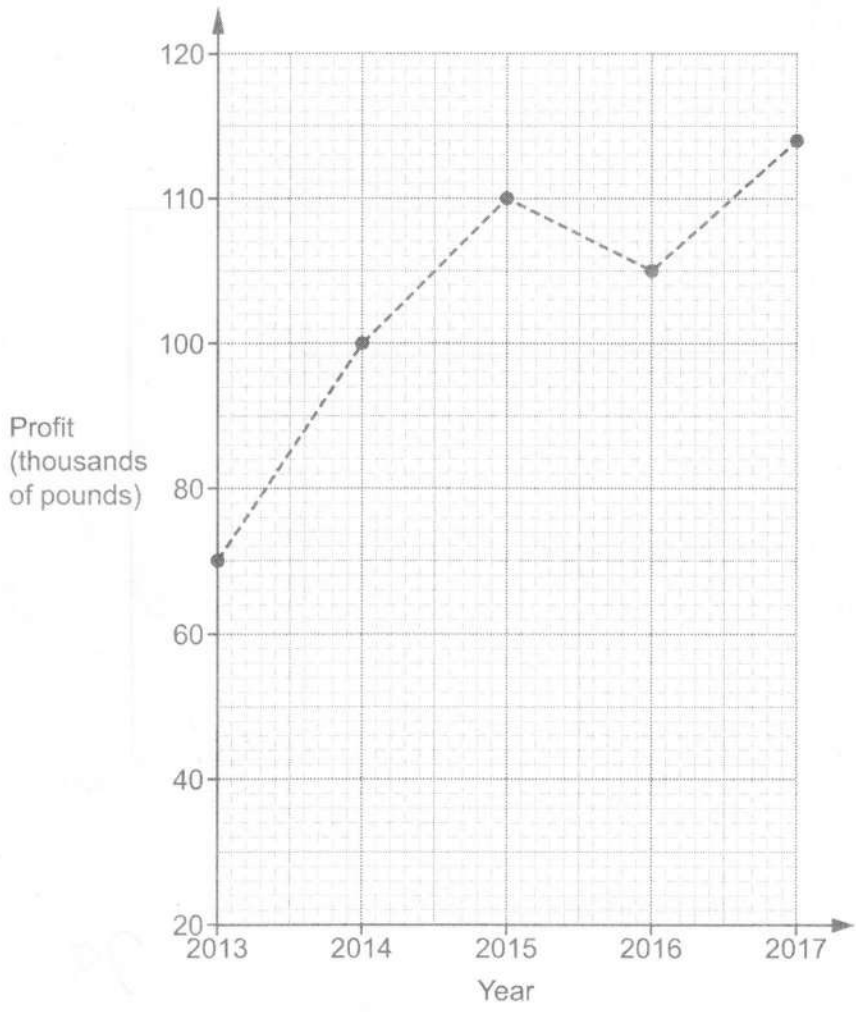
÷70 then ×180

÷70, ×180 ✓✓

(iii) £ 72 ✓ [3]

[±2]

(b) This graph shows the annual profits, in thousands of pounds, of the farm between 2013 and 2017.



Describe one misleading feature of the graph.

y-axis doesn't start at 0 ✓

..... [1]

6 Which is bigger, 36% or $\frac{7}{20}$?

Show your working and give a reason for your answer.

$36\% = \frac{36}{100}$ $\frac{7}{20} = \frac{35}{100}$ ✓✓

36% is bigger because $\frac{36}{100} > \frac{35}{100}$ ✓✓

[4]

7 **(a)** Write down the value of $\sqrt[3]{27}$.

3 ✓

(a) [1]

(b) Work out 7^2.

7x7 ✓

49 ✓

(b) [2]

(c) Write 6^{-1} as a fraction.

$\frac{1}{6}$ ✓

(c) [1]

8 A water company charged the following in 2017.

£2.00 for each m^3 of water used
plus
a fixed charge of £45

In 2017 Jenny used 110 m^3 of water.
For the 12 months of 2017 she paid £20 per month to the water company.

How much more money does Jenny need to pay to the water company?

110 x 2 = £220 ✓

45 + 220 = £265 to pay ✓✓

12 x 20 = £240 paid ✓

265 - 240 ✓ 25 ✓

£ ..... [6]

9 **(a)** Rearrange this formula to make x the subject.

$y = x - 2$

$y + 2 = x$ ✓

(a) ..... [1]

(b) Rearrange this formula to make d the subject.

$C = \pi d$

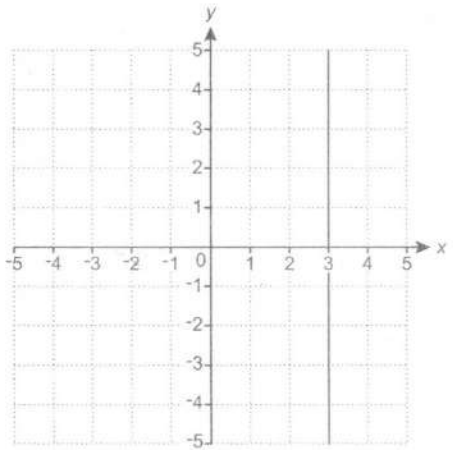
$d = \frac{C}{\pi}$ ✓

(b) ..... [1]

(or $C \div \pi$)

10 (a) Write down the equation of each of these lines.

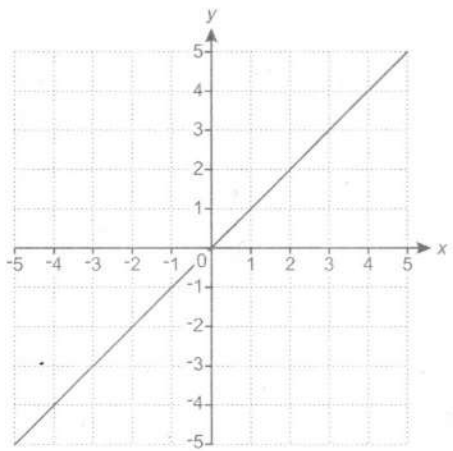
(i)



$x = 3$ ✓

(a)(i) ..... [1]

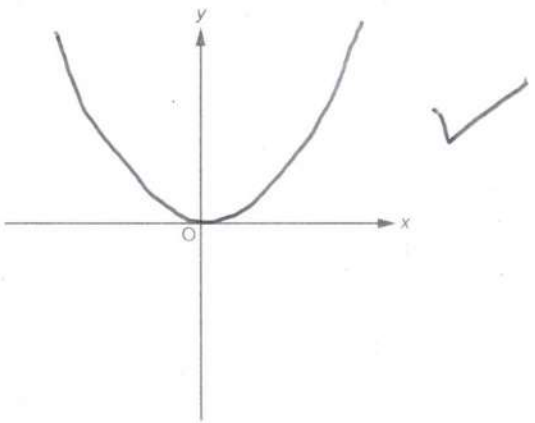
(ii)



$y = x$ ✓

(ii) ..... [1]

(b) Sketch the graph of $y = x^2$.



✓

[1]

11 Some biscuits contain only three ingredients: flour, butter and sugar.

- The ratio of flour to butter is 5 : 4.
- The ratio of butter to sugar is 2 : 1.
- The total weight of the flour, butter and sugar is 770 g.

770 ÷ 11 = 70

Work out the weight of each of the ingredients.

F B S

5 4

4 2 ×2 ×2

2 1

so 5 4 2 ✓

$F = \frac{5}{11} \times 770$ $B = \frac{4}{11} \times 770$

Flour 350 ✓ g

Butter 280 ✓ g

Sugar 140 ✓ g **[4]**

12 **(a)** Work out.

$8 \div 0.4$

$= 80 \div 4$ ✓

$= 20$ ✓

(a) ..... **[2]**

(b) By writing each number correct to 1 significant figure, find an estimate for this calculation.

$$\frac{22.1 \times 37}{1.9}$$

$$= \frac{20 \times 40}{2} \quad \checkmark\checkmark$$

$$= \frac{10 \times 40}{1}$$

400 ✓

(b) ..... **[3]**

13 **(a)** Write 0.003 16 in standard form.

(a) 3.16×10^{-3} ✓ ..... [1]

(b) Work out.

$$2 \times 10^2 \times 4 \times 10^5$$

Give your answer in standard form.

$2 \times 4 = 8$

$10^2 \times 10^5 = 10^7$

(b) 8×10^7 ✓✓ ..... [2]

14 The next term in each of these Fibonacci sequences is found by adding together the two previous terms.
Work out the missing terms in each sequence.

(a) 2 5 7 12 19 31 ✓ [1]

(b) 2 10 12 ✓ 22 34 [2]

✓

15 **(a)** Multiply out.

$$(3x-2y)(x+y)$$

Give your answer in its simplest form.

14

	$3x$	$-2y$	
	$3x^2$	$-2xy$	x
	$3xy$	$-2y^2$	y

(a) $3x^2+xy-2y^2$ ..... [3]

(b) $3(2x+d)+c(x+5)=10x+17$

Work out the value of c and the value of d.

$6x+3d+cx+5c = 10x+17$

x $\quad 6+c=10$

n $\quad 3d+5\times4=17$

$3d=-3$

(b) $c=$ 4 .....

$d=$ -1 ..... [5]

(c) Solve by factorising.

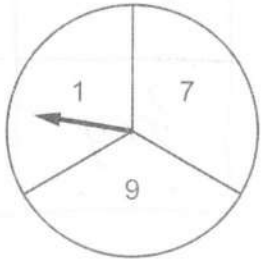
$$x^2-7x+10=0$$

~~$-10, -1$~~ $\quad -5, -2$

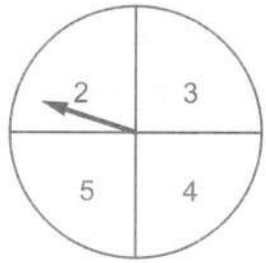
$(x-2)(x-5)$

(c) $x=$ 2 ..... or $x=$ 5 ..... [3]

16 Geoff has two fair spinners.



Spinner A



Spinner B

He spins both spinners and **multiplies** the numbers on each spinner.

(a) Complete the table.

Spinner A

Spinner B	×	1	7	9
	2	2	14	18
	3	3	21	27
	4	4	28	36
	5	5	35	45

✓

[1]

(b) Geoff wants to work out the probability that the outcome of the multiplication is an even number or a prime number.
Here is his working.

> The probability the outcome is an even number is $\frac{6}{12}$.
>
> The probability the outcome is a prime number is $\frac{3}{12}$.
>
> The probability the outcome is an even number or a prime number is $\frac{6}{12} + \frac{3}{12} = \frac{9}{12}$.

Geoff is wrong.
Explain his error and give the correct answer.

Even and prime contain "2" ✓OE
so 2 has been counted twice **[2]**

so $= \frac{8}{12}$ ✓

17 The depth of water in a garden pond is 57.8 cm.
The depth decreases by 0.3 cm per day.

(a) Assume the depth continues to decrease at the same rate.

After how many days will the depth reach 54.2 cm?

$$\begin{array}{r} 57.8 \\ -\ 54.2 \\ \hline 3.6 \\ \hline \end{array}$$ ✓

$3.6 \div 0.3$ ✓

$= 36 \div 3$

12 ✓

(a) ..... days **[3]**

(b) If the depth of water decreases at a slower rate, what effect will this have on your answer to part **(a)**?

Answer would > 12 ✓ OE

..... **[1]**

18 Emily spent £2400 on holiday in 2017.
This was 20% more than she spent on holiday in 2016. = 100%

Calculate the amount she spent on holiday in 2016.

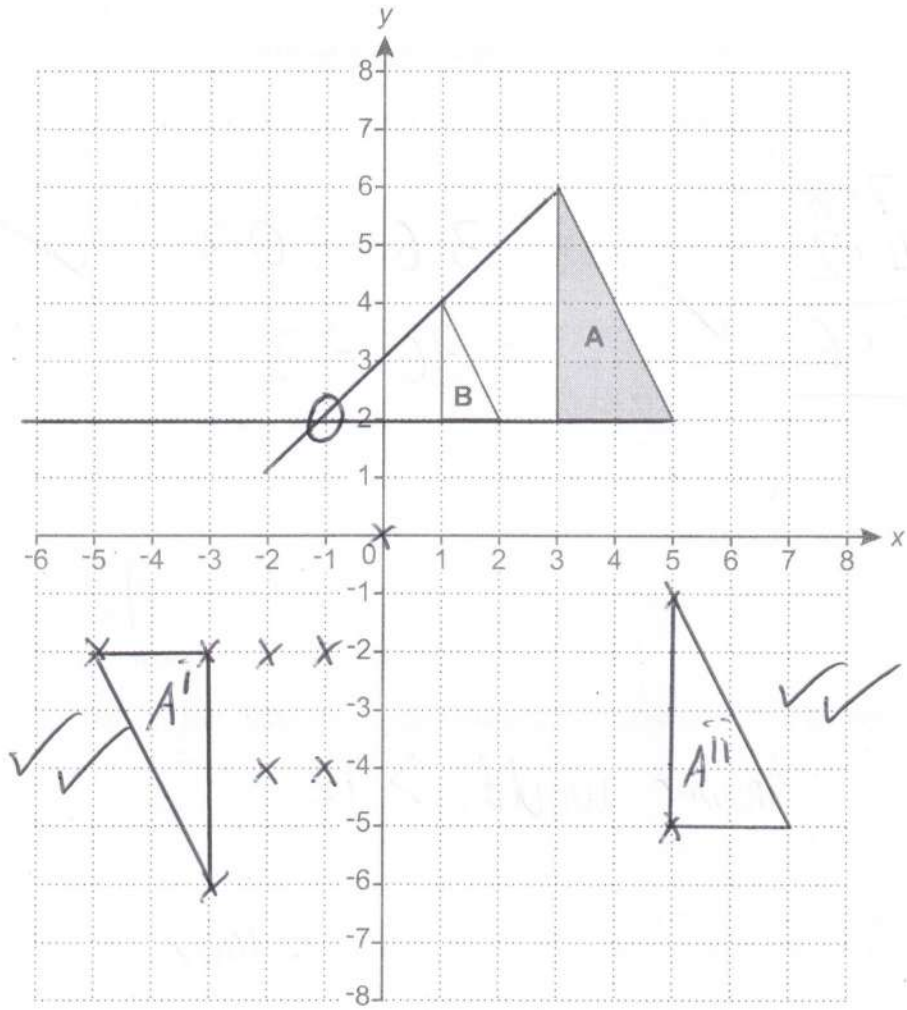
2017 ⇒ 120% = 2400 ✓

10% = 200 ✓

100% = 2000

£ 2000 ✓ **[3]**

19 Triangle **A** and triangle **B** are drawn on the coordinate grid.



(a) (i) Draw the image of triangle **A** after a rotation of 180° about (0, 0). **[2]**

(ii) Draw the image of triangle **A** after a translation by the vector $\begin{pmatrix} 2 \\ -7 \end{pmatrix}$. **[2]**

(b) Describe fully the **single** transformation that maps triangle **A** onto triangle **B**.

Enlargement, scale factor = $\frac{1}{2}$

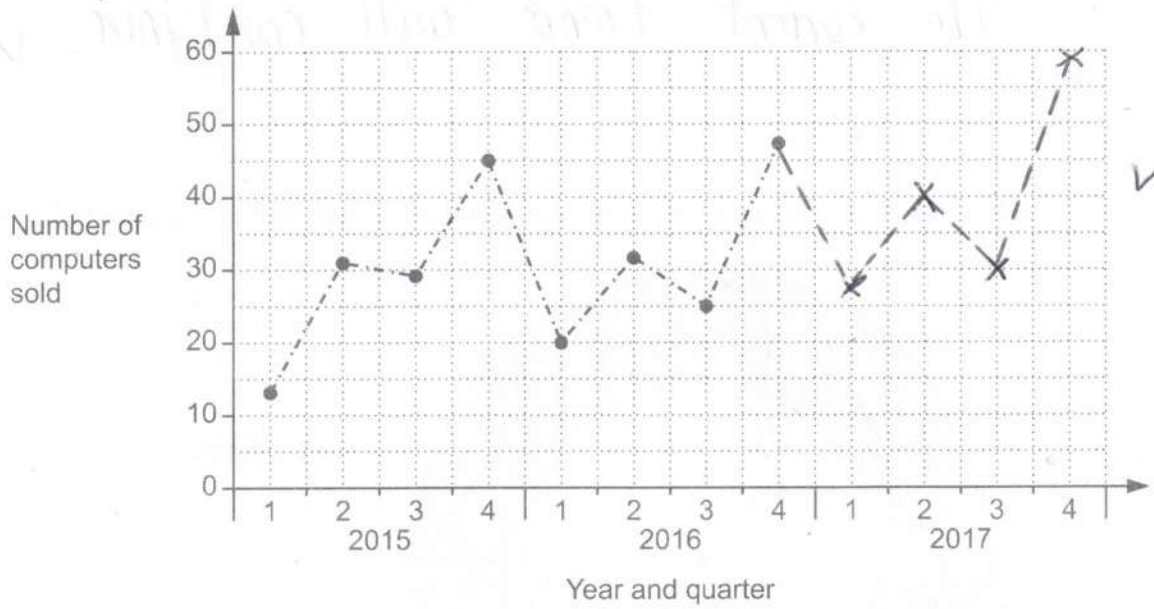
centre (-1, 2)

[3]

20 The table shows the number of computers sold in Tom's shop each quarter from 2015 to 2017.

	2015				2016				2017			
Quarter	1	2	3	4	1	2	3	4	1	2	3	4
Number of computers sold	13	31	29	45	20	32	25	47	27	40	30	58

(a) Complete this graph using the information for 2017.



[2]

(b) Tom adds the three results for quarter 1 and he adds the three results for quarter 4.
Tom says

The ratio of the **total** number of computers sold in quarter 1 compared to quarter 4 is 2 : 5.

Is he correct?
Show your reasoning.

Q1 : Q4
13 + 20 + 27 : 45 + 47 + 58
60 : 150
6 : 15
2 : 5
Yes, he's correct

[2]

(c) Make two comments about Tom's sales over the period 2015 to 2017.

Comment 1 Sales are increasing ✓

Comment 2 1st quarter is weakest ✓ OE
4th quarter is strongest

[2]

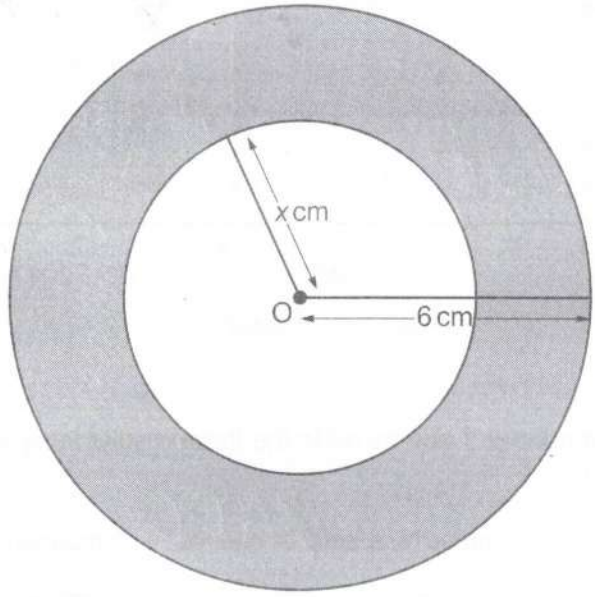
(d) Tom predicts that he will sell more than 60 computers in the 4th quarter of 2018.

What assumption has he made?

The current trend will continue ✓

[1]

21 A circle, with centre O and radius 6 cm, contains another circle, with centre O and radius x cm.



Not to scale

Write down an expression, in terms of π and x, for the shaded area in cm^2.

Large $= \pi \times 6^2 = 36\pi$

Small $= \pi \times x^2 = \pi x^2$

either ✓

Shaded $= 36\pi - \pi x^2$ ✓

[2]

END OF QUESTION PAPER