JustMaths

# BUMPER "BETWEEN PAPERS" PRACTICE

## SET 1 (OF 3)

## HIGHER TIER (SUMMER 2017)

# QUESTIONS

NOT A "BEST" GUESS PAPER.

NEITHER IS IT A "PREDICTION" ... ONLY THE EXAMINERS KNOW WHAT IS GOING TO COME UP! FACT!
YOU ALSO NEED TO REMEMBER THAT JUST BECAUSE A TOPIC CAME UP ON PAPER 1 IT MAY STILL COME UP ON PAPERS 2 OR 3 ...

WE KNOW HOW IMPORTANT IT IS TO PRACTICE, PRACTICE, PRACTICE .... SO WE'VE COLLATED A LOAD OF QUESTIONS THAT WEREN'T EXAMINED IN THE PEARSON/EDEXCEL NEW 9-1 GCSE MATHS PAPER 1 BUT WE CANNOT GUARANTEE HOW A TOPIC WILL BE EXAMINED IN THE NEXT PAPERS ...

ENJOY!

MEL & SEAGER

| | Marks | Actual |  |
|---|---|---|---|
| Q1. Fractions | **2** | | |
| Q2. Circle theorems | **3** | | |
| Q3. Recurring decimals | **3** | | |
| Q4. Linear simultaneous equations | **4** | | |
| Q5. Algebraic fractions | **7** | | |
| Q6. Frequency polygons | **3** | | |
| Q7. Capture-recapture | **4** | | |
| Q8. Pie Charts | **3** | | |
| Q9. Speed, distance and time | **3** | | |
| Q10. Cumulative frequency | **2** | | |
| Q11. Rotations | **3** | | |
| Q12. Distance time graphs | **4** | | |
| Q13. Trig graphs | **5** | | |
| Q14. Histograms | **4** | | |
| Q15. Box Plots | **5** | | |
| Q16. Matching graphs to equations | **4** | | |
| Q17. Surds | **4** | | |
| Q18. Depreciation | **2** | | |
| Q19. Sequences | **2** | | |
| Q20. Area in context | **5** | | |
| Q21. Surds | **2** | | |
| Q22. Recipes | **5** | | |
| Q23. Surface area | **3** | | |
| Q24. Area in context | **6** | | |
| Q25. Proportional reasoning | **4** | | |
| Q26. Multiples in context | **3** | | |
| Q27. Arcs and sectors | **5** | | |
| Q28. Proportional reasoning | **3** | | |
| | **103** | | |

**Q1.** Work out $\frac{1}{3}+\frac{5}{9}$

**(Total for question = 2 marks)**

**Q2.**

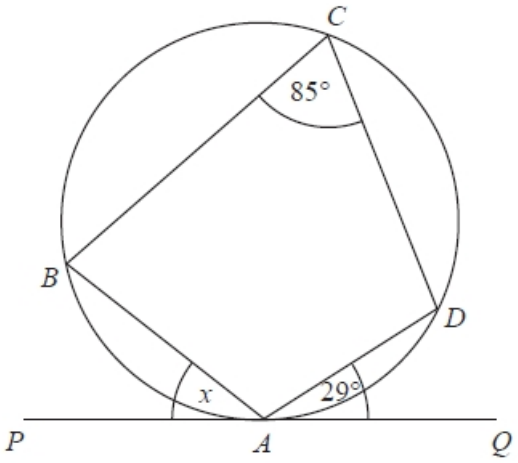



Diagram **NOT** accurately drawn

In the diagram,

the points *A*, *B*, *C* and *D* are on the circumference of a circle
the line *PAQ* is a tangent to the circle
angle *DAQ* = 29°
angle *BCD* = 85°

Work out the size of the angle marked *x*.
Give a reason for each stage of your working.

**(Total for question = 3 marks)**

**Q3.** $x = 0.0\dot{4}\dot{5}$

Prove algebraically that *x* can be written as $\frac{1}{22}$

**(Total for question = 3 marks)**

**Q4.** A cinema sells adult tickets and child tickets.

The total cost of 3 adult tickets and 1 child ticket is £30
The total cost of 1 adult ticket and 3 child tickets is £22

Work out the cost of an adult ticket and the cost of a child ticket.

adult ticket £.....

child ticket £.....

**(Total for question = 4 marks)**

**Q5.**(a) Solve $x^2 + 2x - 35 = 0$

.....**(3)**

(b) Solve $\frac{2}{x+1} + \frac{x}{2x+3} = 1$

Give your solutions as surds.

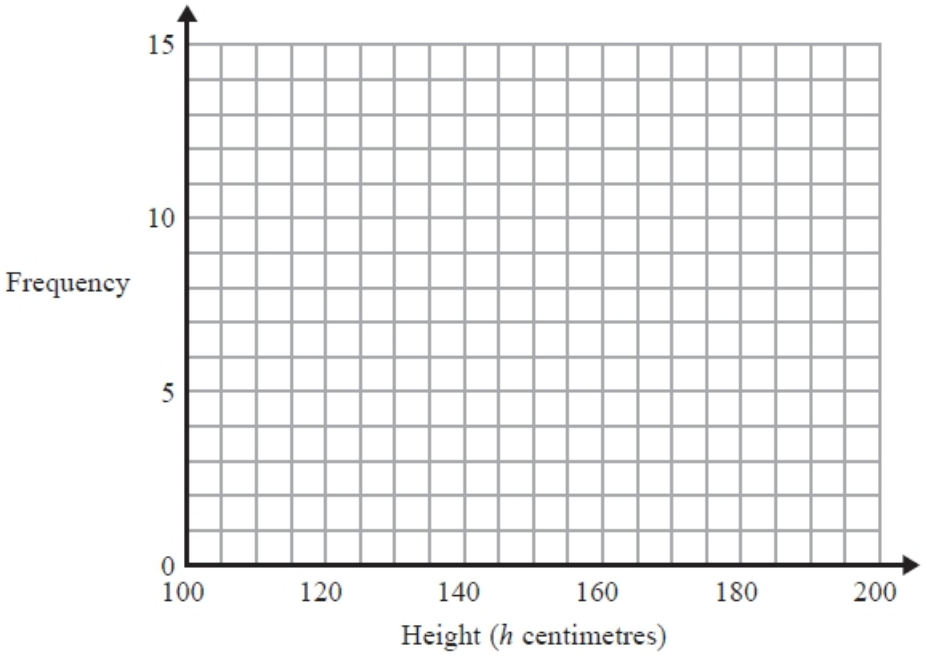
.....**(4)**

**(Total for question = 7 marks)**

**Q6.** The table shows information about the heights, in centimetres, of 30 sunflower plants.

| Height ($h$ centimetres) | Frequency |
|---|---|
| $100 < h \leqslant 120$ | 2 |
| $120 < h \leqslant 140$ | 6 |
| $140 < h \leqslant 160$ | 7 |
| $160 < h \leqslant 180$ | 12 |
| $180 < h \leqslant 200$ | 3 |

(a) On the grid, draw a frequency polygon for this information.




**(2)**

(b) Write down the modal class interval.

.....**(1)**

**(Total for question = 3 marks)**

**Q7.** Toga wants to estimate the number of termites in a nest.

On Monday Toga catches 80 termites.
He puts a mark on each termite.
He then puts all 80 termites back in the nest.

On Tuesday Toga catches 60 termites.
12 of these termites have a mark on them.

Work out an estimate for the total number of termites in the nest.
You must write down any assumptions you have made.

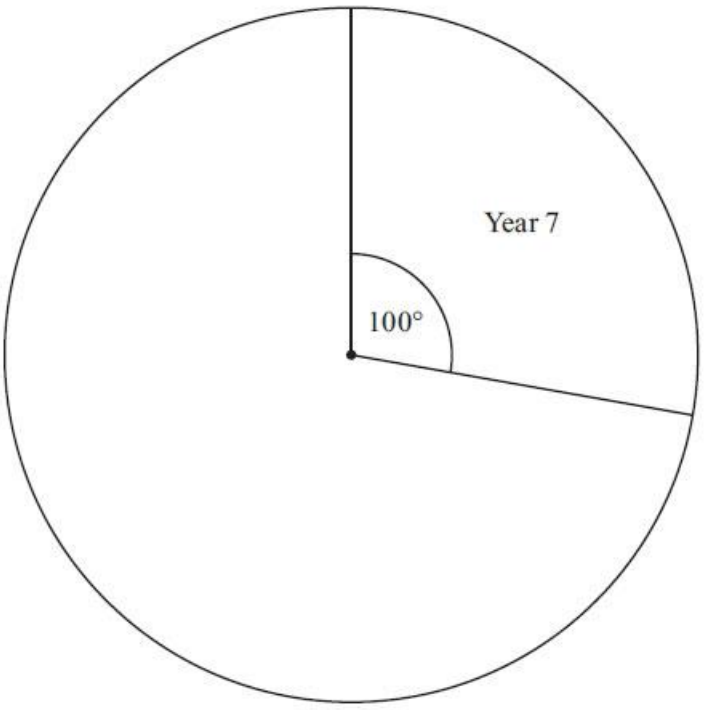
.....

**(Total for question = 4 marks)**

**Q8.** Each year group in a school raised money for charity.The incomplete table and pie chart show some information about this.

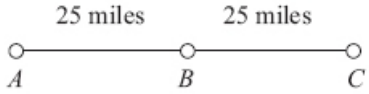
Complete the table.

| Year Group | Amount raised |
|---|---|
| 7 | ..... |
| 8 | £225 |
| 9 | ..... |
| 10 | £125 |
| 11 | £162.50 |
| | £900 |




**(Total for Question is 3 marks)**

**Q9.**




*A*, *B* and *C* are 3 service stations on a motorway.

*AB* = 25 miles
*BC* = 25 miles

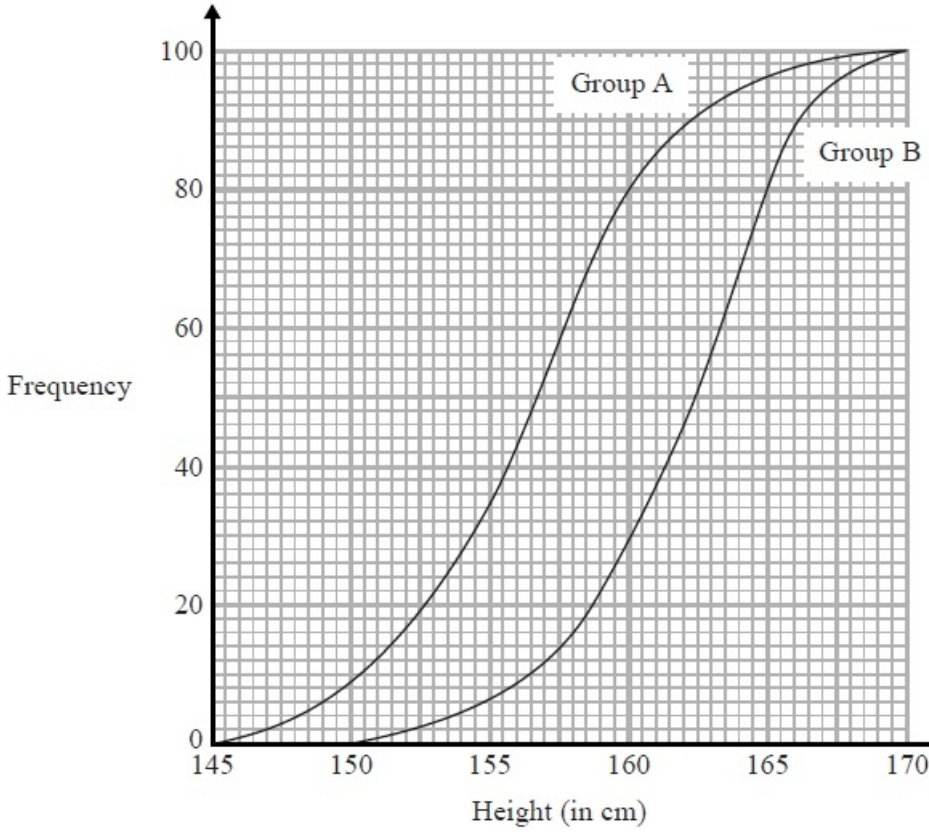
Aysha drives along the motorway from *A* to *C*.

Aysha drives at an average speed of 50 mph from *A* to *B*.
She drives at an average speed of 60 mph from *B* to *C*.

Work out the difference in the time Aysha takes to drive from *A* to *B* and the time Aysha takes to drive from *B* to *C*.
Give your answer in minutes.

**(Total for Question is 3 marks)**

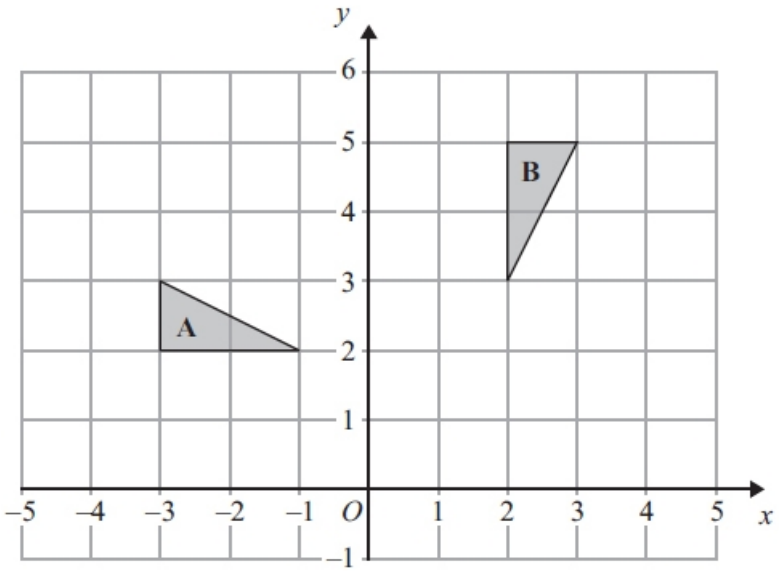
**Q10.** The cumulative frequency graphs give information about the heights of two groups of children, group A and group B.



Compare the heights of the children in group A and the heights of the children in group B.

**(Total for Question is 2 marks)**

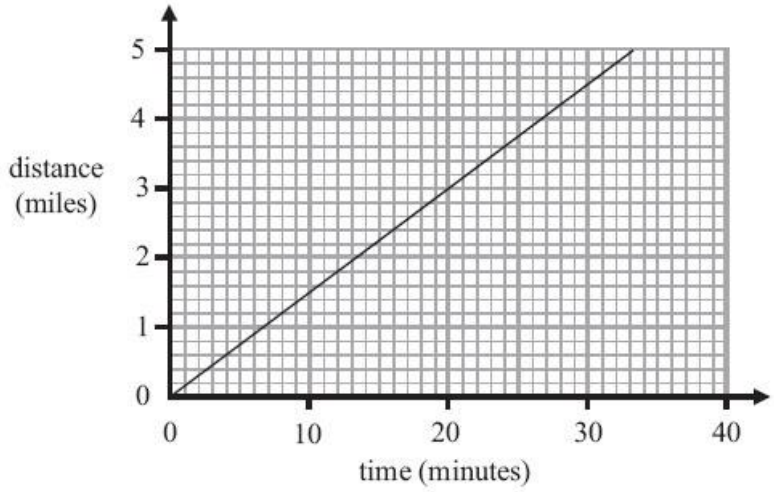
**Q11.**




Describe fully the single transformation which maps triangle **A** onto triangle **B.**

**(Total for Question is 3 marks)**

**Q12.** Lisa cycles to work. The travel graph shows information about her journey to work on Tuesday.

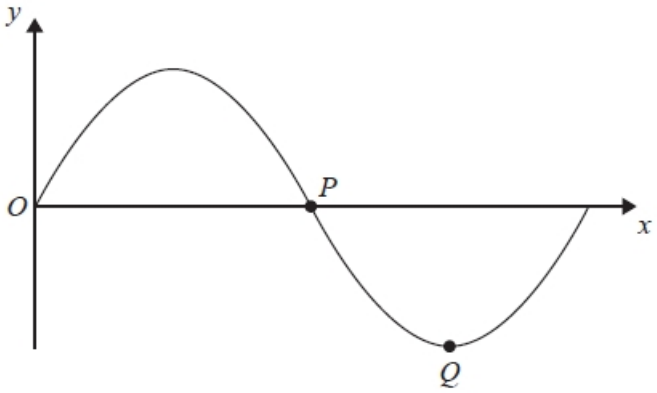



Martin also cycles to work.
On Tuesday his average speed was 16 km per hour.

Who has the greater average speed, Lisa or Martin?
You must show all your working.

**(Total for Question is 4 marks)**

**Q13.** The diagram shows part of a sketch of the curve $y = \sin x°$.



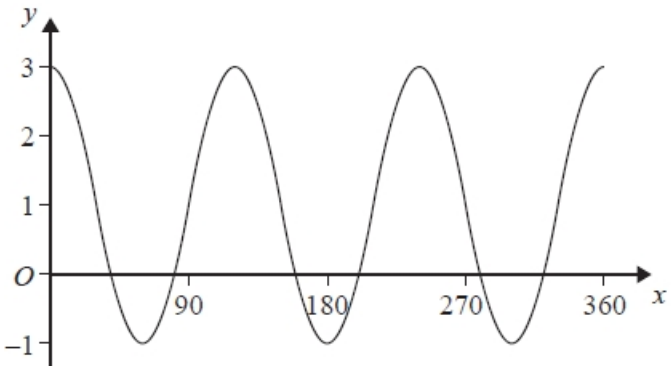

(a) Write down the coordinates of the point $P$.

(..... , .....)
**(1)**

(b) Write down the coordinates of the point $Q$.

(..... , .....)
**(1)**

Here is a sketch of the curve $y = a \cos bx° + c$, $0 \leq x \leq 360$




(c) Find the values of $a$, $b$ and $c$.

$a$ =.....

$b$ =.....

$c$ =.....

**(3)**

**(Total for Question is 5 marks)**

**Q14.** The table shows some information about the weights of oranges.

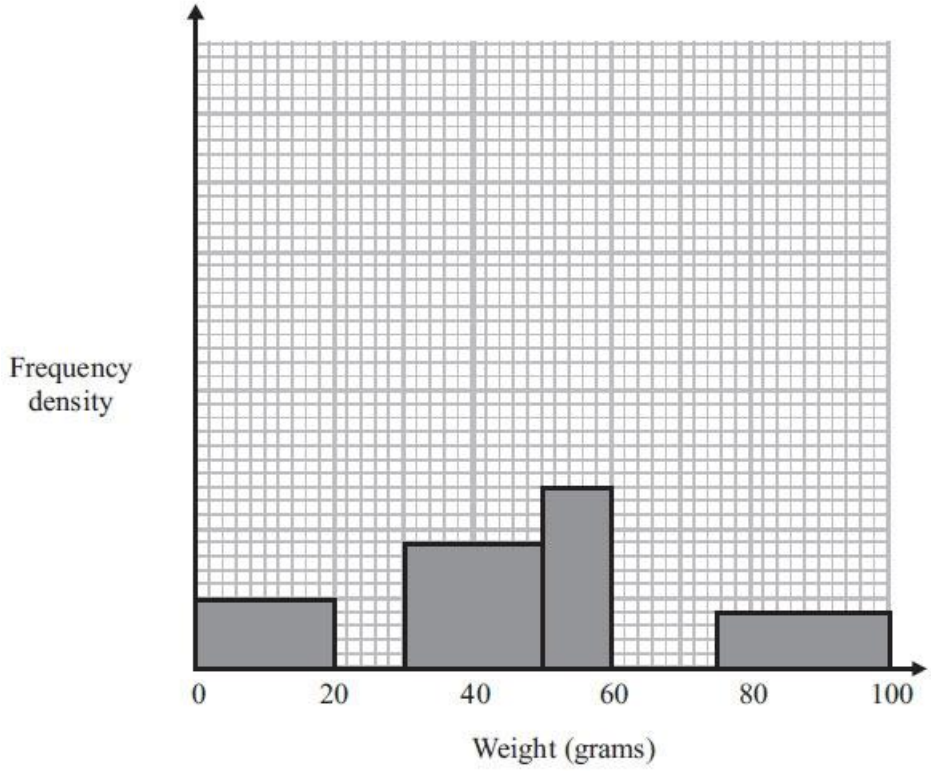
| **Weight ($w$ grams)** | **Frequency** |
|---|---|
| $0 < w \leq 20$ | |
| $20 < w \leq 30$ | 15 |
| $30 < w \leq 50$ | |
| $50 < w \leq 60$ | 13 |
| $60 < w \leq 75$ | 15 |
| $75 < w \leq 100$ | 10 |

(a) Use the histogram to complete the table.

**(2)**

(b) Use the table to complete the histogram.

**(2)**

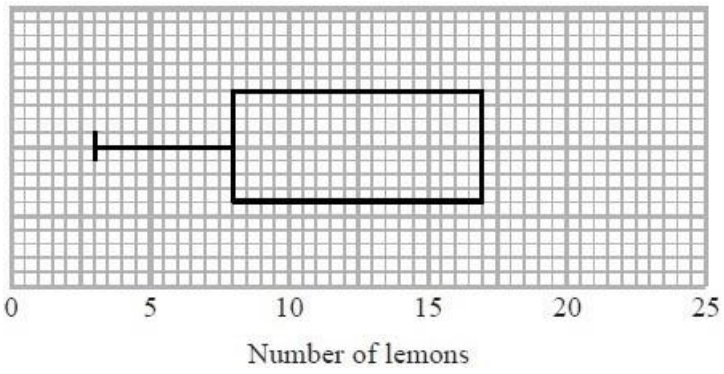



**(Total for Question is 4 marks)**

**Q15.** Presta recorded the number of lemons on each of 60 lemon trees.

The incomplete table and box plot give information about her results.

| | Number of lemons |
|---|---|
| Smallest number | |
| Lower quartile | 8 |
| Median | 11 |
| Upper quartile | |
| Greatest number | 22 |




(a) (i) Use the information in the table to complete the box plot.

(ii) Use the information in the box plot to complete the table.

**(3)**

Some of these 60 lemon trees have 8 or more lemons on them.

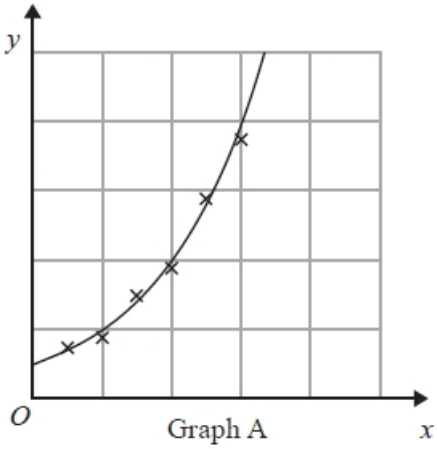
(b) Find an estimate for the number of lemon trees with 8 or more lemons on them.

**(2)**

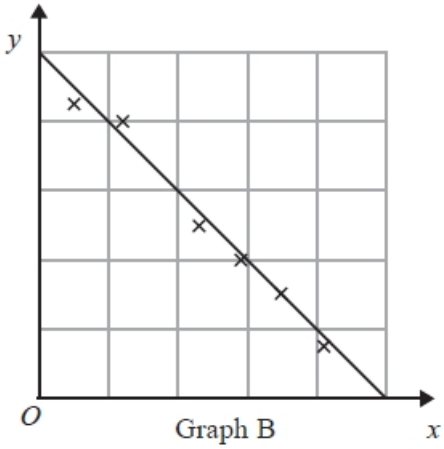
**(Total for Question is 5 marks)**

**Q16** Here are some graphs that show relationships.

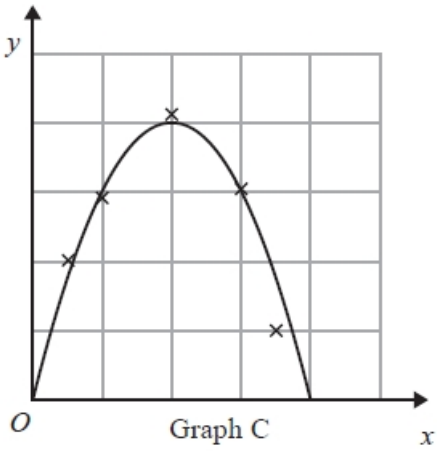
A curve or line of best fit has been drawn on each graph.




Graph A




Graph B




Graph C

The equation of each graph is one of the equations in the following list.

$y = 10 - 2x$ $y = 2^x$ $y = 2x - 10$ $y = 8x - 2x^2$ $y = 3x^2$

Give the equation of each graph.

Graph A .....

Graph B .....

Graph C .....

**(Total for question = 3 marks)**

**Q17.** (a) Rationalise the denominator of $\frac{15}{\sqrt{5}}$

**(2)**

$(1 + \sqrt{3})^2$ can be written in the form $a + b\sqrt{3}$, where $a$ and $b$ are integers.

(b) Work out the value of $a$ and the value of $b$.

$a$ = . . . . . .

$b$ = . . . . . **(2)**

**(Total for Question is 4 marks)**

**Q18.** The value of a van depreciates at the rate of 20% per year.
Gary buys a new van for £27 500
After $n$ years the value of the van is £11 264
Find the value of $n$.

.....

**(Total for Question is 2 marks)**

**Q19.** Here are the first five terms of an arithmetic sequence.

1 5 9 13 17

(a) Write down an expression, in terms of $n$, for the $n$th term of this sequence.

**(2)**

The $n$th term of a different number sequence is $3n^2 + 7$

(b) Find the 10th term of this sequence.

**(2)**

**(Total for Question is 4 marks)**

**Q20** The diagram shows the floor plan of Mary's conservatory.

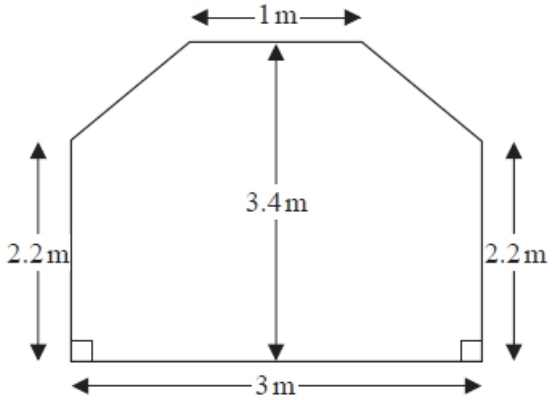



Diagram **NOT** accurately drawn

Mary is going to cover the floor with tiles.

The tiles are sold in packs.
One pack of tiles will cover $2m^2$
A pack of tiles normally costs £24.80
Mary gets a discount of 25% off the cost of the tiles.

Mary has £100

Does Mary have enough money to buy all the tiles she needs?
You must show all your working.

**(Total for question = 5 marks)**

**Q21.** Expand $(1 + \sqrt{2})(3 - \sqrt{2})$

Give your answer in the form $a + b\sqrt{2}$ where $a$ and $b$ are integers.

**(Total for Question is 2 marks)**

**Q22.** Stephanie uses her grandmother's recipe to make apple amber.
Here is the list of ingredients to make 8 portions.

**Apple amber**
(makes 8 portions)

$2\frac{1}{2}$ pounds apples

10 ounces sugar

4 eggs

Stephanie wants to make 12 portions of apple amber.

(a) Work out how much sugar she needs.

..... ounces **(2)**

Stephanie has 2kg of apples.

(b) Show that she has enough apples to make 12 portions of apple amber.
You must show your working.

**(3)**
**(Total for question = 5 marks)**

**Q23.** Here is a cuboid.

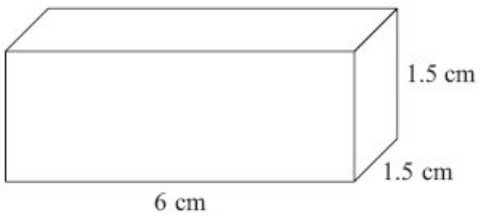



Diagram **NOT** accurately drawn

The cuboid is 6 cm by 1.5 cm by 1.5 cm.

Work out the total surface area of the cuboid.

. . . . . $cm^2$

**(Total for Question is 3 marks)**

**Q24.** The diagram shows a patio in the shape of a rectangle.


Diagram **NOT** accurately drawn

The patio is 3.6 m long and 3 m wide.

Matthew is going to cover the patio with paving slabs.
Each paving slab is a square of side 60 cm.

Matthew buys 32 of the paving slabs.

(a) Does Matthew buy enough paving slabs to cover the patio?
You must show all your working.

**(3)**

The paving slabs cost £8.63 each.

(b) Work out the total cost of the 32 paving slabs.

£. . . . . **(3)**

**(Total for Question is 6 marks)**

**Q25.** Susie has to deliver some packages and some parcels.

The total number of packages is 4 times the number of parcels.
The total number of packages and parcels is 40

Each parcel has a weight of 1.5 kg.
The total weight of the packages and parcels is 37.6 kg.

Each of the packages has the same weight.

Work out the weight of each package.

. . . . . kg

**(Total for Question is 4 marks)**

**Q26.** Tom and Amy set the alarms on their phones to sound at 6.45 am.

Both alarms sound together at 6.45 am.
Tom's alarm then sounds every 9 minutes.
Amy's alarm then sounds every 12 minutes.

At what time will both alarms next sound together?

.....

**(Total for question = 3 marks)**

**Q27.** The diagram shows a pond.

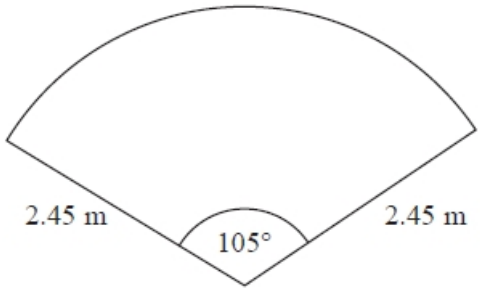



Diagram **NOT** accurately drawn

The pond is in the shape of a sector of a circle.

Toby is going to put edging on the perimeter of the pond.

Edging is sold in lengths of 1.75 metres.
Each length of edging costs £3.49

Work out the total cost of edging Toby needs to buy.

£ .....

**(Total for question = 5 marks)**

**Q28.** Jack is building a wall.

He uses 300 bricks to build part of the wall.
This part of the wall is 5 metres long and 1.5 metres high.

The complete wall will be 8 metres long and 1.5 metres high.

How many more bricks does Jack need to complete the wall?

.....

**(Total for question = 3 marks)**