AQA Foundation Practice Paper

NOT ORDERED BY DIFFICULTY

240 marks' worth of questions that **<u>COULD</u>** come up in papers 2 and 3. Do not revise these topics exclusively – this is not a predicted paper.

Materials
- For this paper you must have:
  - A calculator
  - Mathematical instruments

Instructions:
- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Answer all questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information:
- The marks for questions are shown in brackets.

Advice:
- In all calculations, show clearly how you work out your answer.

Q1.   15 rulers cost £3
       How much do 40 rulers cost?

_____

_____

                              Answer £ ....
                                                                            (Total 2 marks)

Q2.   (a)   Rob is going to drive 130 miles from Hull to Liverpool.
       There are road works for 25 miles of the journey.
       He assumes his average speed will be
       50 mph where there are road works
       70 mph for the rest of the journey.
       Using his assumptions, work out his journey time.

_____

_____

_____

_____

_____

_____

                              Answer _____
                                                                                  (4)

       (b)   Rob's assumptions about his average speeds are too high.
       How does this affect his journey time?

_____

_____
                                                                                  (1)
                                                                            (Total 5 marks)

Q3.   82 children visit a sports centre.
       50 of the children swim.
       At least one adult is needed for every 12 children who swim.
       The other 32 children dance.
       At least one adult is needed for every 15 children who dance
       Work out the minimum number of adults needed for the 82 children.

_____

_____

_____

_____

_____

_____

                              Answer _____
                                                                            (Total 4 marks)

Q4. In a quiz, teams are asked 20 questions.
Teams score

      3 points for a correct answer

      0 points for questions not attempted

      −2 points for an incorrect answer.

(a)   Team A has these results.

	Correct	Not attempted	Incorrect
Number of questions	12	5	3

Work out the total number of points Team A scores.

_____

_____

Answer _____

(2)

(b)   Team B answers 16 out of 20 questions correctly.
Work out the percentage of questions Team B answers correctly.

_____

_____

_____

Answer _____ %

(2)

(c)   After 17 questions, Team C has 35 points.
After 20 questions, Team C has 34 points.
How many of the last three questions are answered correctly, not attempted or answered incorrectly?

_____

_____

_____

Correct _____

Not attempted _____

Incorrect _____

(2)

(Total 6 marks)

Q5. A bag contains red counters and blue counters in the ratio   3 : 5
What fraction of the counters are red?
Circle your answer.

$\dfrac{1}{3}$ $\dfrac{3}{5}$ $\dfrac{3}{8}$ $\dfrac{5}{8}$

(Total 1 mark)

Q6.   In a school, 60% of the students are girls.
       50% of the girls walk to school.
       20% of the boys walk to school.
       What percentage of the students walk to school?

_____

_____

_____

_____

_____

                                    Answer _____ %
                                                                    (Total 3 marks)

Q7.   The ratio of $x : y$ is $2 : 3$
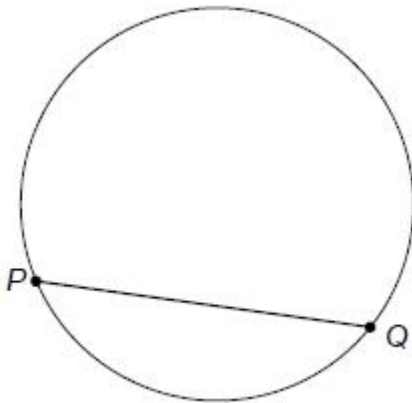   Circle the correct statement.

       x is $\frac{2}{3}$ of y y is $\frac{2}{3}$ of y x is $\frac{2}{5}$ of x y is $\frac{3}{5}$ of x

                                                                    (Total 1 mark)

Q8.   Circle the word that describes the straight line *PQ.*

       chord   diameter   radius   tangent

                                                                    (Total 1 mark)

Q9. A cycle track has two identical semi-circular ends and two straight sides as shown.
Not drawn accurately
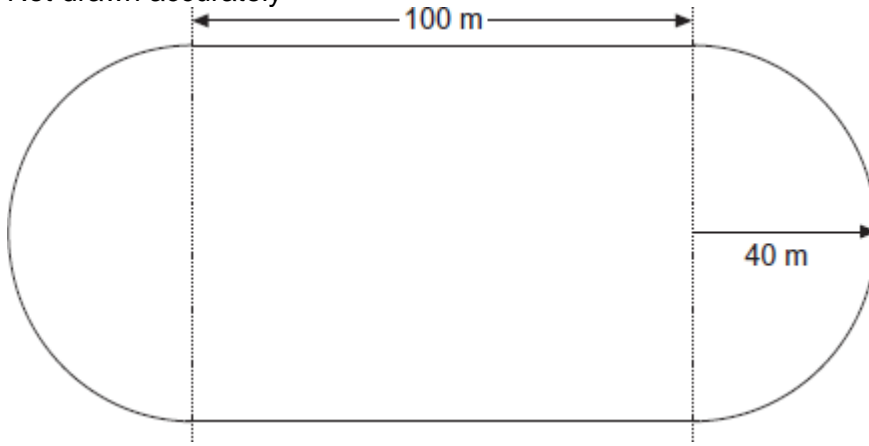
A cyclist completes one lap.
Her average speed is 18 m / s
Her target time to complete one lap is 30 seconds.
Does she beat her target?
You must show your working.

_____

_____

_____

_____

_____

_____

Answer _____

(Total 4 marks)

Q10. (a)   The radius of this circle is 2.5 cm
Not drawn accurately
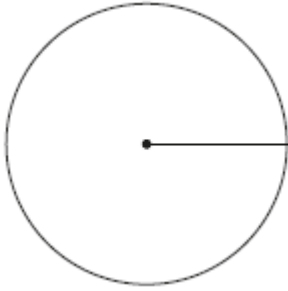
Work out the area.
Give your answer to 1 significant figure..

_____

_____

Answer _____ cm³

(3)

(b)   The diameter of this semicircle is 16 cm
Not drawn accurately

Work out the perimeter of the semicircle.

_____

_____

_____

_____

_____

Answer _____

(3)
(Total 6 marks)

Q11.   What is the sum of the exterior angles of any polygon?
Circle your answer.

180°   360°   380°   540°

(Total 1 mark)

Q12. Two identical circles fit inside a rectangle as shown.
Not drawn accurately
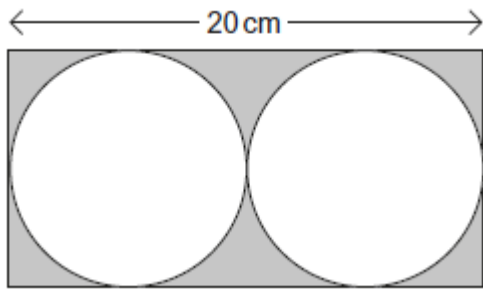
The length of the rectangle is 20 cm
Work out the area of the shaded section.

_____

_____

_____

_____

_____

_____

_____

Answer _____ cm²

(Total 6 marks)

Q13. *ABDE* is a parallelogram.
AB = AC

Not drawn
accurately
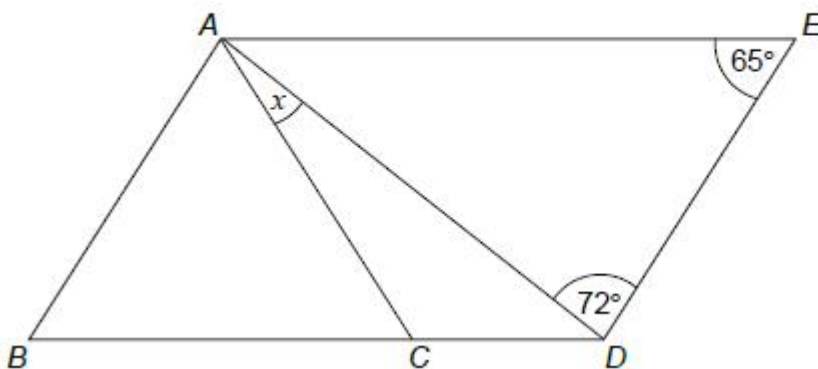
Show that *x* = 22°

_____

_____

_____

_____

_____

_____

(Total 3 marks)

Q14. *AD* is parallel to *BC. AE = DE.* Not drawn accurately
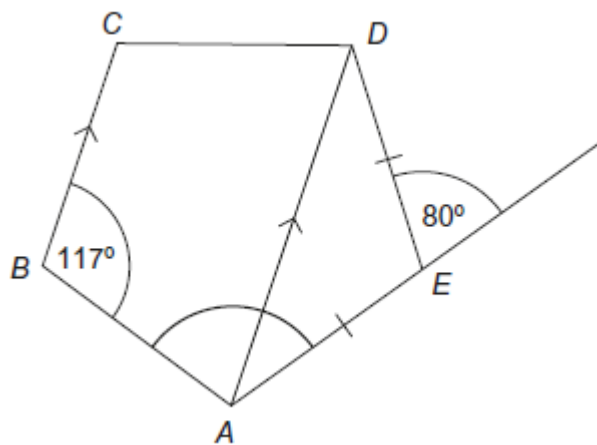
Work out the size of angle *BAE.*

_____

_____

_____

_____

Answer _____degrees

(Total 3 marks)

Q15.
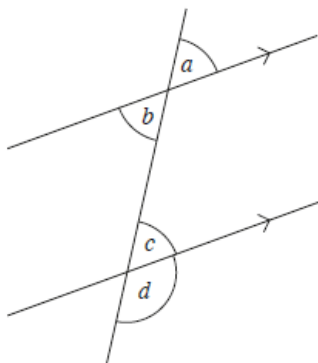
(a)   Which angles are vertically opposite? Circle your answer

   a and *b*   *a* and *c*   *b* and *c*   *b* and *d*   *c* and *d*

(1)

(b)   Which angles are alternate? Circle your answer
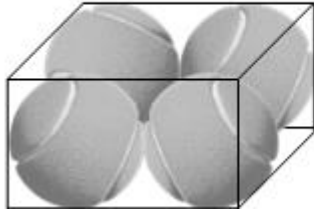
   a and *b*   *a* and *c*   *b* and *c*   *b* and *d*   *c* and *d*

(1)

(c)   Which angles are corresponding? Circle your answer

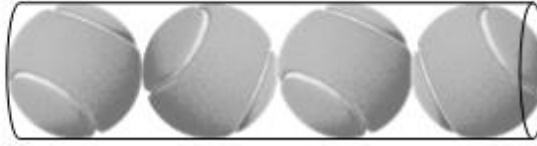   *a* and *b*   *a* and *c*   *b* and *c*   *b* and *d*   *c* and *d*

(1)

(Total 3 marks)

Q16. Here are two closed containers.
Four tennis balls just fit in each container.
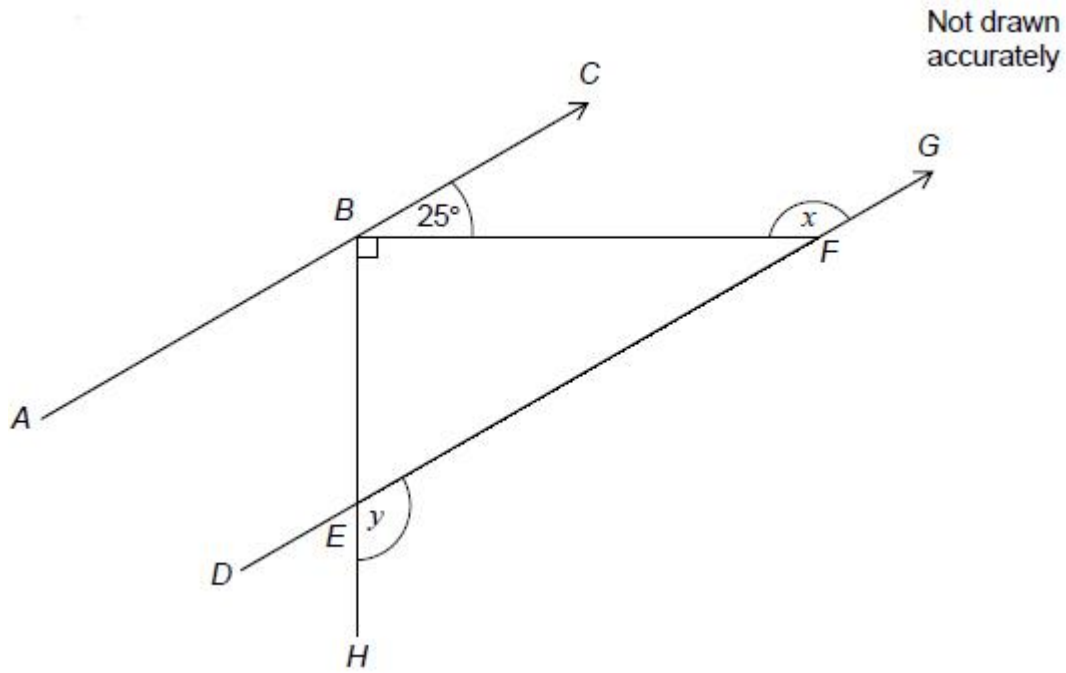Each tennis ball has diameter 64 mm

Cuboid

Cylinder

Which container has the smaller surface area?
You must show your working.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Answer _____

(Total 5 marks)

Q17.   *ABC* and *DEFG* are parallel lines.
       BEH is a straight line.

(a)   Work out the size of angle *x*.

_____

                           Answer _____degrees
                                                                         (1)

(b)   Work out the size of angle *y*.
You must show your working, which may be on the diagram.

_____

_____

_____

_____

                           Answer _____degrees
                                                                         (2)
                                                           (Total 3 marks)

Q18.   (a)   Write   1607   in words.

              Answer _____
                                                                         (1)

       (b)   What is the value of the digit 5 in   13 058?

                           Answer _____
                                                                         (1)

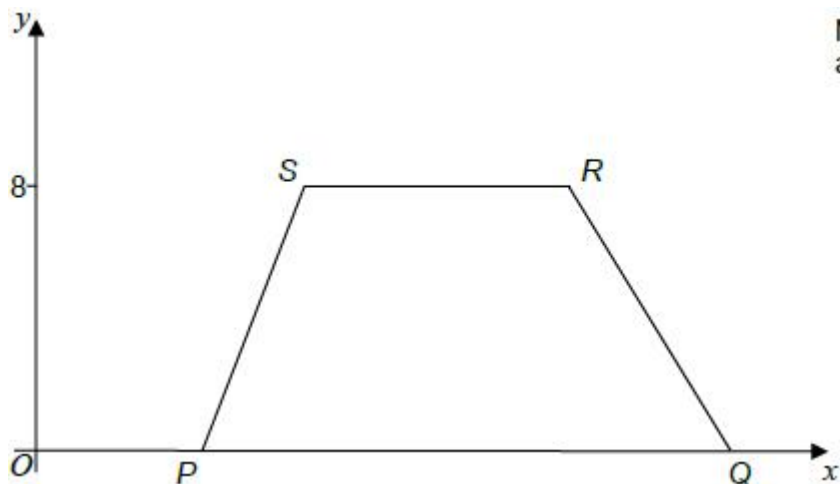   (c)   Round   17 809   to the nearest thousand.

                           Answer _____
                                                                         (1)
                                                           (Total 3 marks)

Q19. *PQRS* is a trapezium with PQ parallel to SR.
P and *Q* are on the *x*-axis.
The *y*-coordinate of S is 8
PQ > SR

Not drawn
accurately

The area of *PQRS* is 48 square units.
Work out one possible set of points for *P*, *Q*, *R* and *S*.

_____

_____

_____

_____

_____

P (.......................... , ...)

Q (.......................... , ...)

R (.......................... , ...)

S (.......................... , ...)

(Total 4 marks)

Q20. Use your calculator to change $\dfrac{27}{64}$ to a decimal.
(a) Write down your full calculator display.

Answer _____

(1)

(b) Give your answer to part (a) to 3 decimal places.

Answer _____

(1)

(Total 2 marks)

Q21. The angles of a quadrilateral are 140°, 80°, 60° and 80°
What type of quadrilateral could it be?
Circle your answer.

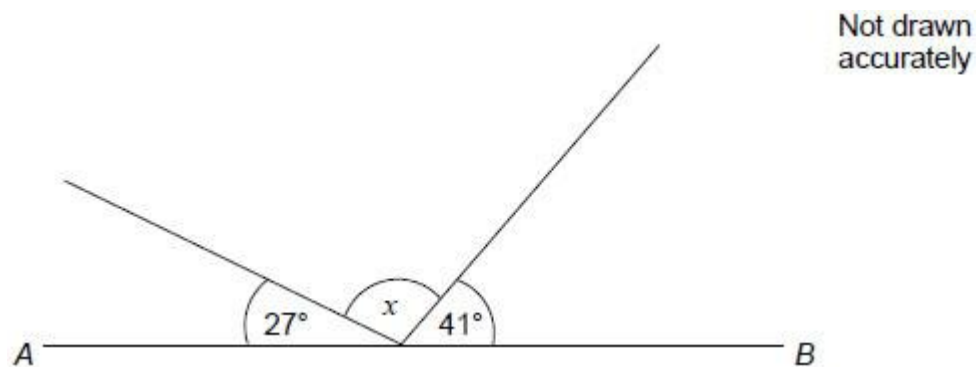Kite   Parallelogram   Rhombus   Trapezium

(Total 1 mark)

Q22. The diagram shows a triangle *ACD* and an equilateral triangle *BCD*.

Work out the size of angle *x*.

_____

_____
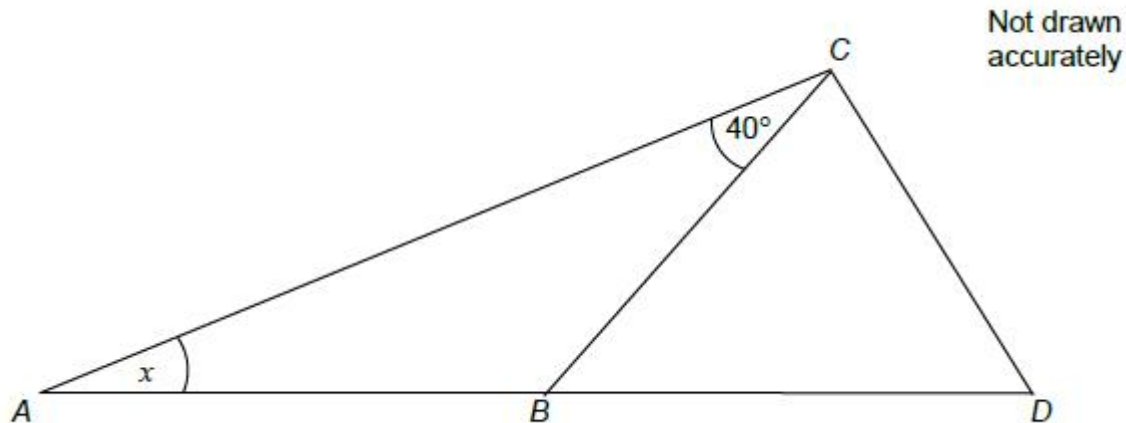
Answer _____degrees

(Total 2 marks)

Q23.

AB is a straight line.
Work out the size of angle *x*

_____

_____

_____

Answer _____degrees

(Total 2 marks)

Q24. Here is a map of France.

Scale: 1 cm represents 80 km

(a)   What is the three-figure bearing of Lyon from Bordeaux?
Circle your answer.

005°   085°   095°   175°

(1)

(b)   Work out the actual straight-line distance from Paris to Marseille.

_____

_____

Answer _____ km

(2)
(Total 3 marks)

Q25. A water tank is a cylinder with radius 40 cm and depth 150 cm

150 cm

40 cm
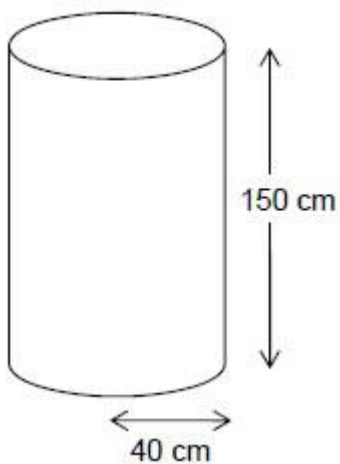
It is filled at the rate of 0.2 litres per second.
1 litre = 1000 cm^3
Does it take longer than 1 hour to fill the tank?
You must show your working.

_____

_____

_____

_____

_____

_____

_____

Answer _____

(Total 4 marks)

Q26.

(a)   Simplify $3a + 7b - a + 4b$

_____

_____

Answer _____

(2)

(b)   Expand $4(2d + 5)$

_____

Answer _____

(2)

(c)   Factorise $15x + 18y$

_____

Answer _____

(1)

(Total 5 marks)

Q27.

(a) Expand and simplify $2(a + 3) + 5(a - 1)$

_____

_____

Answer _____
(2)

(b) Simplify $5c^4d^2 \times c^2d^3$

_____

_____

Answer _____
(2)

(c) Simplify fully $\dfrac{8(x-3)^2}{4(x-3)(x+3)}$

_____

_____

_____

Answer _____
(2)
(Total 6 marks)

Q28. Circle the correct words to complete each sentence.

(a) $5x + 1 = 16$ is

an expression   an equation   a formula
(1)

(b) $V = \pi r^2 h$ is

an expression   an equation   a formula
(1)

(c) $x + 3$ is

an expression   an equation   a formula
(1)

(d) $2x + 3y$ is

an expression   an equation   a formula
(1)
(Total 4 marks)

Q29.
(a) Solve $x + 12 = 29$

_____

_____

$x =$ _____
(1)

(b) Solve $0.5y = 20$

_____

_____

$y =$ _____
(1)
(Total 2 marks)

Q30. Here is a centimetre grid.
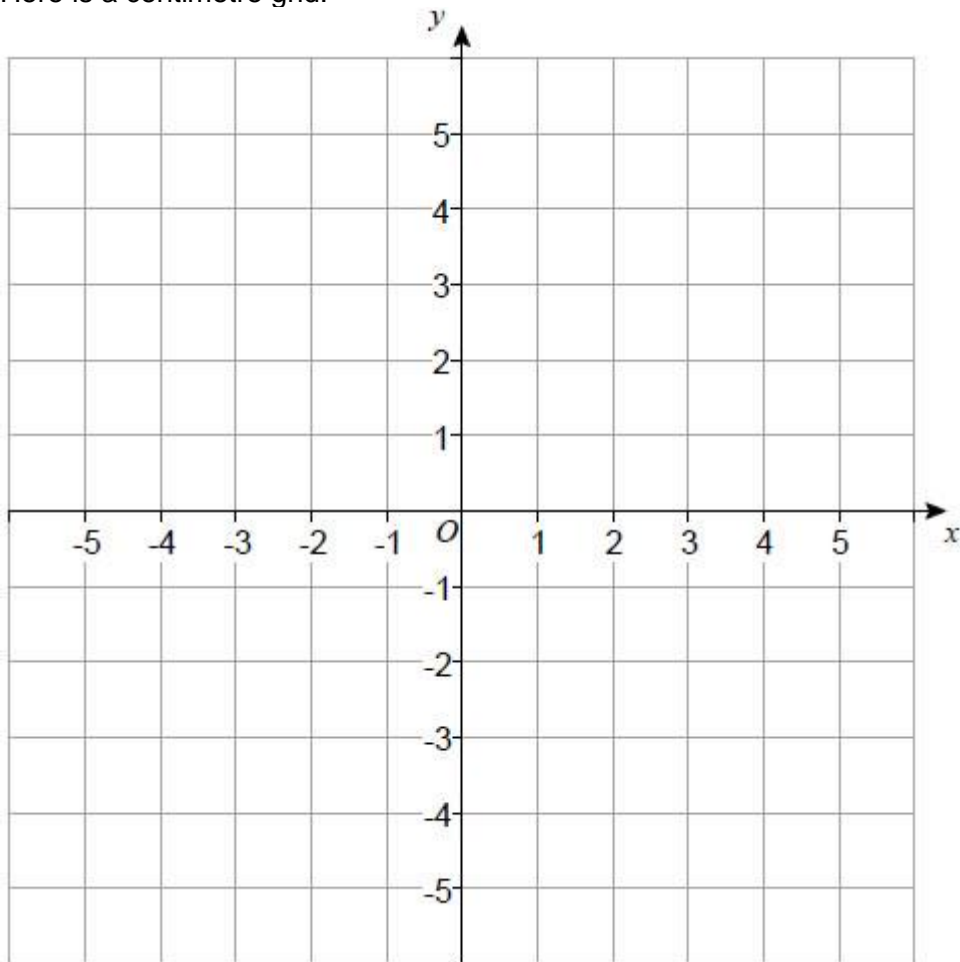
A (3, 5), B (0, -3) and C (-5, 2) are three points.
What type of triangle is ABC?
You must show your working, which may be on the diagram.

Answer _____
(Total 2 marks)

Q31. A straight line has the equation $y = 6 - 2x$
Circle the gradient of the line.

-2 2 $2x$ 6

(Total 1 mark)

Q32. By rounding each number to 1 significant figure, estimate the answer to

$$\frac{78 \times 11.6}{391}$$

You must show your working.

_____

_____

_____

_____

Answer _____

(Total 3 marks)

33. Use your calculator to work out $\frac{3.21 + 4.89}{5.62 - 1.89}$ as a decimal.
    (a) Write down your full calculator display.

_____

_____

Answer _____

(1)

(b) Write your answer to 1 decimal place.

_____

Answer _____

(1)

(Total 2 marks)

Q34. Sam spends exactly £20 on petrol.
The petrol costs £1.45 per litre.
Work out the number of litres of petrol she buys.
Give your answer to 1 decimal place.

_____

_____

_____

Answer _____ litres

(Total 3 marks)

Q35. A pop concert has a crowd of 2000 people rounded to 1 significant figure.
A rock concert has a crowd of 2000 people rounded to 2 significant figures.

Work out the largest possible difference between the exact numbers of the two crowds.

_____

_____

_____

Answer _____

(Total 3 marks)

Q36. Diaries are sold in boxes of 12
Pencils are sold in boxes of 10
Rulers are sold in boxes of 6
A teacher wants to buy the same number of diaries, pencils and rulers.
Work out the smallest number of boxes of each item he could buy.

_____

_____

_____

_____

_____

_____

_____

_____boxes of diaries

_____boxes of pencils

_____boxes of rulers
(Total 3 marks)

Q37. x = 2500 to the nearest 100
Circle the smallest possible value of x.

2449   2450   2495   2499

(Total 1 mark)

Q38. Here is a sequence.

40   35   30   25   20

Circle the expression for the nth term of the sequence.

$5n + 35$ $5n - 45$ $45 - 5n$ $n - 5$

(Total 1 mark)

Q39. The region *R* satisfies the three inequalities.

$$x > -3 \qquad x + y \le 2 \qquad y \ge \frac{x}{2} - 1$$

Show the region *R* on the grid.
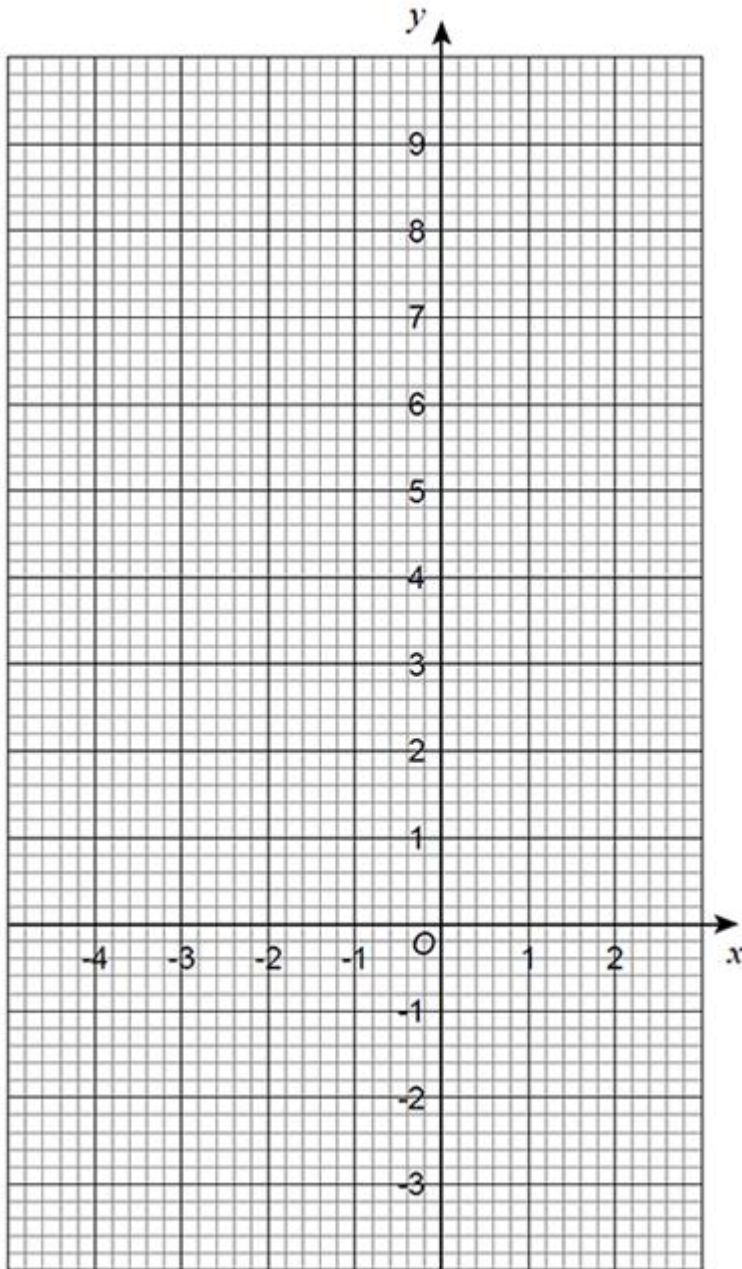
(Total 4 marks)

Q40. Circle the two equations that are equivalent to $2y = 3x + 4$

A $\qquad 2x = 3y + 4$

B $\qquad y - \frac{3}{2}x = 2$

C $\qquad y = \frac{3}{2}x + 4$

D $\qquad 3x - 2y + 4 = 0$

(Total 2 marks)

Q41. Expand and simplify $(2x + 5y)(3x - 8y)$

_____

_____

_____

_____

Answer _____

(Total 3 marks)

Q42.

(a)   Expand and simplify $(x + 5)(x - 4)$

_____

_____

_____

_____

Answer _____

(2)

(b)   Solve $(x - 8)(x + 7) = 0$

_____

_____

_____

Answer _____

(1)

(Total 3 marks)

Q43. The pie charts show the eye colour of some students.

Girls
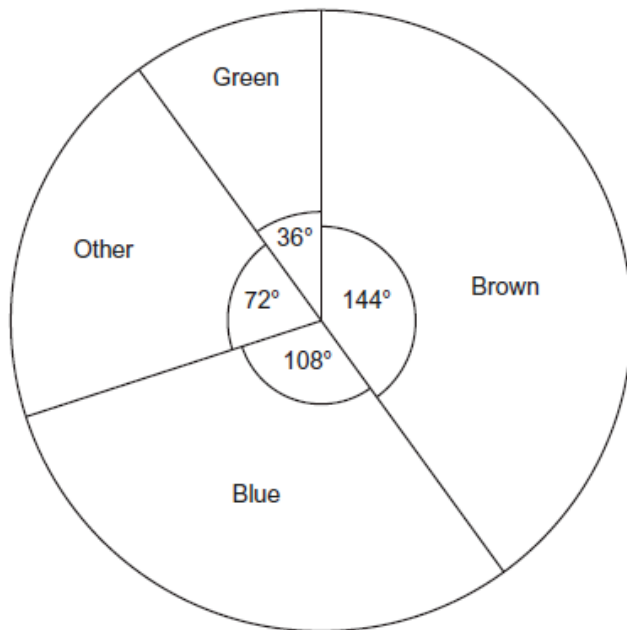
Boys
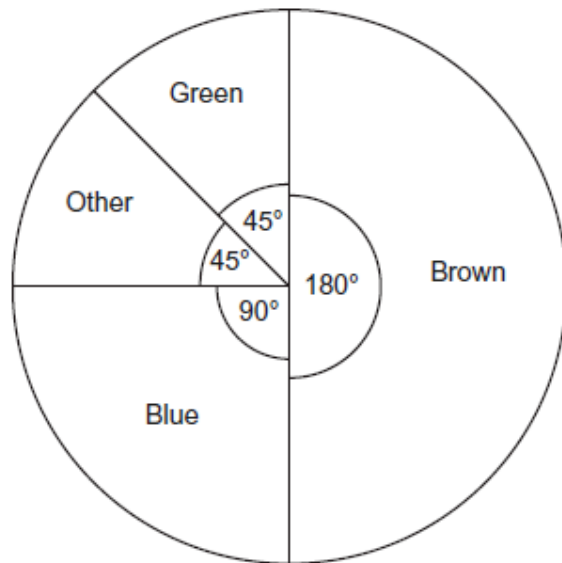
The areas of the pie charts are proportional to the number of students.
The radius of the girls' pie chart is 5 cm
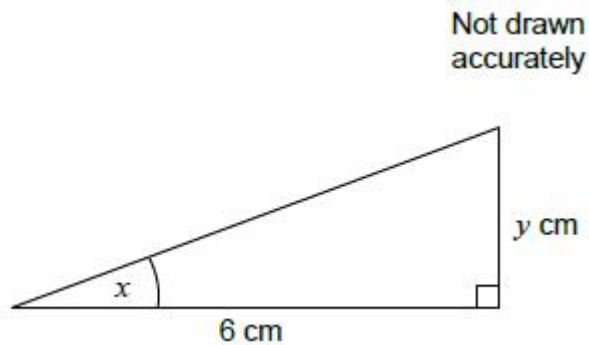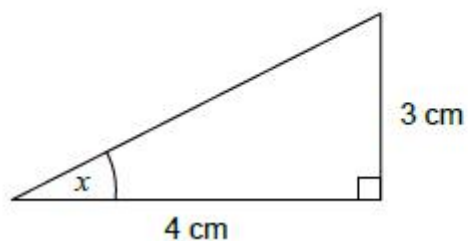The radius of the boys' pie chart is 4 cm
5 girls have green eyes.
How many boys and girls altogether have blue eyes?

_____

_____

_____

_____

_____

_____

_____

_____

Answer _____

(Total 5 marks)

Q44. These two right-angled triangles are similar.

Not drawn accurately

3 cm

x

4 cm

y cm

x

6 cm

(a)   Write down the value of tan x.
Give your answer as a fraction.

Answer _____
(1)

(b)   Work out the value of y.

_____

_____

_____

_____

Answer _____ cm
(2)
(Total 3 marks)

Q45. A charity collection was made.
Information about the amounts given by men is shown in the table.

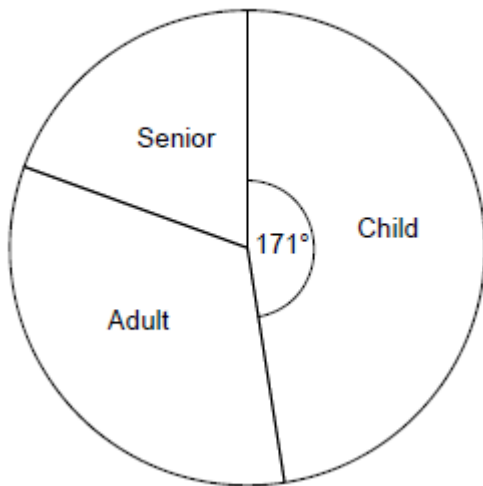| Amount, x (£)	Midpoint	Number of men	
$0 \leq x < 5$		11	
$5 \leq x < 10$		7	
$10 \leq x < 15$		2	
		Total = 20	

The mean amount given by women was £6.30 per person.
Compare the mean amounts given by men and women.

_____

_____

_____

_____

_____

_____

_____

_____
(Total 4 marks)

Q46. The pie chart shows information about the sales of 800 tickets.
There were twice as many adult ticket sales as senior ticket sales.
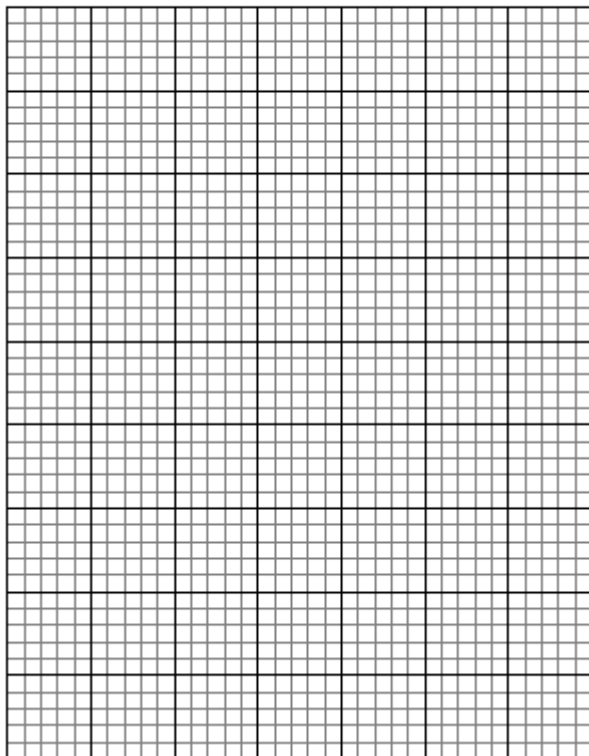Not drawn accurately

Ticket sales

(a) Show that there were 140 senior ticket sales.

_____

_____

_____

(3)

(b) Draw a bar chart on the grid to represent the child, adult and senior ticket sales.

Ticket sales

(4)
(Total 7 marks)

Q47. At a nursery, the mean age of 4 children is 31 months.
Katy joins the nursery.
The mean age of all 5 children is now 30 months.
Work out the age of Katy.

_____

_____

_____

_____

_____

Answer _____ months

(Total 4 marks)

Q48. The times that 80 customers waited at a supermarket checkout are shown.

Time, t (minutes)	Frequency
$0 \leq t < 2$	32
$2 \leq t < 4$	19
$4 \leq t < 6$	20
$6 \leq t < 8$	7
$8 \leq t < 10$	2

(a)   In which class interval is the median?
Circle your answer.

$0 \leq t < 2$ $\qquad$ $2 \leq t < 4$ $\qquad$ $4 \leq t < 6$ $\qquad$ $6 \leq t < 8$

(1)

(b)   The manager of the supermarket says,
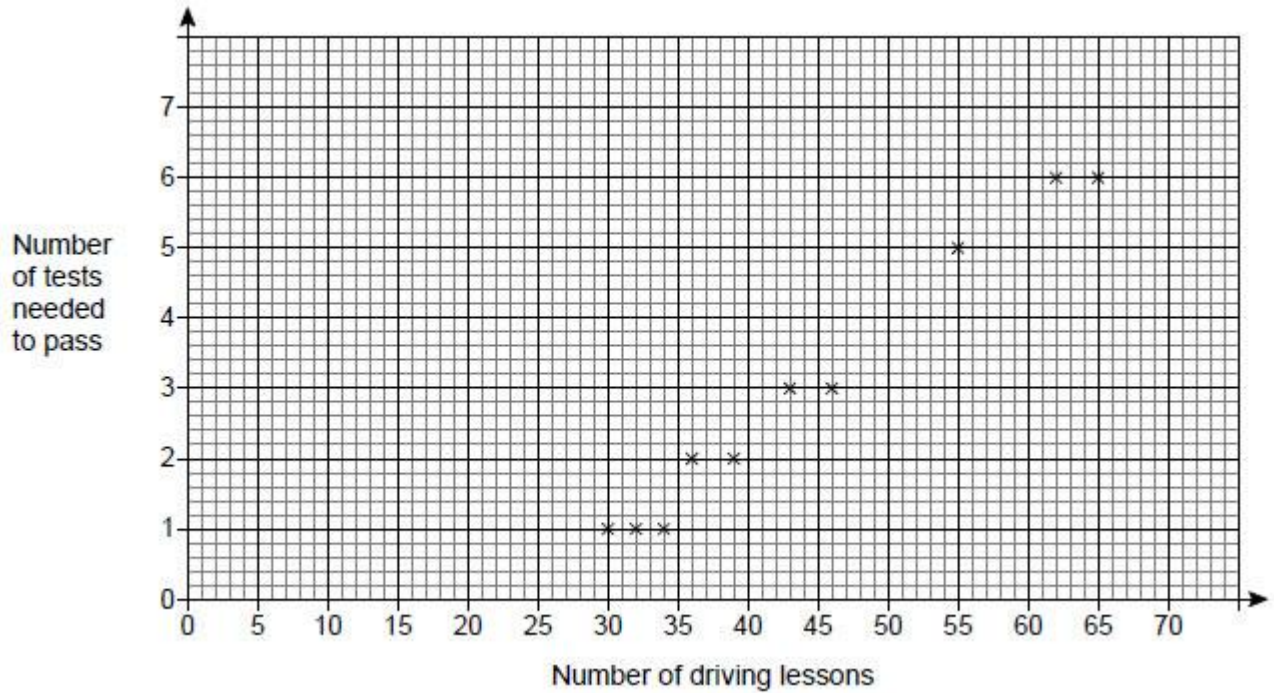   "90% of our customers wait less than 6 minutes."
Does the data support this statement?
You must show your working.

_____

_____

_____

_____

_____

Answer _____

(1)
(Total 2 marks)

Q49. The scatter graph shows the number of driving lessons and the number of tests needed to pass by 10 people.

Number of driving lessons

(a)   What proportion of the 10 people passed on their first test?

_____

Answer _____

(1)

(b)   Describe the correlation.
Circle your answer.

strong positive   weak positive   weak negative   strong negative

(1)

(c)   Use a line of best fit to estimate the number of tests needed to pass by a person who has 50 lessons.

_____

_____

Answer _____

(2)

(d)   Meera says,
        "I can use the trend to predict the number of driving tests needed to pass for any number of driving lessons."
    Comment on her statement.

_____

_____

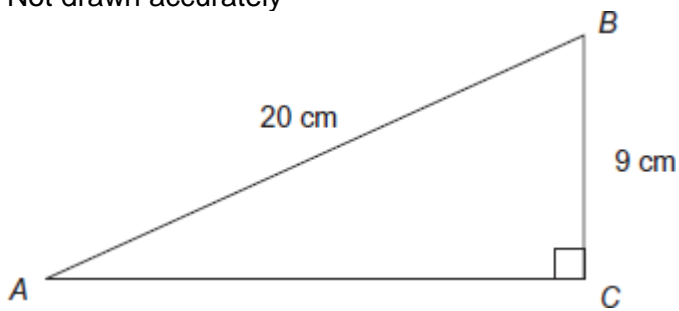_____

_____

(1)
(Total 5 marks)

Q50. *ABC* and *DEC* are similar triangles. Not drawn accurately
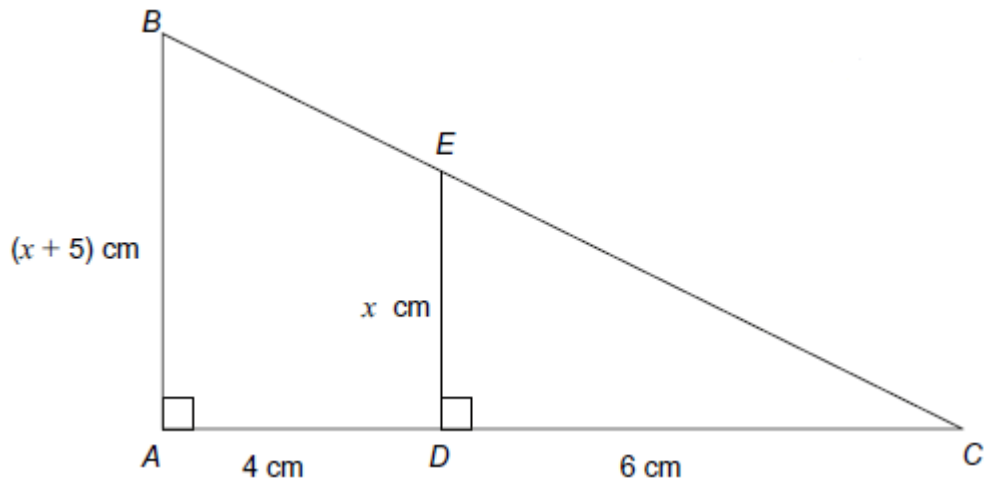
Work out the value of *x*.

_____

_____

_____

_____

_____

_____

_____

Answer _____ cm

(Total 4 marks)

Q51. Not drawn accurately

Work out the length *AC*.
Give your answer to 1 decimal place.

_____

_____

_____

_____

Answer _____ cm

(Total 4 marks)

Q52. The area of the rectangle is 68 cm²

Not drawn accurately

16 cm

Work out the size of angle *x*.

_____

_____

_____

_____
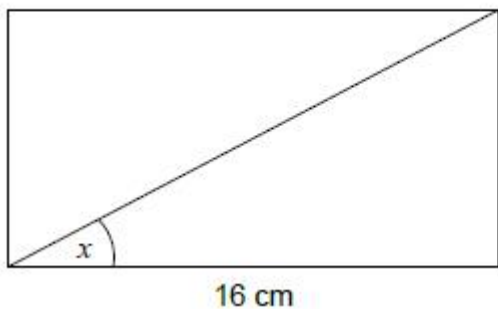
Answer _____degrees

(Total 3 marks)

Q53. Noah is attempting to work out the base of different right-angled triangles.
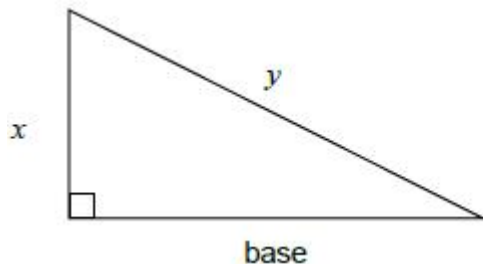
Not drawn accurately

base

Here is his method with the working for $y = 10$ and $x = 6$

| Work out the value of y^2 | $10^2 = 100$ |
Work out the value of x^2	$6^2 = 36$
Work out the value of $y^2 - x^2$	$100 - 36 = 64$
The base is $\sqrt{y^2 - x^2}$	base = $\sqrt{64}$

Tick the correct statement.

☐ The method will always give an answer which is a whole number.

☐ The method will sometimes give an answer which is a whole number.

☐ The method will never give an answer which is a whole number.

Show working to support your answer

_____

_____

_____

_____

(Total 3 marks)

Q54. A children's nursery uses one room for babies and one room for toddlers.

Not drawn accurately
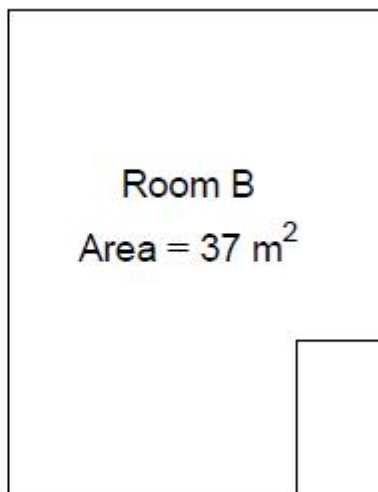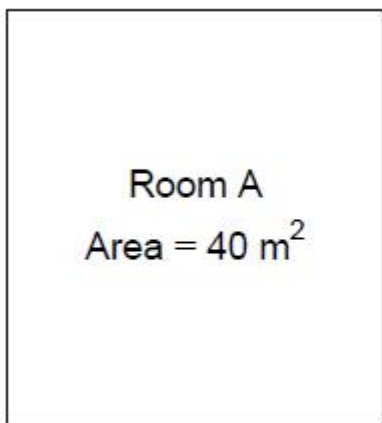
Room A
Area = 40 m^2

Room B
Area = 37 m^2

Each baby needs at least 3.5 m^2 of floor space.
Each toddler needs at least 2.5 m^2 of floor space.
Show that the total number of children allowed is larger if
       the toddlers are in Room A
and   the babies are in Room B.

_____

_____

_____

_____

_____

_____

_____

(Total 4 marks)

Q55. The table shows information about journeys A and B. Complete the table.

	Distance travelled	Time taken	Average speed
A	32 miles		64 mph
B		1 hour 20 minutes	42 mph

(Total 2 marks)

Q56. Which of these is used to work out density? Tick a box.

mass × volume   ☐

mass^2 × volume   ☐

mass ÷ volume   ☐

volume ÷ mass   ☐

(Total 1 mark)

Q57. Increase 4200 by 38%

_____

_____

_____

_____

Answer _____

(Total 2 marks)

Q58. £800 is invested for 3 years at 2% simple interest per year.
Work out the total interest.

_____

_____

_____

_____

_____

Answer £...

(Total 3 marks)

Q59. Toilet rolls come in packs of 4 and 9

Our Brand
4
Toilet rolls

£1.89

Our Brand
9
Toilet rolls

£3.99

Which pack is better value?
You must show your working.

_____

_____

_____

_____

_____

Answer _____

(Total 3 marks)

Q60. Write 180 g as a fraction of 3 kg
Give your answer in its simplest form.

_____

_____

_____

Answer _____

(Total 2 marks)

Q61. In March, Kim pays the same amount for each song she downloads.
She pays £35.60 for 40 songs.
In April, she pays 5p more for each song.
She has a £30 voucher.
What is the maximum number of songs she can download using the voucher?

_____

_____

_____

_____

_____

Answer _____

(Total 3 marks)

Q62. Two straight lines are shown. *B* is the midpoint of *AC*. *TB* : *BS* = 2 : 3


Not drawn accurately
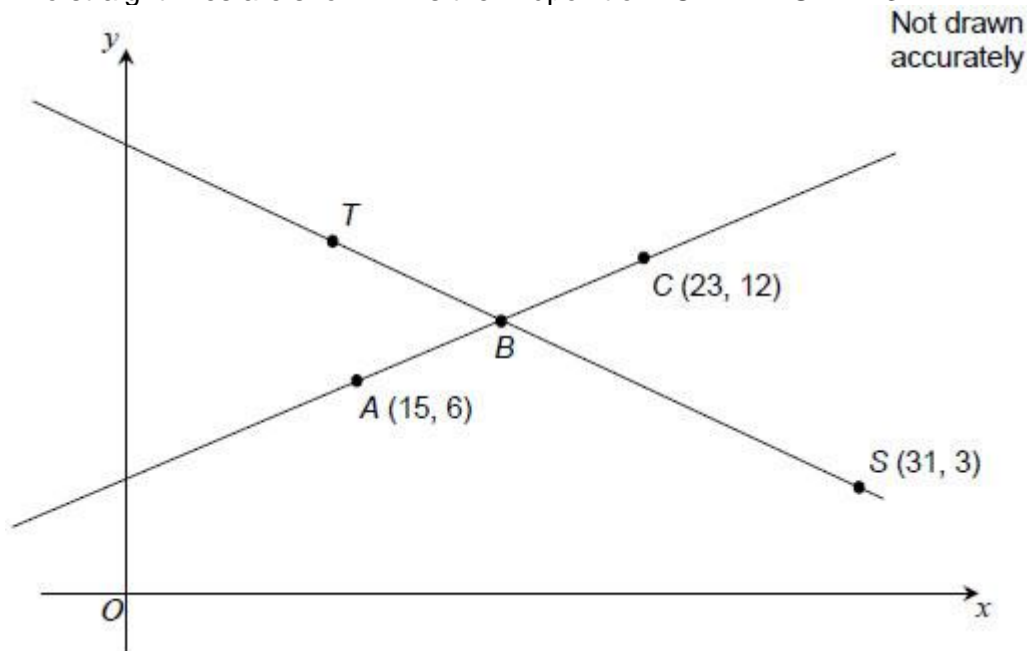
Work out the coordinates of *T*.

_____

_____

Answer (_____, _____)

(Total 4 marks)

Q63. Three whole numbers have a total of 100
The first number is a multiple of 15
The second number is ten times the third number.
Work out the three numbers.

_____

_____

_____

_____

Answer _____ , _____ , _____

(Total 3 marks)

Q64. (a) The outcomes of two independent experiments are success and failure.
Complete the tree diagram.

First experiment   Second experiment
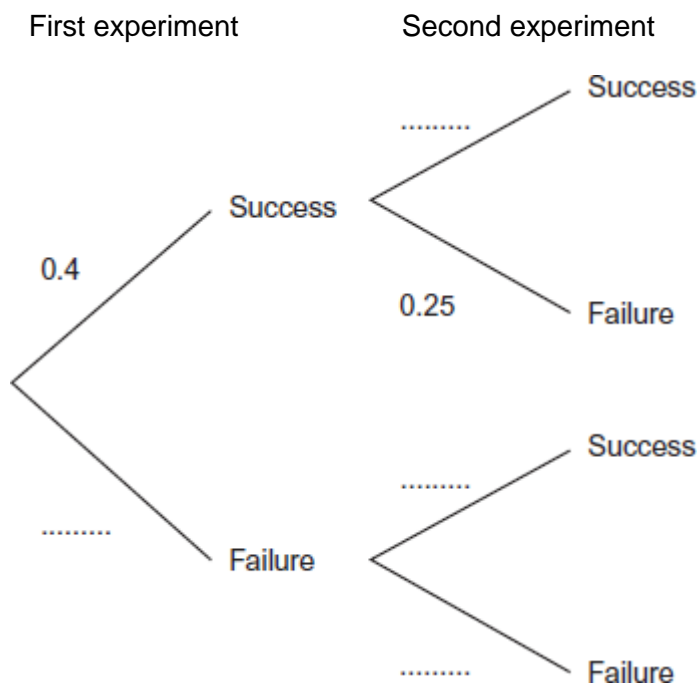
(2)

(b) Work out the probability of success in both experiments.

_____

_____

_____

Answer _____

(2)
(Total 4 marks)

Q65. There are 20 students. 12 are boys.
What fraction are boys?
Circle your answer.

$\dfrac{2}{3}$ $\qquad\qquad$ $\dfrac{2}{5}$ $\qquad\qquad$ $\dfrac{3}{5}$ $\qquad\qquad$ $\dfrac{3}{4}$

(Total 1 mark)

Q66. Bag A contains 3 red balls and 7 blue balls.
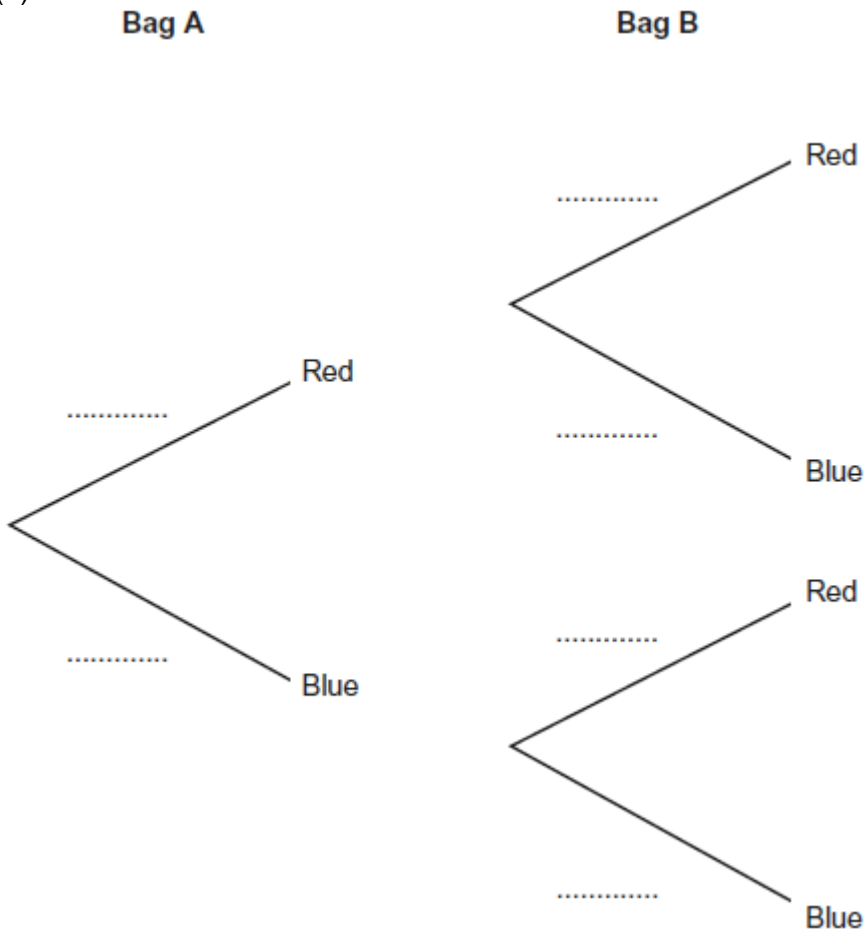Bag B contains 8 red balls and 2 blue balls.

Bag A   Bag B

A ball is picked at random from each bag.
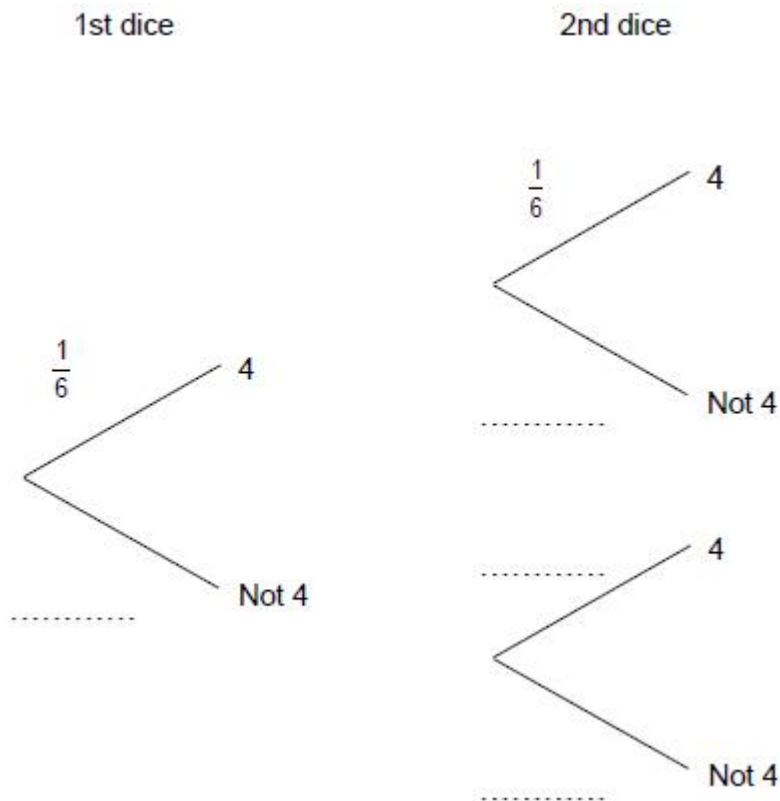(a)   Complete the tree diagram to show all the probabilities.
(b)

Bag A   **Bag B**

                                                              Red
                                            ....
                                                              Blue
                              Red
              ....
              ....
                              Blue
                                            ....   Red

                                            ....   Blue

(3)
(b)   Work out the probability of picking a red ball from Bag A and a blue ball from Bag B.

_____

_____

_____

_____

Answer _____

(2)
(Total 5 marks)

Q67. Two ordinary fair dice are rolled.
(a) Complete the tree diagram.

1st dice   2nd dice

$\frac{1}{6}$ — 4

$\frac{1}{6}$ — 4

.... — Not 4

.... — Not 4

.... — 4

.... — Not 4

(1)

(b) Circle the probability that both dice land on 4

$\frac{1}{4}$ $\qquad$ $\frac{2}{12}$ $\qquad$ $\frac{2}{6}$ $\qquad$ $\frac{1}{12}$ $\qquad$ $\frac{1}{36}$

(1)

(c) Work out the probability that at least one of the dice does not land on 4

_____

_____

_____

_____

Answer _____

(2)

(Total 4 marks)

Q68. The probability that a biased coin lands on heads is $\frac{2}{3}$
The coin is spun twice.
Circle the probability of two heads.

$\frac{2}{9}$ $\qquad$ $\frac{4}{6}$ $\qquad$ $\frac{4}{9}$ $\qquad$ $\frac{4}{3}$

(Total 1 mark)

Q69. John goes to work by car or by train.
(a)   The probability that John goes by car is 0.4
Work out the probability he goes by train.

_____

_____

Answer _____
(1)

(b)   John works for 200 days each year.
How many days would you expect him to go to work by car?

_____

_____

Answer _____
(2)

(c)   Ben also goes to work by car or by train.
Out of 200 days, he went by car on 150 days.
Work out the relative frequency that Ben goes to work by car.

_____

_____

Answer _____
(1)
(Total 4 marks)

Q70. (a)   What is $\frac{1}{5}$ as a percentage?
Circle your answer.

1.5%   5%   15%   20%
(1)

(b)   What is 0.9 as a percentage?
Circle your answer.

0.009%   0.09%   9%   90%
(1)
(Total 2 marks)

Q71. A spinner has four sections A, B, C and D.
The table shows the probabilities of the spinner landing on A, B or C.

Outcome	A	B	C	D
Probability	0.2	0.3	0.15	

Work out the probability of landing on D.

_____

_____

_____

Answer _____
(Total 2 marks)

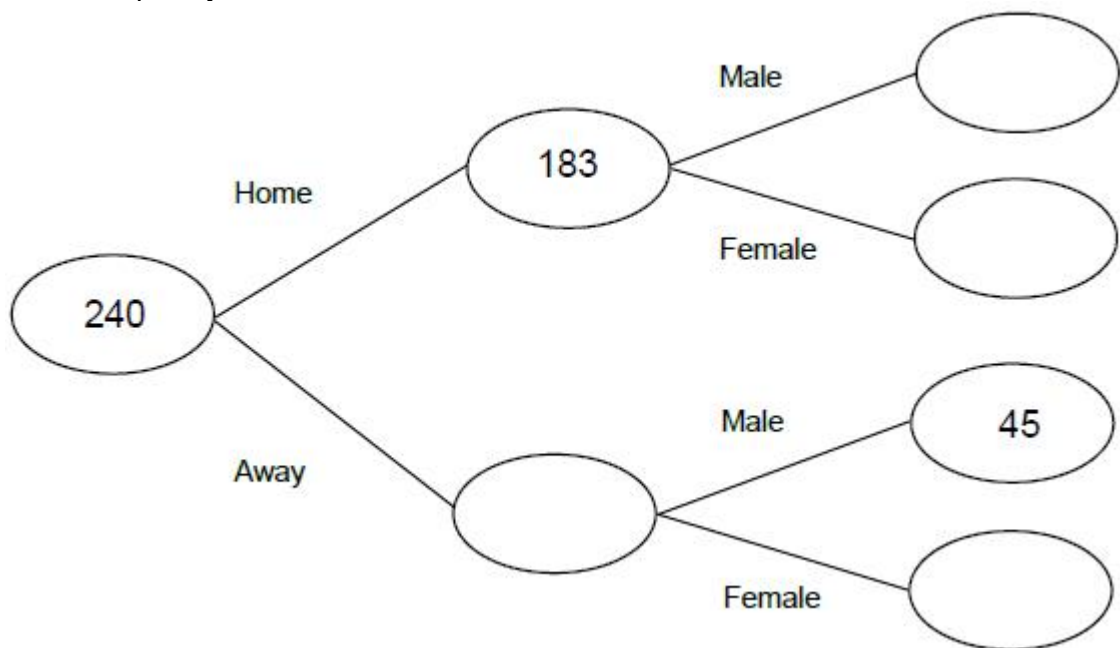Q72.   The four possible outcomes of an experiment are A, B, C and D.

P(A) = 0.28
P(B) = 2P(A)
P(C) = P(D)

Work out P(D)

_____

_____

_____

_____

_____

Answer _____

(Total 3 marks)

Q73.   240 people go to a rugby match.
183 of the people support the home team.
The other people support the away team.
162 of the supporters are male.
45 of the away supporters are male.
Complete the frequency tree.

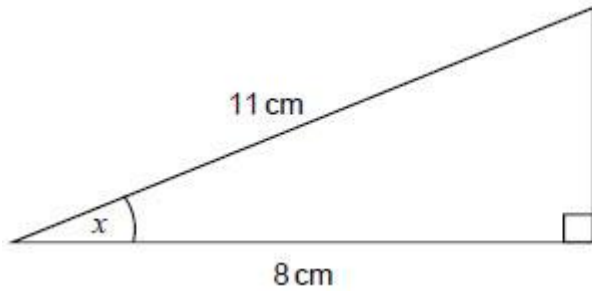
(Total 4 marks)

Q74.   50 people took a test.
        Before the test, they predicted whether they would pass or fail.
        30 people predicted they would pass.
        26 of the people who predicted they would pass did pass.
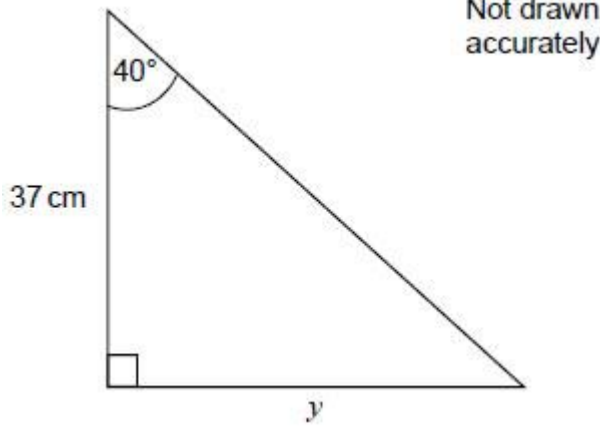   37 people passed altogether.
        Complete the frequency tree.

Prediction   **Result**
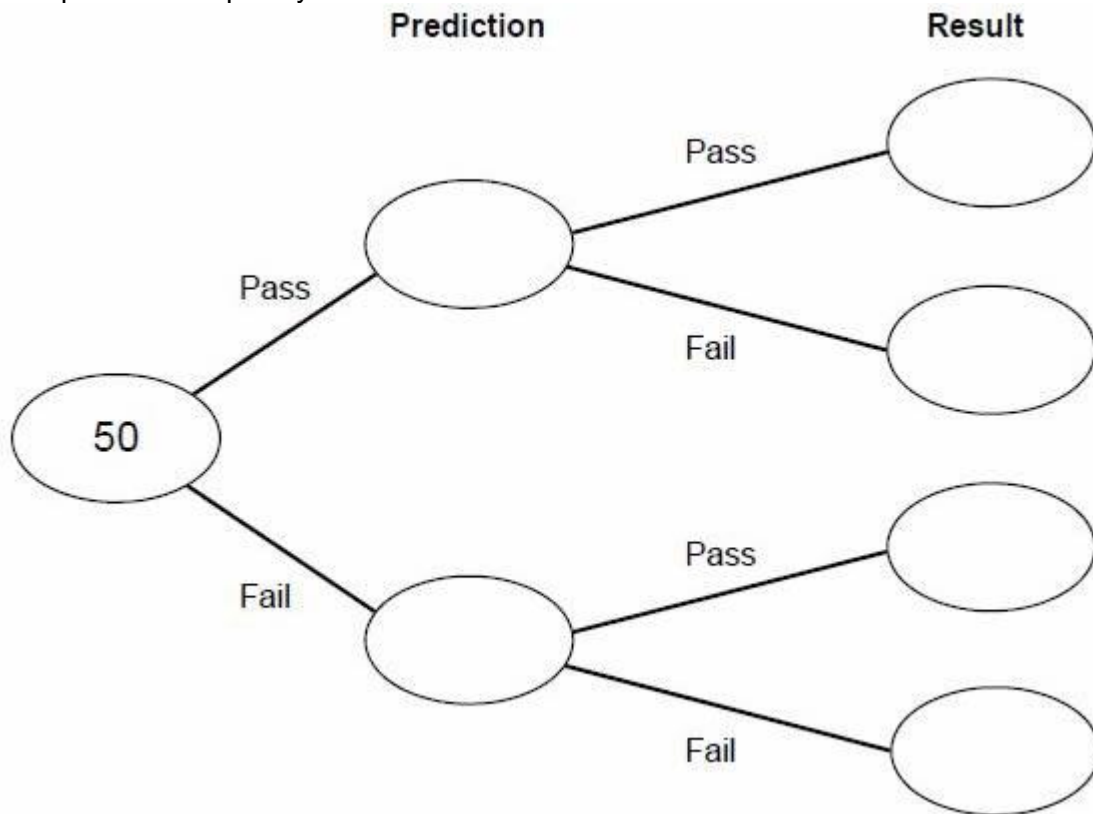
(Total 2 marks)

Q75.

(a) Work out the size of angle *x*.

Not drawn accurately

11 cm

x

8 cm

_____

_____

_____

_____

Answer _____degrees

(2)

(b) Work out length *y*.

Not drawn accurately

40°

37 cm

y

_____

_____

_____

_____

Answer _____ cm

(2)

(Total 4 marks)

Q76. The table shows information about water used in a household.
The value for April is missing.

Month	Water used (m³)
January	16.2
February	18.1
March	15.9
April	
May	17.8
June	21.0

The mean monthly water used for the six months is 18 m³
Work out the value for April.

_____

_____

_____

_____

_____

Answer _____ m³

(Total 3 marks)