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Pearson Edexcel
Level 1/Level 2 GCSE (9 - 1)

Centre Number

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Mathematics

Paper 3 (Calculator)

Foundation Tier

Sample Assessment Materials for first teaching September 2015

Time: 1 hour 30 minutes

Paper Reference

1MA1/3F

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 be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.
- Diagrams are NOT accurately drawn, unless otherwise indicated.
- You must **show all your working out** with your **answer clearly identified** at the **end of your solution**.



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.

Turn over ►

S47350A

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Formulae Sheet

Perimeter, area, surface area and volume formulae

Where r is the radius of the sphere or cone, l is the slant height of a cone and h is the perpendicular height of a cone:

$$\text{Curved surface area of a cone} = \pi r l$$

$$\text{Surface area of a sphere} = 4\pi r^2$$

$$\text{Volume of a sphere} = \frac{4}{3}\pi r^3$$

$$\text{Volume of a cone} = \frac{1}{3}\pi r^2 h$$

Kinematics formulae

Where a is constant acceleration, u is initial velocity, v is final velocity, s is displacement from the position when $t = 0$ and t is time:

$$v = u + at$$

$$s = ut + \frac{1}{2}at^2$$

$$v^2 = u^2 + 2as$$

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 (a) Write the following numbers in order.

-3 -8 7 -5 3 0

(1)

(b) Write the following numbers in order.

0.59 0.5 0.09 0.95 0.05

(1)

(c) Write down all the factors of 20

(2)

(Total for Question 1 is 4 marks)

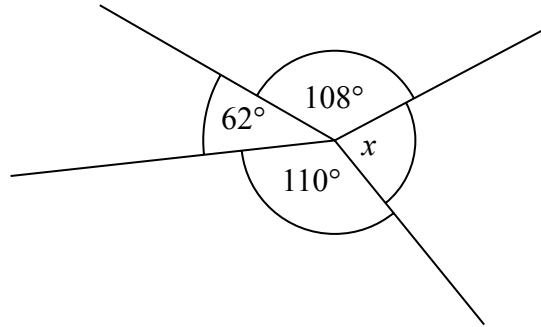
2 (a) Complete the following sentences.

(i) A cuboid has six

(ii) A is a straight line from the centre of a circle to its circumference.

(2)

(b)



Explain clearly why angle x cannot be a right angle.

(2)

(Total for Question 2 is 4 marks)

3 (a) Here are the first four terms of a sequence.

4 11 18 25

Write down the next two terms of this sequence.

(1)

(b) The n th term of a different sequence is $3n + 1$

Work out the 5th term of this sequence.

(1)

(Total for Question 3 is 2 marks)

- 4 Amir, Caitlin and Michael work in a warehouse.
The table shows some information about their wages one week.

| | Basic wage | | Overtime | | Total wage |
|----------------|----------------------|------------------------|----------------------|------------------------|------------|
| | Rate of pay per hour | Number of hours worked | Rate of pay per hour | Number of hours worked | |
| Amir | £8.40 | 30 | £12.60 | 7 | £340.20 |
| Caitlin | £9.30 | 30 | £12.40 | 4 | |
| Michael | £7.80 | 35 | £15.60 | | £319.80 |

- (a) Work out Caitlin's total wage for this week.

(2)

- (b) Work out how many hours Michael worked.

(3)

(Total for Question 4 is 5 marks)

5 Rob buys p packets of plain crisps and c packets of cheese crisps.

(a) Write down an expression for the total number of packets of crisps Rob buys.

(1)

The formula

$$F = 1.8C + 32$$

can be used to convert between temperatures in degrees Celsius (C) and temperatures in degrees Fahrenheit (F).

(b) Change 28° Celsius into degrees Fahrenheit.

(2)

(c) Solve $4x + 2 = 20$

(2)

(d) Factorise $3x^2 - 2x$

(1)

(Total for Question 5 is 6 marks)

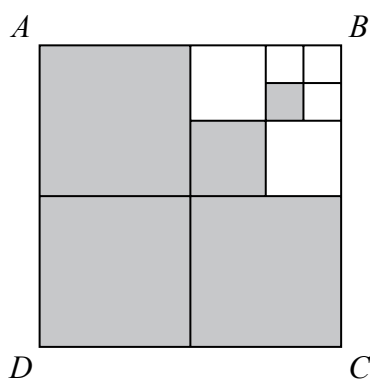
6 (a) Work out the value of

$$\frac{1}{4} + \left(\frac{1}{4} \times \frac{1}{4}\right) + \left(\frac{1}{4} \times \frac{1}{4} \times \frac{1}{4}\right)$$

(2)

$ABCD$ is a square.

This diagram is drawn accurately.



(b) What fraction of the square $ABCD$ is shaded?

(2)

(Total for Question 6 is 4 marks)

7 The cost of 3 calculators is £26.85

(a) Work out the cost of 5 of these calculators.

(2)

The ratio of the number of boys to the number of girls in a class is 3 : 4

(b) What fraction of the class is boys?

(1)

Shane and Gemma share 35 sweets in the ratio 1 : 4

Gemma eats 10 of her sweets and then gives Shane $\frac{1}{2}$ of the sweets she has left.

(c) How many sweets does Shane have now?

(3)

(Total for Question 7 is 6 marks)

8 (a) Work out $\frac{9.76 + 1.031}{5.7 - 0.85}$

Give your answer correct to 2 decimal places.

(2)

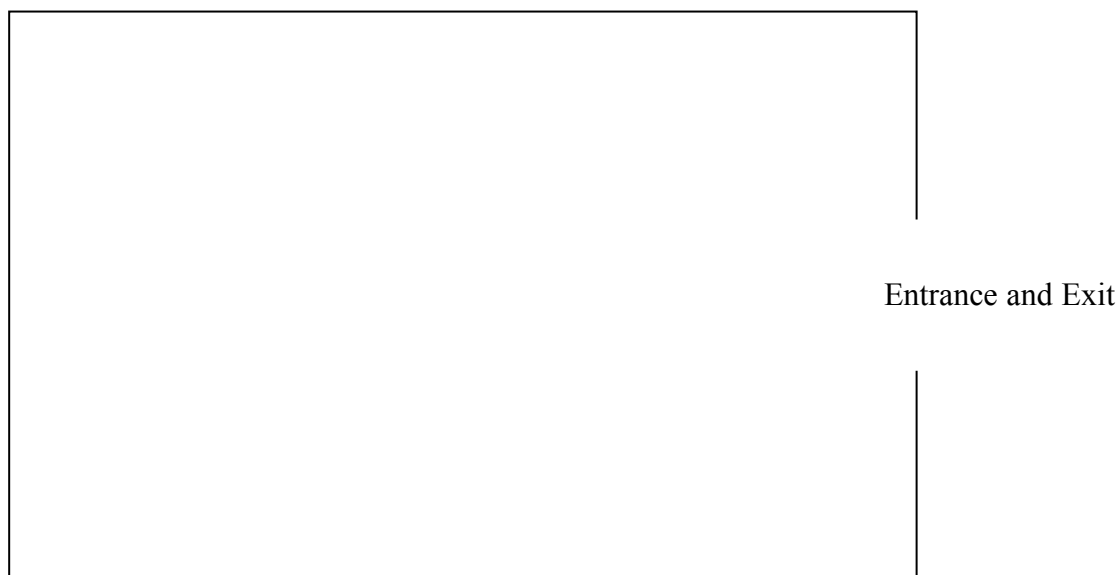
The area of a square is 42.25 m^2 .

(b) Find the length, in metres, of one side of the square.

(1)

(Total for Question 8 is 3 marks)

9 Here is a scale drawing of a car park.



Scale: 1 cm represents 2 m

There must be at least 5 m between rows of parking bays to enable cars to go in and out.

Stuart wants there to be 20 parking bays.

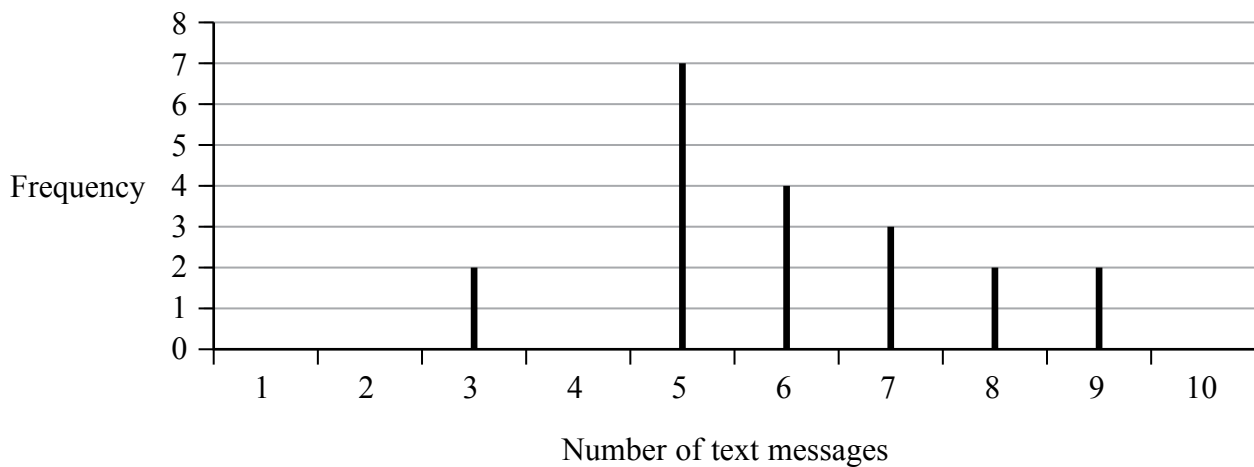
Is this possible?

You must show how you got your answer.

(Total for Question 9 is 3 marks)

10 Mrs Brown carried out a survey about the number of text messages received on one day by the students in her class.

The vertical line graph gives information about the number of text messages received by the boys.



(a) Write down the number of text messages that was the mode for the boys.

(1)

The mean number of text messages received on the same day by the girls was 6.5

(b) Who had the greater mean, the boys or the girls?
You must show how you got your answer.

(3)

(Total for Question 10 is 4 marks)

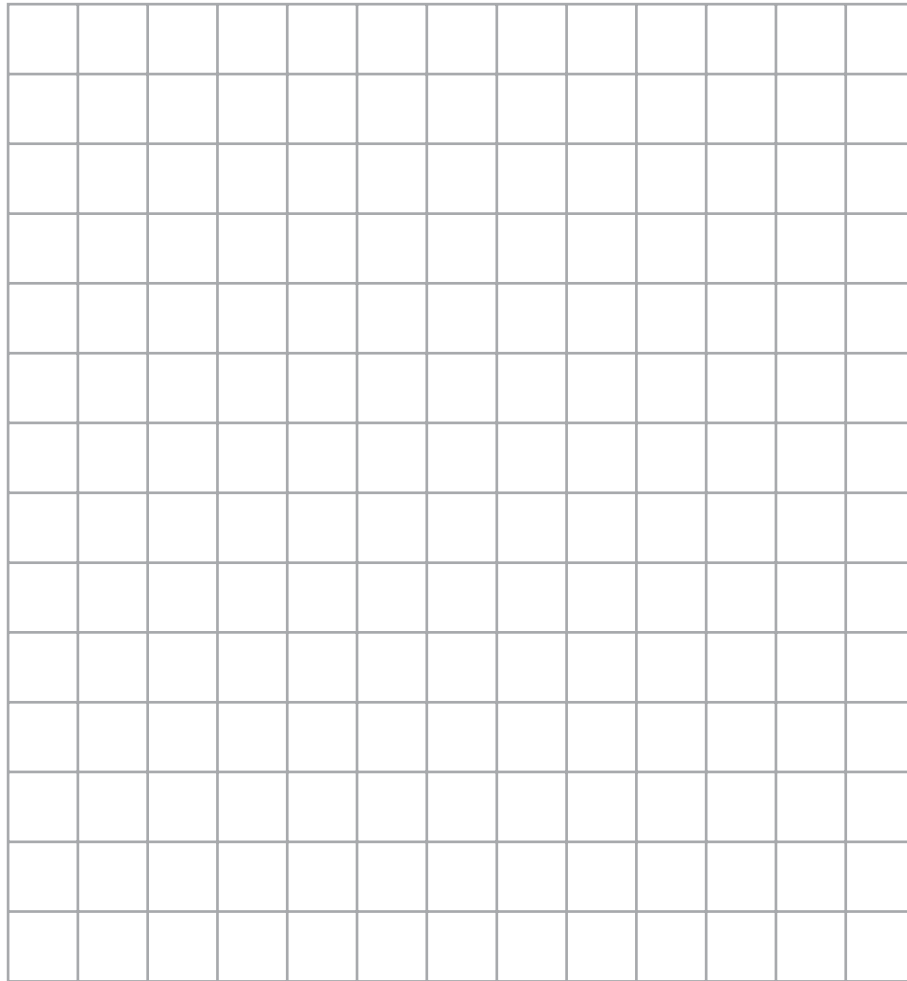
- 11** A has coordinates $(40, 60)$
 B has coordinates $(0, 20)$

A straight line passes through the points A and B .

The point P lies on this straight line.

The x -coordinate of P is 0.5 .

- (a) Find the y -coordinate of P .



(3)

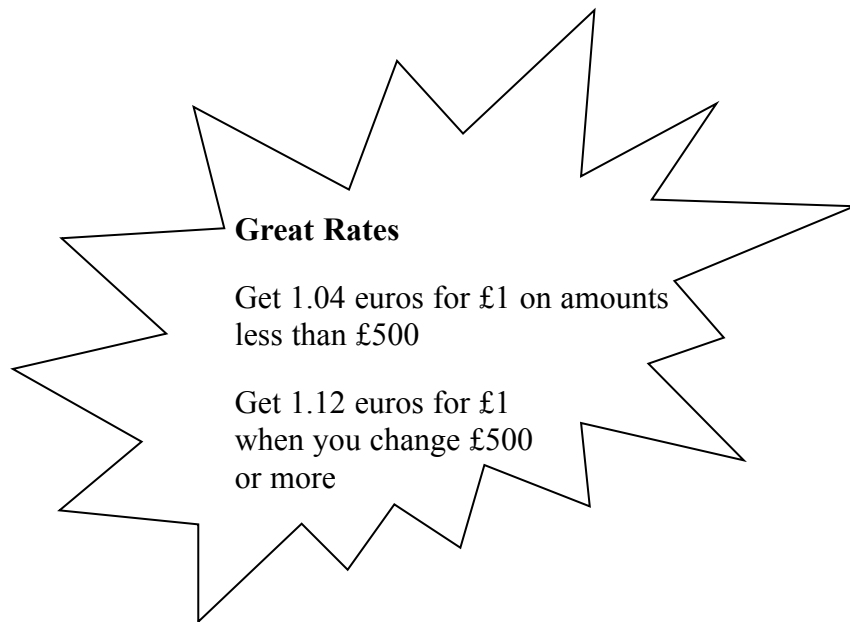
(b) Is your answer to part (a) reliable?
Explain your answer.

(1)

(Total for Question 11 is 4 marks)

12 Mr and Mrs Sharma are going to France.

They each have £300 which they want to change into euros.
They see this deal in a bank.



Mr and Mrs Sharma want the best deal.

They put their money together before changing it into euros.

How much extra money do they get by putting their money together before they change it?

(Total for Question 12 is 3 marks)

13 Stephen throws a fair dice until he gets a six.
Work out the probability that Stephen throws the dice

(i) exactly once

(ii) exactly twice

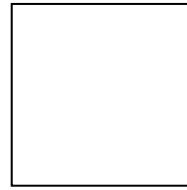
(iii) more than twice.

(Total for Question 13 is 4 marks)

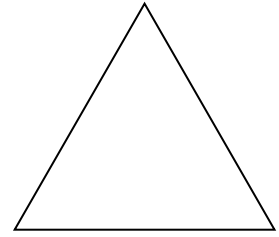
14 Here are a square and an equilateral triangle.

The length of a side of the square is x cm.

The length of a side of the equilateral triangle is 2 cm more than the length of a side of the square.



x cm



The perimeter of the square is equal to the perimeter of the equilateral triangle.

(a) Work out the perimeter of the square.

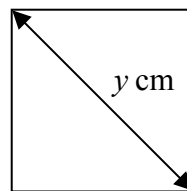
(3)

Here are the same square and the same equilateral triangle.

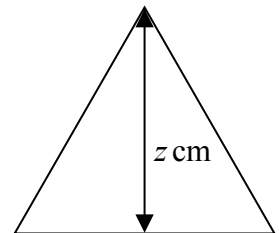
The length of the diagonal of this square is y cm.

The height of this equilateral triangle is z cm.

(b) Which has the greater value, y or z ?



x cm



(4)

(Total for Question 14 is 7 marks)

15 Linda keeps chickens.
She sells the eggs that her chickens lay.

She has 140 chickens.
Each chicken lays 6 eggs a week.

Linda gives each chicken 100 g of chicken feed each day.
The chicken feed costs £6.75 for a 25 kg bag.

Work out the cost of the chicken feed for every 12 eggs.

(Total for Question 15 is 5 marks)

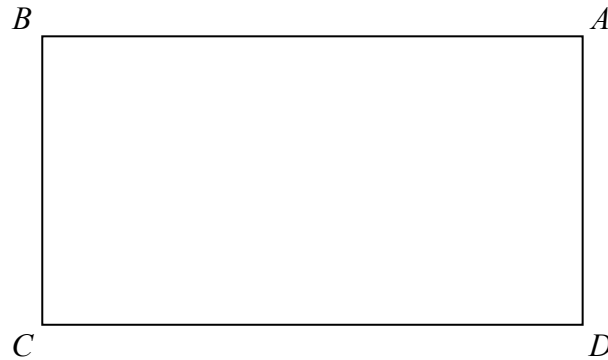
16 Bella invests £5000 in an account for two years.
The account pays 3% compound interest per annum.

Bella has to pay 20% tax on the interest earned each year.
This tax is taken from the account at the end of each year.

How much money will Bella have in her account at the end of the two years?

(Total for Question 16 is 4 marks)

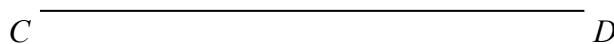
17 The diagram shows a rectangle $ABCD$.



In the space below, use a ruler and a pair of compasses to construct a right-angled triangle equal in area to the area of the rectangle $ABCD$.

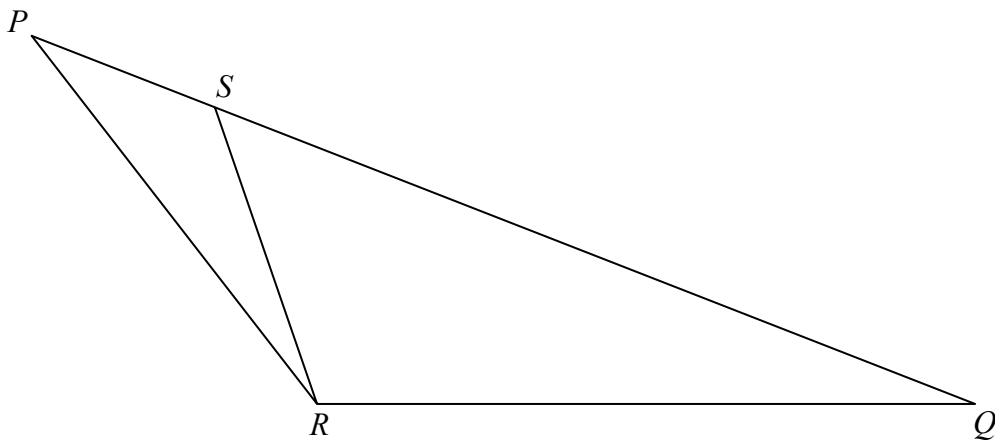
You must show all your construction lines.

The base of the triangle, which is equal in length to the side CD , has been drawn for you.



(Total for Question 17 is 3 marks)

18 Triangle PQR is similar to triangle PRS .



PSQ is a straight line

Angle $PQR =$ angle PRS .

$PS = 2$ cm.

$PR = 5$ cm.

Work out the length of SQ .

(Total for Question 18 is 3 marks)

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Please turn the page over for question 19

19 Some students watched a film.

James recorded the heart rates, in beats per minute, of the students after they had watched the film.

The back-to-back stem and leaf diagram gives information about his results.

| Female | | Male |
|-----------|----|-----------|
| 8 5 | 7 | 6 7 9 |
| 7 5 4 3 0 | 8 | 3 5 7 8 |
| 9 8 6 1 | 9 | 2 3 5 7 8 |
| | 10 | 1 3 7 |

Key

5|7 represents 75 beats per minute for female students

7|6 represents 76 beats per minute for male students

- (a) Compare the distribution of the heart rates of the female students and the distribution of the heart rates of the male students.

(3)

13 of the 26 students like comedy films.
16 of the 26 students like science fiction films.
5 of the 26 students like both comedy and science fiction films.

(b) Draw a Venn diagram to show this information.

(3)

(Total for Question 19 is 6 marks)

TOTAL FOR PAPER IS 80 MARKS

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Foundation tier Paper 3 – Calculator

| Question | Working | Answer | Mark type | AO | Notes |
|-----------|---------|--------------------------------|-----------|--------------|--|
| 1 (a) | | -8, -5, -3, 0, 3, 7 | B | 1.3a | B1 accept in reverse order |
| 1 (b) | | 0.05, 0.09, 0.5, 0.59, 0.95 | B | 1.3a | B1 accept in reverse order |
| 1 (c) | | 1, 2, 4, 5, 10, 20 | M A | 1.3a 1.3a | M1 for at least 3 factors A1 for all factors with no additions |
| 2 (a) (i) | | faces | B | 1.1a | B1 |
| (ii) | | radius | B | 1.1a | B1 |
| (b) | | | P | 2.2 | P1 for adding given angles or subtracting given angles from 360° |
| | | | C | 2.2 | C1 for conclusion, e.g. comparing total with 360° or showing that x is 80° and not 90° |
| 3 (a) | | 32, 39 | B | 1.3a | B1 |
| 3 (b) | | 16 | B | 1.3a | B1 |
| 4 (a) | | £328.60 | M A | 1.3b 1.3b | M1 for $9.30 \times 30 + 12.40 \times 4$ A1 for £328.60 (must be in correct monetary notation) |
| 4 (b) | | 38 hours | P P | 3.1d 3.1d | P1 for starting to solve the problem, e.g. $\text{£}319.80 - \text{£}7.80 \times 35 (= \text{£}46.80)$ P1 for a complete process to solve the problem, e.g. " $\text{£}46.80" \div \text{£}15.60 (= 3)$ |
| | | | A | 1.3b | A1 cao |

| Question | Working | Answer | Mark type | AO | Notes |
|----------|-----------------------|-----------------|-------------|----------------------|---|
| 5 (a) | | $p + c$ | B | 1.3a | BI |
| 5 (b) | | 82.4°F | M A | 1.3a 1.3a | M1 for correct substitution A1 cao |
| 5 (c) | | 4.5 | M A | 1.3a 1.3a | M1 for subtracting 20 from both sides or dividing all terms by 4 A1 for 4.5 oe |
| 5 (d) | | $x(3x - 2)$ | B | 1.3a | BI |
| 6 (a) | | $\frac{21}{64}$ | M A | 1.3a 1.3a | M1 for a fully complete and correct method A1 cao |
| 6 (b) | | $\frac{53}{64}$ | P A | 2.3a 1.3a | P1 for interpreting information, e.g. recognising that the shaded area = $\frac{3}{4} + (\frac{1}{4} \times \frac{1}{4}) + (\frac{1}{4} \times \frac{1}{4} \times \frac{1}{4})$ or adding in lines to diagram to show 64ths A1 for $\frac{53}{64}$ or ft $\frac{1}{2}$ + their answer to (a) |
| 7 (a) | | £44.75 | M A | 1.3b 1.3b | M1 for $26.85 \div 3$ A1 |
| 7 (b) | | $\frac{3}{7}$ | B | 1.3a | BI |
| 7 (c) | | 16 | P P A | 3.1d 3.1d 1.3b | P1 for starting to solve problem, e.g. $35 \div 5 (=7)$ P1 for complete process to solve problem, e.g. $7 + (28 - 10) \div 2$ A1 cao |
| 8 (a) | $\frac{10.791}{4.85}$ | 2.22 | M A | 1.3a 1.3a | M1 for a correct order of operation equivalent to dividing 10.791 by 4.85 (= 2.22...) A1 cao |

| Question | Working | Answer | Mark type | AO | Notes |
|----------|---------|--|-----------|------|---|
| 8 (b) | | 6.5 (m) | B | 1.3a | B1 |
| 9 | | Yes with explanation of the position of the bays | P | 2.3a | P1 for interpreting the information, e.g. using the scale with the dimensions of the car park as 24 m by 15 m or the dimensions of a bay as 2.4 cm by 1.2 cm |
| | | | P | 2.1a | P1 for a correct process to deduce the number of bays/row from, e.g. $24 \div 2.4 (= 10)$ or $12 \div 1.2 (= 10)$ or an attempt to position the bays correctly in a different orientation |
| | | | C | 2.3b | C1 for "Yes" with a row of 10 bays on either side of the entrance/exit; could be shown on the diagram |
| 10 (a) | | 5 | C | 2.3a | C1 for correct interpretation from diagram |
| 10 (b) | | Girls with correct figures (boys have mean of 6) | P | 2.3a | P1 for an interpretation of the diagram, e.g. 2, 7, 4, 3, 2 or $2 + 7 + 4 + 3 + 2 + 2 (= 20)$ |
| | | | M | 1.3b | M1 for a correct process to find the mean of the boys, e.g. $(3 \times 2' + 5 \times 7' + 6 \times 4' + 7 \times 3' + 8 \times 2' + 9 \times 2') \div '20'$ |
| | | | P | 2.3b | P1 for an answer of 'girls' with mean of 6 for boys |

| Question | Working | Answer | Mark type | AO | Notes |
|----------|---------|--------------------------|-----------|------|--|
| 11 (a) | | 20.5 | P | 3.1b | P1 for a correct start to a correct process to identify the required straight line, e.g. a sketch showing points (40, 60) and (0, 20) joined with a line segment or a correct process to find the gradient of a line between the two points, e.g. $\frac{60-20}{40-0}$ (=1) P1 for a correct process using scale factors, e.g. showing two similar triangles with the line crossing the x-axis or for a correct process using $y = mx + c$ to find the value of c (= 20) or $y = x + 20$ A1 for 20.5 |
| 11 (b) | | decision and explanation | C | 3.4b | C1 for a decision on the reliability of their answer to part (a) with valid explanation eg no I have drawn a line on the grid and my line may not be accurate (need both the decision and an explanation to gain the mark) |
| 12 | | €48 or £42.86 | P | 3.1c | P1 for a correct process, using the lower rate, to find the amount by changing their money separately, e.g. $300 \times 1.04 \times 2$ (= 624) P1 for a correct process, using the higher rate, to find the amount by changing their money together, e.g. $300 \times 2 \times 1.12$ (= 672) resulting in two values to compare A1 for 48 euros or £42.85 or £42.86 if converted to sterling, units must be clear |

| Question | Working | Answer | Mark type | AO | Notes |
|----------|--|---------------------|------------------|------------------------------|---|
| 13 (i) | | $\frac{1}{6}$ | B | 1.2 | B1 oe |
| (ii) | | $\frac{5}{36}$ | B | 1.3a | B1 oe |
| (iii) | | $\frac{25}{36}$ | M | 1.3b | M1 for $1 - \frac{1}{6} - \frac{5}{36}$ or $\left(1 - \frac{1}{6}\right) \times \left(1 - \frac{1}{6}\right)$ |
| | | | A | 1.3b | A1 oe OR M1 for 1 – “(i)” – “(ii)” A1 ft provided answer is less than 1 |
| 14 (a) | $4x = 3x + 6$ $x = 6$ 4×6 | 24 (cm) | P | 3.1b | P1 for translating the problem into an algebraic equation, e.g. $x + x + x + 2 = x + 2 + x + 2 + x + 2$ oe P1 for collecting terms and solving for x oe A1 24 cao |
| 14 (b) | $y^2 = 6^2 + 6^2$ $y = \sqrt{72}$ $z^2 = 8^2 - 4^2$ $z = \sqrt{48}$ | $y > z$ with reason | P M M C | 2.3a 1.3b 1.3b 2.1a | P1 for interpreting information, e.g. numerical values for sides on square and triangle M1 for a correct method to find y or z M1 for a correct method to find y and z C1 conclusion based on at least P1 consistent with candidate's figures for y and z or y^2 and z^2 |

| Question | Working | Answer | Mark type | AO | Notes |
|----------|---------|----------|-----------|------|--|
| 15 | | 38p | P | 3.1d | P1 for a correct first step, e.g. 140×6 (= 840 eggs per week) P1 for a correct process to find the weight of feed per week, e.g. $100 \times 140 \times 7$ (= 98000g or 98 kg) P1 for a correct method to find the weekly cost, e.g. $6.75 \div 25 \times "98"$ (= £26.46) P1 for completing the process to find the cost of feed required for 12 eggs, e.g. $(2646 \div 840) \times 12 = 37.8p$ A1 for 37.8p or 38p oe |
| 16 | | £5242.88 | P | 3.1d | P1 for a correct first step in the process, e.g. 5000×0.03 (= 150) or $3 \times 0.8 = 2.4\%$ P1 for a correct process in finding the effect of the 20% tax on interest (ie "150"), e.g. " $150" \times 0.8$ (= 120) or 5000×1.024 P1 (dependent on previous P marks) for a fully complete and correct process to find balance after 2 years, e.g. $(5000 + "120") + (5000 + "120") \times 0.03 \times 0.8$ or $5000 \times (1.024)^2$ A1 cao |

| Question | Working | Answer | Mark type | AO | Notes | | | | | | | | | | | | | | | | | | | | | |
|----------|--|---|-----------|------|---|----|----|----|----|----|--------|----|----|----|----|----|----|----|-----|-------|----|----|-------------|---|------|---|
| 17 | | A correct right-angled triangle constructed | P | 2.3a | P1 for a construction of a right angle at C or D (construction arcs must be seen) | | | | | | | | | | | | | | | | | | | | | |
| | | | P | 2.3b | P1 (indep) for the correct height of the triangle drawn or shown | | | | | | | | | | | | | | | | | | | | | |
| | | | P | 2.3b | P1 for a fully correct constructed triangle | | | | | | | | | | | | | | | | | | | | | |
| 18 | | 10.5 cm | P | 3.1b | P1 for comparing correct corresponding sides, e.g. developing a scale factor of 2.5 ($= 5 \div 2$) | | | | | | | | | | | | | | | | | | | | | |
| | | | P | 3.1b | P1 for a fully correct and complete process to find the length of PQ, e.g. " $2.5'' \times 5$ ($= 12.5$)" | | | | | | | | | | | | | | | | | | | | | |
| | | | A | 1.3b | A1 for a correct answer of 10.5 ($= 12.5 - 2$) cm | | | | | | | | | | | | | | | | | | | | | |
| 19 (a) | <table border="1"> <thead> <tr> <th></th> <th>F</th> <th>M</th> </tr> </thead> <tbody> <tr> <td>Lv</td> <td>75</td> <td>76</td> </tr> <tr> <td>Lq</td> <td>80</td> <td>83</td> </tr> <tr> <td>Median</td> <td>85</td> <td>92</td> </tr> <tr> <td>Uq</td> <td>96</td> <td>98</td> </tr> <tr> <td>Hv</td> <td>99</td> <td>107</td> </tr> <tr> <td>Range</td> <td>24</td> <td>31</td> </tr> </tbody> </table> | | F | M | Lv | 75 | 76 | Lq | 80 | 83 | Median | 85 | 92 | Uq | 96 | 98 | Hv | 99 | 107 | Range | 24 | 31 | Comparisons | C | 2.3a | C1 for a correct interpretation of diagram, e.g. correct median, LQ or UQ |
| | F | M | | | | | | | | | | | | | | | | | | | | | | | | |
| Lv | 75 | 76 | | | | | | | | | | | | | | | | | | | | | | | | |
| Lq | 80 | 83 | | | | | | | | | | | | | | | | | | | | | | | | |
| Median | 85 | 92 | | | | | | | | | | | | | | | | | | | | | | | | |
| Uq | 96 | 98 | | | | | | | | | | | | | | | | | | | | | | | | |
| Hv | 99 | 107 | | | | | | | | | | | | | | | | | | | | | | | | |
| Range | 24 | 31 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | C | 2.3b | C1 for a correct comparison of a measure of central tendency (must be in context of the data) | | | | | | | | | | | | | | | | | | | | | |
| | | | C | 2.3b | C1 for a correct comparison of a measure of spread (must be in context of the data) | | | | | | | | | | | | | | | | | | | | | |
| 19 (b) | | Correct Venn diagram | P | 2.3a | P1 for two overlapping circles with 5 in the overlap | | | | | | | | | | | | | | | | | | | | | |
| | | | P | 2.3a | P1 for 8 in 'comedy' or 11 in 'science fiction' | | | | | | | | | | | | | | | | | | | | | |
| | | | C | 2.3b | C1 for a fully correct Venn diagram with labels | | | | | | | | | | | | | | | | | | | | | |