Write your name here

Surname		Other names

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

Centre Number

Candidate Number

Mathematics
Paper 1 (Non-Calculator)

Foundation Tier

Sample Assessment Materials for first teaching September 2015 **Time: 1 hour 30 minutes**	Paper Reference **1MA1/1F**

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 not be used.**
- 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 ▶

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Pearson Edexcel Level 1/Level 2 GCSE (9 – 1) in Mathematics
Sample Assessment Materials – Issue 1 – September 2014 © Pearson Education Limited 2014

5

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 stages in your working.

1 (a) Work out $16 - 6 \times 2$

(1)

(b) Write 0.7 as a percentage.

(1)

(c) Write $\dfrac{3}{5}$ as a decimal.

(1)

(d) Find 15% of 120

(2)

(Total for Question 1 is 5 marks)

2 (a) Solve $4x = 20$

(1)

(b) Solve $y - 9 = 17$

(1)

(Total for Question 2 is 2 marks)

3 Dan buys 24 packets of nuts.
Each packet of nuts weighs 225 g.

(a) Work out the total weight of all the packets of nuts that Dan buys.

(2)

Susan is going to have a party.
There will be 50 people at the party.

Susan wants to buy enough sausages so that each person at the party can have 2 sausages.

There are 8 sausages in each pack.
Susan buys 12 packs of sausages.

(b) Has she bought enough sausages?

(3)

(Total for Question 3 is 5 marks)

4 (a) Write down the 20th odd number.

(1)

The sum of two consecutive odd numbers is 48

(b) Find the smaller of these two odd numbers.

(2)

Here are the first five terms of an arithmetic sequence.
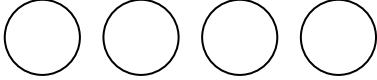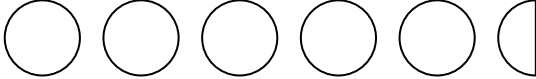
$$5 \qquad 8 \qquad 11 \qquad 14 \qquad 17$$

(c) Is 42 a term of this sequence?
Show how you get your answer.

(2)

(Total for Question 4 is 5 marks)

5 Ajay owns a cafe.
The pictogram shows information about the number of each type of fruit he has in the cafe.

Apples	◯ ◯ ◯ ◯
Oranges	◯ ◯ ◯ ◯ ◯ ◖
Bananas	◯ ◯ ◿

Key

◯

represents 4 pieces of fruit

It takes 7 oranges to make 500 m*l* of orange juice.

Ajay has to make $1\frac{1}{2}$ litres of orange juice.

Has Ajay enough oranges?
You must show all your working.

(Total for Question 5 is 3 marks)

6 Shazia buys 10 boxes of drinks.

The cost of each box of drinks is £5
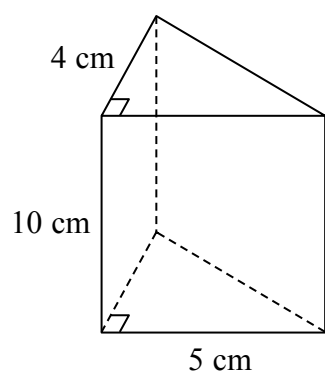Each box holds 12 cans of drink.

Shazia sells $\dfrac{2}{3}$ of the total number of cans for 60p each.

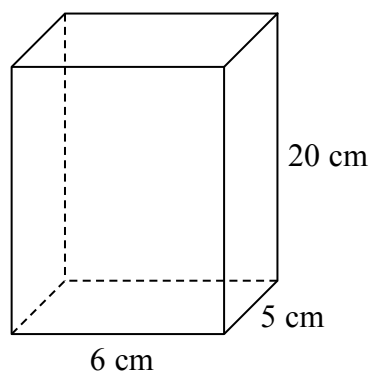She then sells all the remaining cans for 30p each.

Work out the total profit that Shazia makes.

(Total for Question 6 is 5 marks)

7 The diagram shows a right-angled triangular prism **A** and a cuboid **B**.

4 cm

10 cm

5 cm

A

20 cm

5 cm

6 cm

B

Show that the volume of **B** is 6 times the volume of **A**.

(Total for Question 7 is 3 marks)

8   Carpet tiles are going to be used to cover a floor.

The floor is a 1200 mm by 1000 mm rectangle.
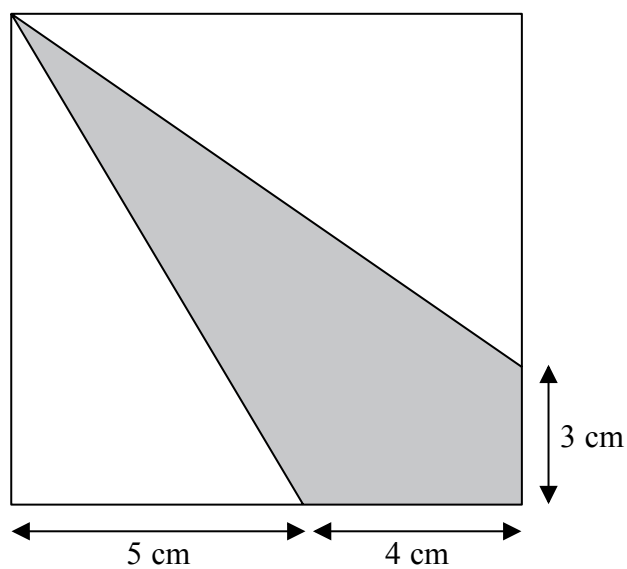Each carpet tile is a 40 cm by 30 cm rectangle.

Exactly 10 carpet tiles can be used to cover the floor completely.

Show in a labelled sketch how this can be done.

(Total for Question 8 is 3 marks)

9 The diagram shows a shaded quadrilateral inside a square.

3 cm

5 cm   4 cm

Work out the area of the shaded quadrilateral.

(Total for Question 9 is 4 marks)

10 There are 3 red beads and 1 blue bead in a jar.
A bead is taken at random from the jar.

(a) What is the probability that the bead is blue?

(1)

There are 4 yellow counters and 3 green counters in a bag.

Sharon puts some more green counters into the bag.
The ratio of the number of yellow counters to the number of green counters is now 2 : 5

(b) How many green counters did Sharon put into the bag?
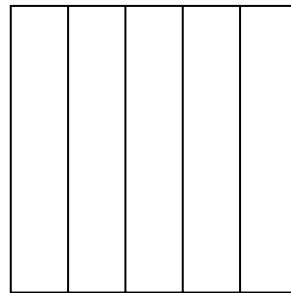
(2)

(Total for Question 10 is 3 marks)

11 Here are two identical squares.

The first square is divided into four equal parts.
The second square is divided into five equal parts.
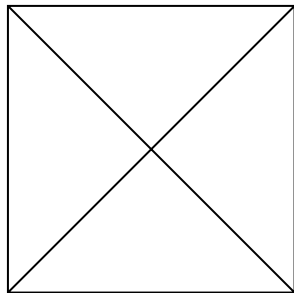
The two squares are joined together as shown to make a rectangle.
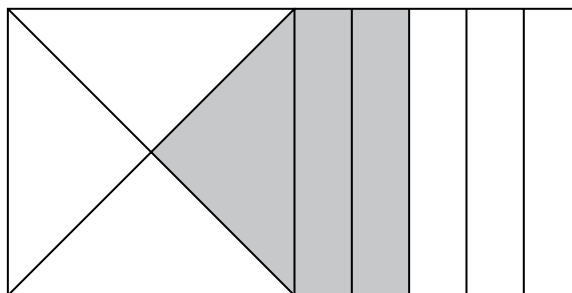
What fraction of the rectangle is shaded?

(Total for Question 11 is 3 marks)

12 The diagram shows three sides of a regular polygon.
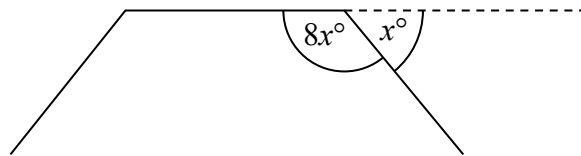
The size of each exterior angle of the regular polygon is $x°$.
The size of each interior angle of the regular polygon is $8x°$.

Work out the number of sides the regular polygon has.

(Total for Question 12 is 3 marks)

13 Liam, Sarah and Emily shared some money in the ratio 2 : 3 : 7
Emily got £80 more than Liam.

How much money did Sarah get?

(Total for Question 13 is 3 marks)

14 The table shows the life expectancy (in years) for males born in the UK from 2000 to 2012.

Year of birth	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Life expectancy (years)	75.4	75.7	75.8	76.1	76.6	76.9	77.2	77.4	77.6	78.1	78.4	78.8	79.0

(Data from statistics.gov.uk)

(a) Use this information to predict the life expectancy of a male born in 2030.
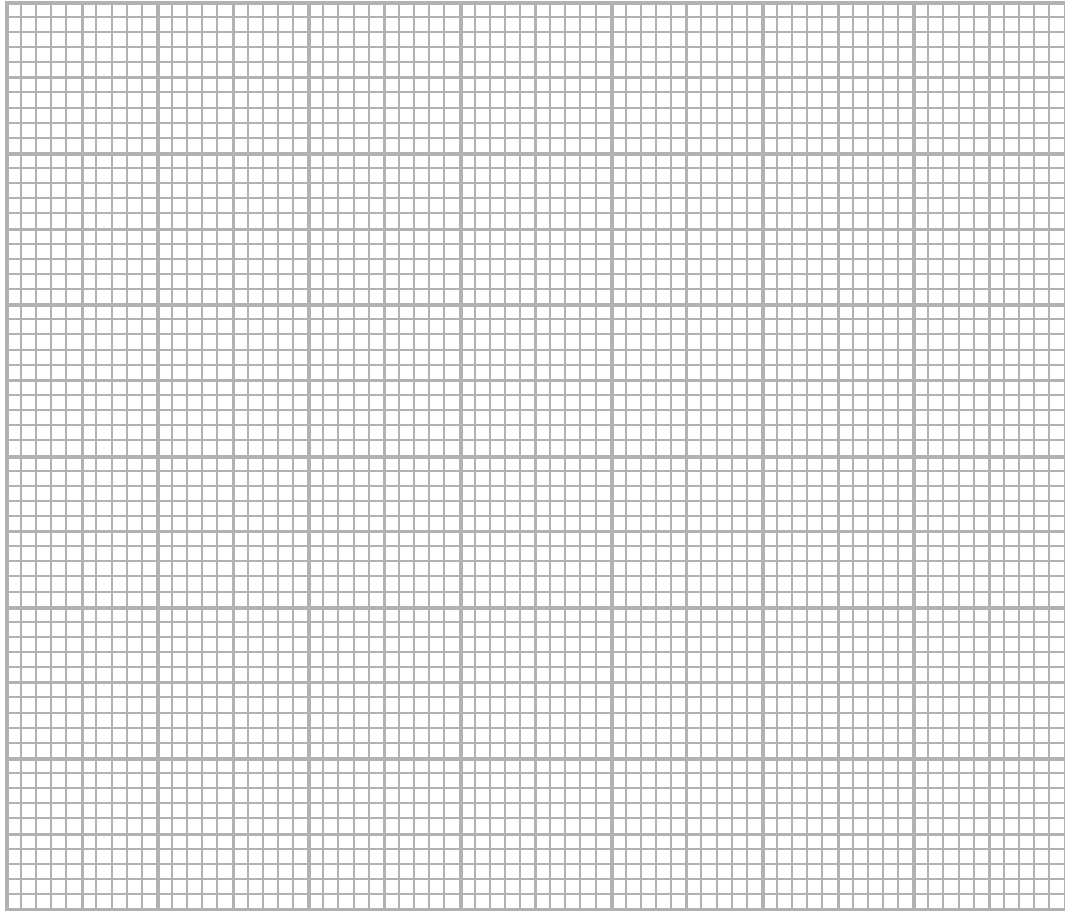
(4)

(b) Make two comments explaining why your prediction in part (a) may not be reliable.

(2)

(Total for Question 14 is 6 marks)

15 Given that $A = 2^4 \times 3^3 \times 5$ and $B = 2^3 \times 3 \times 5^2$

write down, as a product of powers of its prime factors,

(i) the highest common factor (HCF) of A and B

(ii) the lowest common multiple (LCM) of A and B.

(Total for Question 15 is 2 marks)

16 A rectangular piece of card *ABCP* is placed on a horizontal straight line.

The card is first rotated 90° clockwise about *C*.
The card is then rotated 90° clockwise about *B*.
The card is then rotated 90° clockwise about *A*.

Draw the locus of the vertex *P*.

(Total for Question 16 is 3 marks)

17 (a) Solve the simultaneous equations $3x + 5y = 4$

$$2x - y = 7$$

(3)

(b) Find the integer value of x that satisfies both the inequalities

$$x + 5 > 8 \quad \text{and} \quad 2x - 3 < 7$$

(3)

(Total for Question 17 is 6 marks)

18 Modelling the planet Mercury as a sphere, it has a radius of 2440 km.

   (a) (i) Work out an estimate in square kilometres for the surface area of Mercury.

   (ii) Without carrying out a further calculation, give evidence to show whether your method gives you an underestimate or an overestimate for the surface area of Mercury.

   (3)

In July 2013, the spacecraft Messenger was near Mercury at a distance of 9.75×10^7 km from Earth.

Taking the speed of light to be 3×10^8 m/s,

(b) work out how long it takes light to travel a distance of 9.75×10^7 km.

(3)

(Total for Question 18 is 6 marks)

19 The graph gives information about how the temperature, $T\,°C$, of the atmosphere decreases as the height above ground level, h km, increases.
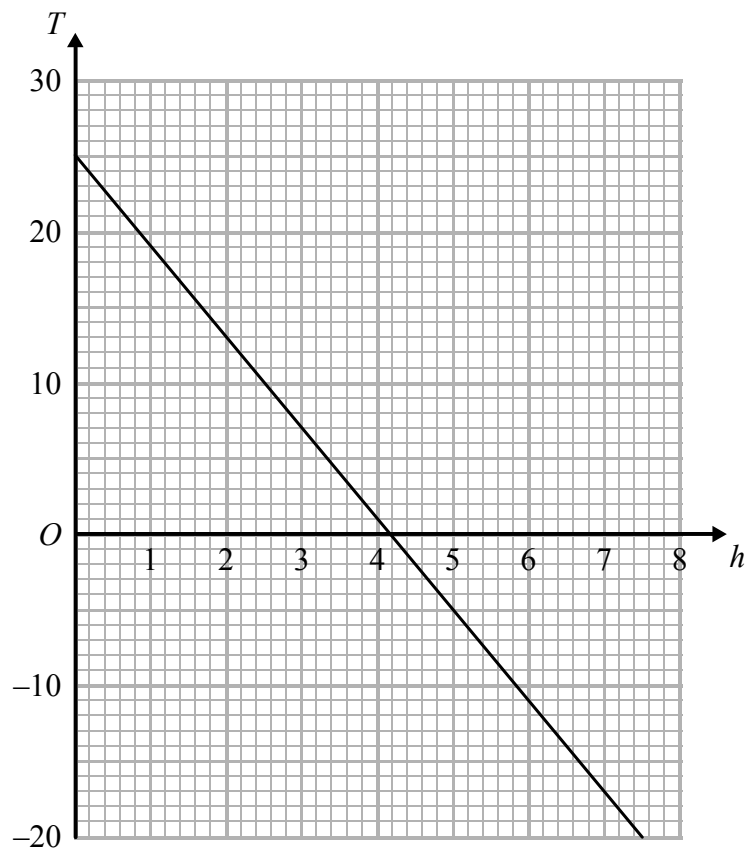
(a) Use the graph to estimate the temperature at a point 2.5 km above ground level.

(1)

A balloon rises up from ground level to a height of 5.5 km.

(b) Use the graph to estimate the decrease in temperature.

(2)

Jean says:

"The temperature falls 6 °C for every kilometre the balloon rises."

(c) What evidence is available from the graph to support this?

(4)

(Total for Question 19 is 7 marks)

20 Michael carried out a survey of the time, in minutes, it takes the 20 people in his office to get to work. This table gives some information about his results.

Time (*t* minutes)	Frequency
$0 < t \leqslant 10$	8
$10 < t \leqslant 20$	6
$20 < t \leqslant 30$	1
$30 < t \leqslant 40$	4
$40 < t \leqslant 50$	1

Michael used this information to work out the mean of the times taken.
He got an answer of 68 minutes.

(a) Explain why it is impossible for the mean time to be 68 minutes.

(1)

The 20 people in the survey had:
a mean age of 45 years
a median age of 41 years

Michael decides to include his age so that he works out the mean age and median age of 21 people.
Michael is 42 years old.

Here are two statements about the ages of the 21 people.

Statement 1:   The mean age of the 21 people is less than 45 years.

Statement 2:   The median age of the 21 people is more than 41 years.

(b) (i) Is statement 1 correct?
        You must give a reason to support your answer.

    (ii) Is statement 2 correct?
        You must give a reason to support your answer.

(2)

(Total for Question 20 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS
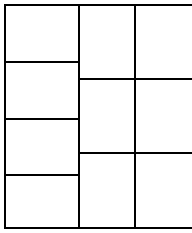
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Foundation tier Paper 1 – Non-calculator

Question		Working	Answer	Mark	AO	Notes
1	(a)		4	B	1.3a	B1
1	(b)		70%	B	1.3a	B1
1	(c)		0.6	B	1.3a	B1
1	(d)		18	M	1.3a	M1 for 0.15×120 oe
				A	1.3a	A1 cao
2	(a)		5	B	1.3a	B1
2	(b)		26	B	1.3a	B1
3	(a)		5400 g or 5.4 kg	M	1.3a	M1 for a complete correct method for multiplication with no more than one multiplication error
				A	1.3a	A1 cao
3	(b)		Deduction, e.g. No with 100 and 96	P	3.1c	P1 start to solve problem, e.g. 50×2 or 8×12
				M	1.3a	M1 show sufficient calculations that would enable a deduction to be made, e.g. 50×2 and 8×12 **or** 50×2 and $50 \times 2 \div 8$
				C	2.1a	C1 deduction from accurate figures
4	(a)		39	B	1.3a	B1 cao
4	(b)		23	P	3.1a	P1 for a correct process to start to solve the problem, e.g. $48 \div 2$ or $23 + 25$
				A	1.3a	A1
4	(c)		No with justification	P	2.2	P1 for a start to the process, e.g. sight of $3n + 2$ or a correct continuation of sequence with an extra 3 terms
				C	2.4a	C1 for 'No' with full justification, e.g. if $3n + 2 = 42$

Question	Working	Answer	Mark	AO	Notes
					then $n = \dfrac{40}{3}$ which is not an integer value **or** complete sequence up to 41, 44 with statement that 42 is not in the sequence
5	$5 \times 4 + 2 \ (= 22)$ oranges $1.5 \times 1000 \div 500 \ (=3)$ '3' $\times 7 \ (=21)$	Yes with supporting evidence	P P C	2.3a 3.1b 2.3b	P1 for interpreting the key, e.g. $5 \times 4 + 2$ **or** 22 (oranges) P1 for complete process to find number of oranges needed C1 for 'yes' with 21 and 22
6	Cost price is £50 Total number is 120 $\dfrac{2}{3} \times 120 = 80$ Income from these is 60p $\times 80 = £48$ Income from the remainder is 30p $\times 40 = £12$ Profit = £48 + £12 − £50	£10	P P P P A	3.1d 3.1d 3.1d 3.1d 1.3b	P1 for a process to find the total cost of 10 boxes of drink and the total number of cans bought, e.g. $10 \times 5 \ (=50)$ and $10 \times 12 \ (=120)$ P1 for a process to find the number of cans sold for 60p, e.g. $\dfrac{2}{3} \times$ '120' $(= 80)$ oe P1 for a process to find the cost of cans sold for 60p e.g. '80' $\times$ 60p $(= £48)$ oe P1 for a process to find the cost of their remaining cans at 30p each, e.g. $(120 - '40') \times 30$p oe A1 cao

Question	Working	Answer	Mark	AO	Notes
7		Show	M	1.1	M1 for Use of correct formula for volume for triangular prism or cuboid, e.g. $\frac{1}{2}$ ×4×10×5(=100) **or** 6 × 20 × 5(= 600)
			P	2.2	P1 for beginning to construct chains of reasoning, e.g. $\frac{1}{2}$ ×4×10×5(=100) **and** 6 × 20 × 5 (= 600)
			C	2.2	C1 for completion of chains of reasoning, e.g. 600 ÷ 100 = 6
8	1200 ÷ 300 = 4 1200 ÷ 400 = 3 1000 = 400 + 300 + 300	Correct diagram with correct layout	M	1.1	M1 for changing to consistent units, e.g. 1000 ÷ 10 or 40 × 10
			P	2.3a	P1 for interpreting information and a process to fit tiles in floor area, e.g. may be seen on a sketch or may see a calculation
			C	2.3b	C1 for diagram to communicate a correct layout with lengths clearly identified
9	Square 9 × 9 =81 Bottom triangle $\frac{5\times9}{2} = \frac{45}{2}$ Top triangle $\frac{6\times9}{2} = \frac{54}{2}$ Shaded area 81 − 22.5 −27	31.5 cm²	P	3.1b	P1 for a process to establish the missing lengths on the perimeter of the shape
			P	3.1b	P1 for a process to begin the problem by finding the area of one relevant shape
			P	3.1b	P1 for complete process to find the shaded area, e.g. 9 × 9 − ('22.5' + '27')

Question	Working	Answer	Mark	AO	Notes
9 cont.	Or $\frac{1}{2} \times 4 \times (4+5) + \frac{1}{2} \times 3 \times (4+5)$		A	1.3b	A1 cao
10 (a)		$\frac{1}{4}$	B	1.2	B1 for $\frac{1}{4}$ oe
10 (b)		7	P	3.1c	P1 for process to start to solve problem, e.g. $2:5 = 4:10$
			A	1.3a	A1 cao
11		$\frac{13}{40}$	P	2.3a	P1 for interpreting diagrams eg. writing the area of the triangle section of the square as a quarter or writing the rectangular section as a fraction of the area of the square as two fifths
			P	3.1a	P1 for correct processes needed to solve problem, e.g. $\frac{1}{4} + \frac{2}{5} = \frac{1 \times 5 + 2 \times 4}{4 \times 5} \left(= \frac{13}{20} \right)$ **and** $\frac{1}{2} \times \frac{13}{20}$, $\frac{13}{20}$
			A	1.3a	A1 for $\frac{13}{40}$ oe

Question		Working	Answer	Mark	AO	Notes
12			18	P	3.1b	P1 for a process to start to solve problem, e.g. $8x + x = 180$ or $180 ÷ 9$ (=20)
				P	3.1b	P1 for a full process to solve problem, e.g. $360 ÷$ '20'
				A	1.3b	A1 cao
13		$80 ÷ (7 – 2) (= 16)$ '16' $× 3$	£48	P	3.1d	P1 for a strategy to start to solve problem, e.g. $80 ÷ (7 – 2)$ (=16)
				P	3.1d	P1 for full process to solve problem, e.g. '16' $× 3$
				A	1.3b	A1 cao
14	(a)		84 to 85	P	2.3a	P1 for interpreting the data and deciding to draw a graph or a table to represent the data
				P	2.3b	P1 for a correct process to label axes or communicate the data connections
				P	3.1d	P1 drawing in an appropriate line of best fit or model the problem as a linear function in time
				A	1.3b	A1 for correctly reading off the value at 2030 in the range 84 to 85 or using their linear function correctly to give an answer in this range
	(b)			C	3.4b	C1 for a valid comment eg cannot assume a linear relationship
				C	3.4b	C1 for a valid comment eg that one cannot predict accurately with a date so far away from the original data
15	(i)		$2^3 × 3 × 5$	B	1.3a	B1 cao
	(ii)		$2^4 × 3^3 × 5^2$	B	1.3a	B1 cao

Question		Working	Answer	Mark	AO	Notes
16			locus (see diagram at the end)	C	2.3b	C1 for method of showing a rotation about one fixed point, e.g. quarter circle with radius PC centre C or radius PB centre B or PA centre A
				C	2.3b	C1 for understanding it is a continuous process, e.g. quarter circle with radius PC centre C and radius PB centre B and radius PA centre A
				C	2.3b	C1 for fully correct drawing
17	(a)	$3x + 5y = 4$ $10x - 5y = 35$ $13x = 39$	$x = 3, y = -1$	M	1.3b	M1 for correct method to eliminate one variable
				M	1.3b	M1 for correct method to find second variable
				A	1.3b	A1 for $x = 3$ and $y = -1$
17	(b)	$x + 5 > 8$ $x > 3$ $2x - 3 < 7$ $2x < 10$ $x < 5$	$x = 4$	B	1.3b	B1 for $x > 3$ or for $x < 5$
				B	1.3b	B1 for $x > 3$ **and** for $x < 5$
				B	1.3b	B1 for $x = 4$ from $x > 3$ and $x < 5$
18	(a) (i)	$4 \times 3 \times 2000^2$	48 000 000 km^2	M	1.3a	M1 for use of $4\pi r^2$ with either π or r rounded to 1 significant figure
				A	1.3a	A1 accept 50 000 000 km^2
	(ii)			C	3.4a	C1 for appropriate evaluation of method, e.g. 3 and 2000 both less than true values
18	(b)	$9.75 \times 10^7 \times 1000 \div (3 \times 10^8)$	325 s	M	1.3b	M1 for use of distance $\div$ time
				M	1.3b	M1 for consistent units
				A	1.3b	A1 cao

Question		Working	Answer	Mark	AO	Notes
19	(a)		10°C	B	1.3a	B1 for answer in range 9 – 11
19	(b)	25 – – 8	33°C	P	2.3a	P1 for a process to identify 25 as the temperature when $h = 0$ and when h is 5.5 and show an intention to subtract, e.g. 25 – – 8
				A	1.3a	A1 for 33°C cao
19	(c)		Explanation with –6	C	2.3a	C1 the graph is a straight line, e.g. the gradient is constant oe
				C	2.1b	C1 falling as the graph has a negative gradient (or gradient is –6)
				M	1.3a	M1 for method to find gradient
				A	1.3a	A1 for –6
20	(a)		Explanation	C	2.5a	C1 for explanation, e.g. 68 is outside the range of the data
	(b) (i)		Yes and reason	C	2.4a	C1 for Yes and reason, e.g. mean will go down as Michael's age is below the mean of the 20 people
	(ii)		Don't know and reason	C	2.4a	C1 for 'don't know' and reason, e.g. cannot tell as do not know other ages

Question 16: