# Collins

## Edexcel GCSE Mathematics

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### SET A – Paper 1 Higher Tier (Non-Calculator)

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## Time allowed: 1 hour 30 minutes

#### You must have:

 Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser.



You may not use a calculator

#### Instructions

- Use **black** ink or black ball-point pen.
- 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.

#### 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.
- 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.

#### Name:

#### Answer ALL questions.

#### Write your answers in the spaces provided.

#### You must write down all the stages of your working.

1 Find the lowest common multiple of 6, 15 and 40.

(Total for Question 1 is 3 marks)

Solve the equation  $\frac{x-1}{6} = \frac{10-x}{3}$ 

(Total for Question 2 is 3 marks)

3 The plan, front elevation and side elevation of a solid prism are shown below.



(a) Draw a sketch of the solid prism in 3 dimensions.

(b) Determine the volume of the prism.

(2)

(1)

(Total for Question 3 is 3 marks)

Matt wishes to travel from London to Aberdeen, calling in on his friends in Manchester and Glasgow.
From London to Manchester he can either fly, take the train or take a coach.
From Manchester to Glasgow he can either fly, take the train or take a coach.
From Glasgow to Aberdeen, he can either fly or take the train.
In how many different ways can he travel from London to Aberdeen?

(Total for Question 4 is 2 marks)

A sequence is generated by the term to term rule 'subtract 5', with the initial term being 100.

(a) Write down the first five terms in the sequence.

(b) Find a formula for the  $n^{\text{th}}$  term of the sequence.

(2)

(Total for Question 5 is 3 marks)

(1)

- 6 Write the following numbers in standard form.
  - **(a)** 33000

**(b)** 0.0082

(c)  $0.002 \times 10^{-4}$ 

(1)

(1)

(1)

(Total for Question 6 is 3 marks)

7 The following Venn diagram shows the distribution of 30 random students, all of whom are studying physics, chemistry or biology at GCSE level.



(a) Find the probability that a student selected at random studies biology.

(b) Find the probability that a student selected at random studies physics, given that they study chemistry.

(c) Find the probability that a student selected at random studies chemistry, given that they do not study biology.

(1)

(1)

(Total for Question 7 is 3 marks)

8 Given  $p = \frac{3-q}{3+q}$ , rearrange the formula to make q the subject.

(Total for Question 8 is 3 marks)

9 Expand and simplify the expression  $(2x - 1)^3$ 

(Total for Question 9 is 4 marks)

**10** The shape P is enlarged by a scale factor of  $-\frac{1}{2}$  from the point (-1, 0).

Draw the new shape on the grid provided.



(Total for Question 10 is 2 marks)

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Find the exact values of the following.

**(b)**  $\left(\frac{16}{25}\right)^{-\frac{3}{2}}$ 

(1)

(2)

(Total for Question 11 is 3 marks)

#### **12** The following graph is of the function $y = 2^x$



(a) On the same axes, reflect the graph in the line x = 0

(b) State the equation of the new graph.

(1)

(1)

(Total for Question 12 is 2 marks)

(Total for Question 13 is 2 marks)

#### 14 The following diagram shows a circle, centre *O*.

AB and BC are tangent lines.



Find the size of the following angles giving your reasons in each case.

<i>p</i> =			
Reason:			
<i>q</i> =	***		
Reason:			
<i>r</i> =	-		
Reason:			
		(Total for Ques	tion 14 is 3 marks)

**15** The following box plots illustrate the range of temperatures during one October month for Cyprus and Majorca.



(a) Calculate the interquartile range of temperatures for both Cyprus and Majorca.

	Cyprus:
	Majorca:
	(2)
(b)	Bill wishes to go on holiday in October, hoping for good weather.
	Suggest where he should choose and why.
	(2)
	(Total for Question 15 is 4 marks)

16 Given the sequence whose general term  $u_n = (2\sqrt{3})^n$ , find  $u_1 + u_2 + u_3 + u_4$ , expressing your answer in the form  $a + b\sqrt{3}$ , where *a* and *b* are constants to be determined.

(Total for Question 16 is 4 marks)

17 The ratio of brazil nuts to hazelnuts is 2:5

The ratio of hazelnuts to walnuts is 3:7

(a) Find the ratio of brazil nuts to walnuts.

(b) If there are 105 walnuts, calculate how many brazil nuts there are.

(1)

(3)

(Total for Question 17 is 4 marks)

**18** Express the fraction  $\frac{71}{90}$  as a recurring decimal.

(Total for Question 18 is 3 marks)

#### **19** (a) On the grid below, sketch the graph of $y = \tan x$



(b) Using your graph, solve the equation  $\tan x = \sqrt{3}$  for  $-180^{\circ} < x < 180^{\circ}$ 

(3)

(2)

(Total for Question 19 is 5 marks)

(Total for Question 20 is 7 marks)



(Total for Question 21 is 3 marks)

22 Write each of the following expressions in the form  $a + b\sqrt{5}$ , where a and b are rational numbers.

#### (a) $\sqrt{5}(2-\sqrt{5})^2$

**(b)** 
$$\frac{5}{5-3\sqrt{5}}$$

(3)

(2)

(Total for Question 22 is 5 marks)

23 (a) Sketch the graph of  $y = 2x^2 - 3x - 14$  on the grid below, showing clearly where the graph crosses the x and y-axes.



(4)

(b) Solve the inequality  $2x^2 - 3x - 14 > 0$ , giving your answer in set notation.

(2)

(Total for Question 23 is 6 marks)

#### **TOTAL FOR PAPER IS 80 MARKS**