Collins

Edexcel

GCSE

Mathematics

H

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.

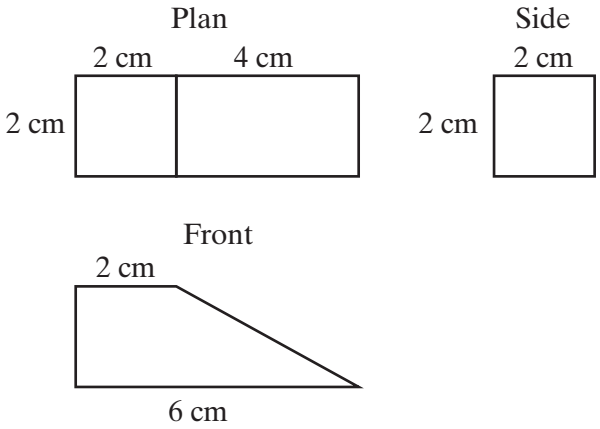
1 Find the lowest common multiple of 6, 15 and 40

(Total for Question 1 is 3 marks)

2 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.

(1)

(b) Determine the volume of the prism.

.....

(2)

(Total for Question 3 is 3 marks)

4 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)

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

(a) Write down the first 5 terms in the sequence.

.....

(1)

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

.....

(2)

(Total for Question 5 is 3 marks)

6 Write the following numbers in Standard Form.

(a) 33 000

(1)

(b) 0.0082

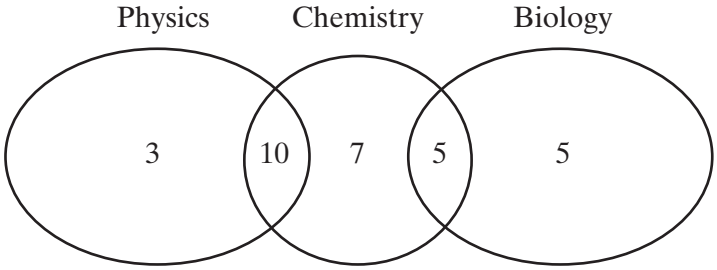
(1)

(c) 0.002×10^{-4}

(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.

(1)

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

(1)

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

(1)

(Total for Question 7 is 3 marks)

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

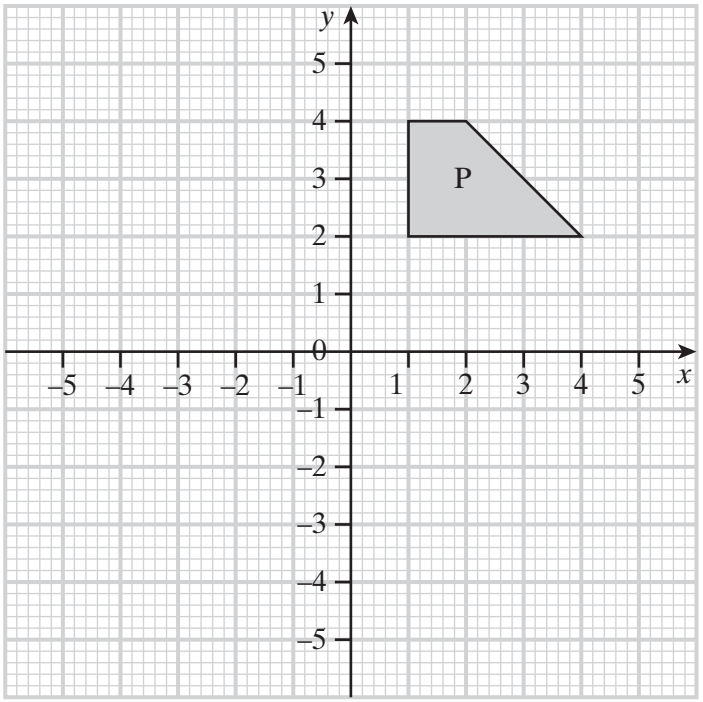
(Total for Question 8 is 3 marks)

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)

11 Find the exact values of the following.

(a) $64^{\frac{2}{3}}$

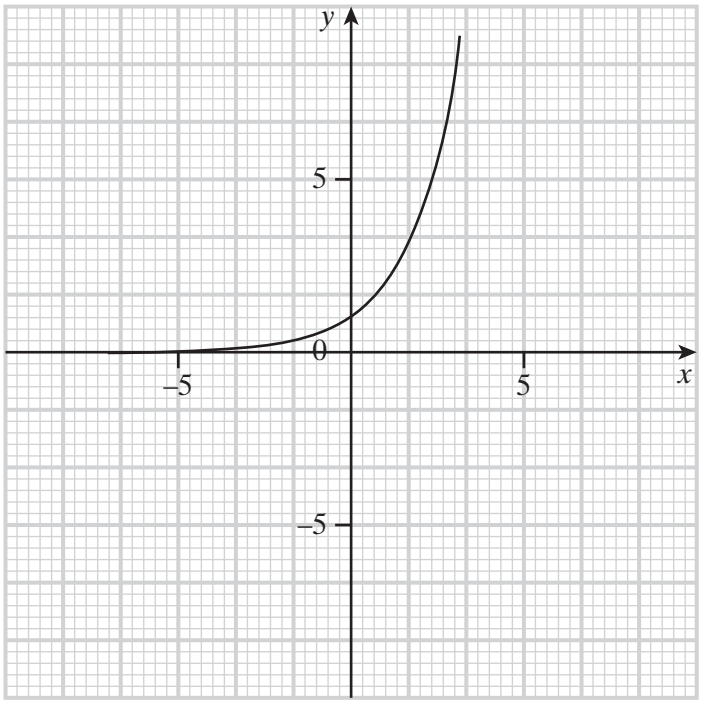
(1)

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

(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 $x = 0$

(1)

(b) State the equation of the new graph.

.....

(1)

(Total for Question 12 is 2 marks)

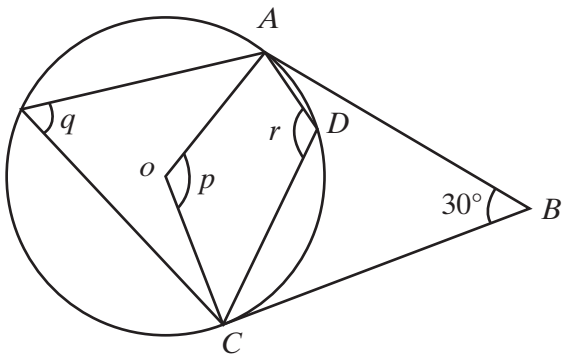
13 Factorise completely the expression $2x^2 - 32$

.....

(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.

p = ...

Reason: .....

q = ...

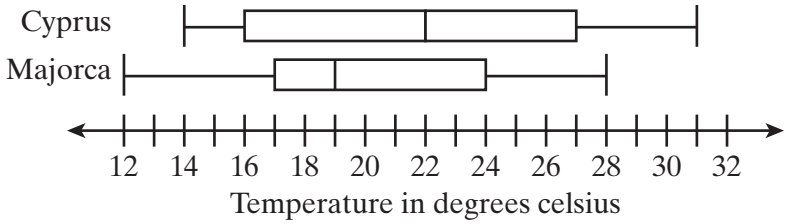
Reason: .....

r = ...

Reason: .....

(Total for Question 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.

(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.

(3)

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

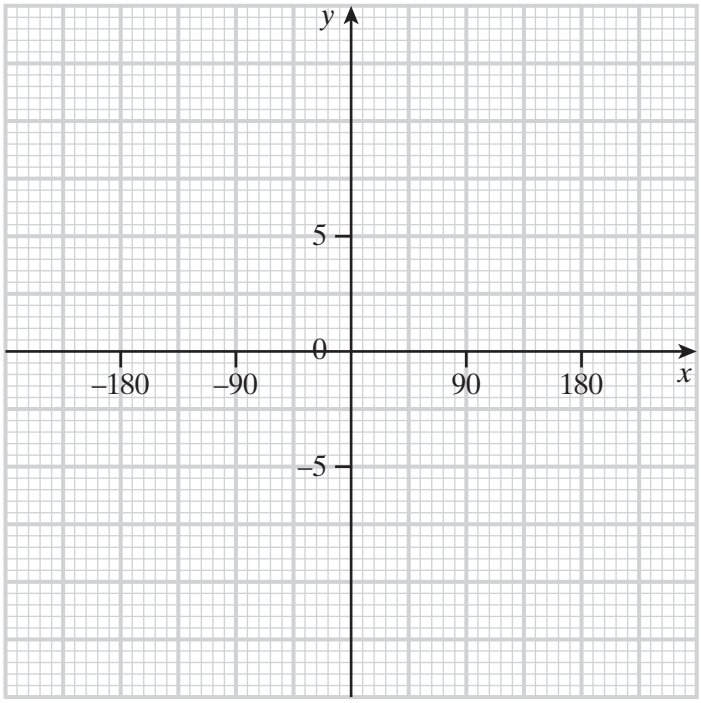
(1)

(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 $y = \tan x$



(2)

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

(3)

(Total for Question 19 is 5 marks)

20 Solve the simultaneous equations $y = 2x^2 - 3x + 5$ and $y = 8 - 2x$

(Total for Question 20 is 7 marks)

21 Prove that $(3n + 1)^2 - (3n - 1)^2$ is a multiple of 6 for all positive integers n.

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

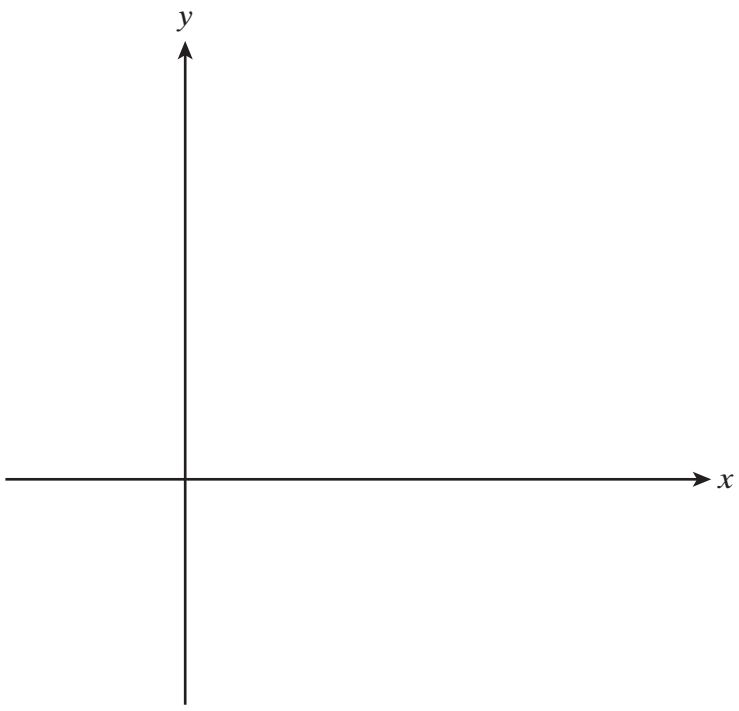
(2)

(b) $\dfrac{5}{5-3\sqrt{5}}$

(3)

(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