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0086434346689

MATHEMATICS **0580/21**

Paper 2 (Extended) **October/November 2021**

1 hour 30 minutes

You must answer on the question paper.

You will need: Geometrical instruments

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You should use a calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For π, use either your calculator value or 3.142.

INFORMATION

- The total mark for this paper is 70.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **12** pages.

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1 P is a prime number where $60 < P < 80$.
P is 2 less than a square number.

Find the value of P.

$P =$ ..... [2]

2 Hank flies from Los Angeles to Shanghai.

(a) The flight departs on Friday 22 July at 21 40.
The flight takes 13 hours 35 minutes.
The local time in Shanghai is 15 hours ahead of the local time in Los Angeles.

Find the day, date and time in Shanghai when Hank's flight arrives.

Day ....., Date ....., Time ..... [3]

(b) The cost of the flight is \$920.
The exchange rate is \$1 = 6.87 Chinese yuan.

Find the cost of the flight in yuan.

..... yuan [1]

3 Calculate.

$$\frac{4.87 - 2.7}{-0.2 + \sqrt[3]{0.729}}$$

..... [1]

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4 The number of items that each of 22 people buy in a supermarket is shown in the stem-and-leaf diagram.

1	1 3 6 6
2	0 2 2 2 4 8 9
3	1 1 5 8 9 9
4	2 4 6 7 8

Key: 1 | 1 represents 11 items

(a) Find the mode.

..... [1]

(b) Find the median.

..... [1]

5 The table shows the relative frequency of the games won by a football team.

Result of game	won	lost	drawn
Relative frequency	0.1		

The number of games lost is twice the number of games drawn.

Complete the table.

[3]

6 The scale drawing shows the positions of two towns, *P* and *Q*.
The scale is 1 cm represents 4 km.



Scale: 1 cm to 4 km

(a) Find the actual distance between town *P* and town *Q*.

..... km [2]

(b) Measure the bearing of town *Q* from town *P*.

..... [1]

(c) Town *X* is 28 km from town *P* on a bearing of 140°.

On the scale drawing, mark the position of town *X*. [2]

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7 **Without using a calculator**, work out $1\frac{5}{6}+\frac{2}{5}$.
You must show all your working and give your answer as a mixed number in its simplest form.

..... [3]

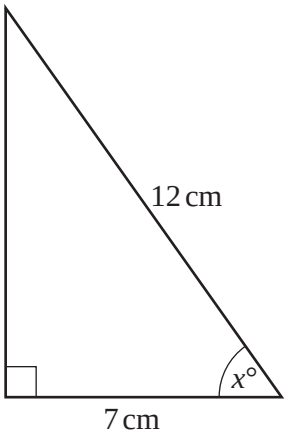
8 Solve the simultaneous equations.
You must show all your working.

$$4x-2y=-13$$
$$-3x+4y=\ 11$$

$x=$ .....

$y=$ ..... [3]

9



NOT TO SCALE

Calculate the value of x.

$x =$ ..... [2]

10 A regular polygon has an interior angle of 174°.

Find the number of sides of this polygon.

..... [2]

11 Line L has equation $y = 4 - 5x$.

Find the equation of a line that is perpendicular to line L and passes through the point (0, 6).

..... [3]

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12 Chai invests some money.
By the end of the first year, the value of the investment has decreased by 35%.
By the end of the second year, the value of the investment has increased by 40% of its value at the end of the first year.

Find the overall percentage change in the value of the investment.

..... % [3]

13 Solve.

$$4-3x \geqslant \frac{6-x}{5}$$

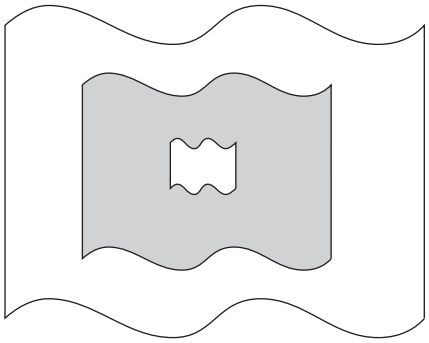
..... [3]

14 y is inversely proportional to the square root of $(x-2)$.
When $x = 4.25$, $y = 12$.

Find x when $y = 3$.

$x =$ ..... [3]

15



NOT TO SCALE

The diagram shows three shapes that are mathematically similar.
The heights of the shapes are in the ratio small : medium : large = 1 : 5 : 8.

Find the ratio shaded area : total unshaded area.
Give your answer in its simplest form.

..... : ..... [4]

16 Find the *n*th term of each sequence.

(a) 8, 15, 34, 71, 132, ...

..... [2]

(b) $\frac{2}{1}$, $\frac{3}{4}$, $\frac{4}{16}$, $\frac{5}{64}$, $\frac{6}{256}$, ...

..... [3]

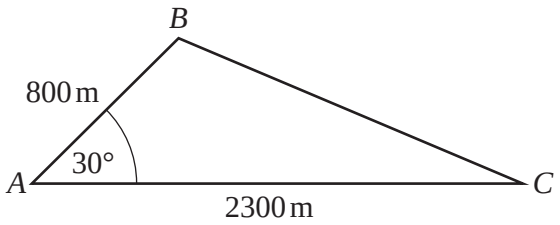
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17 $y = \dfrac{3x-2}{1-x}$

Make x the subject of the formula.

$x =$ ..... [4]

18



NOT TO SCALE

The diagram shows some land in the shape of a triangle ABC.
Houses are built on this land.
Each house requires $400\,m^2$ of land.

Find the greatest number of houses that can be built on this land.

..... [3]

19 Write as a single fraction in its simplest form.

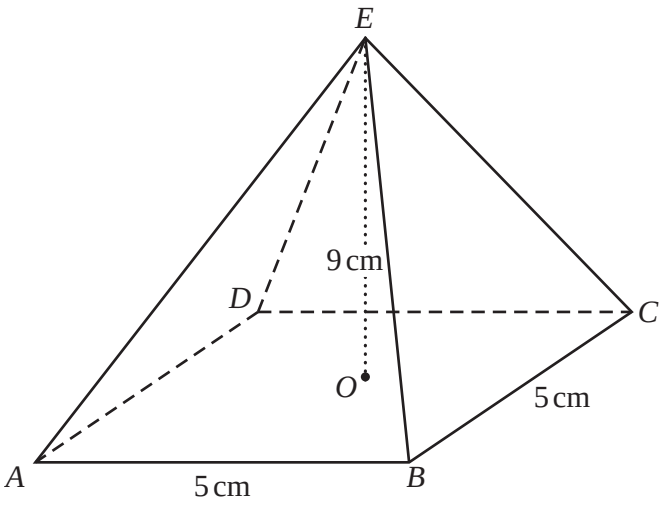
$$\frac{2}{x+3} - \frac{x+2}{7}$$

..... [3]

20 Solve $3(2+\cos x) = 5$ for $0° \leqslant x \leqslant 360°$.

..... [3]

21



NOT TO SCALE

The diagram shows a pyramid *ABCDE*.
The pyramid has a square horizontal base *ABCD* with side 5 cm.
The vertex *E* is vertically above the centre *O* of the base.
The height *OE* of the pyramid is 9 cm.

Calculate the angle that *EC* makes with the base *ABCD*.

..... [4]

Question 22 is printed on the next page.

22 **(a)** Simplify.

$$\frac{x^{\frac{2}{3}}}{x^{\frac{8}{3}}}$$

..... [1]

(b) $16 = 64^{k}$

Find the value of k.

$k =$ ..... [1]

(c) Solve.

$$3^{3x} \times \left(\frac{1}{9}\right)^{4-3x} = 3$$

$x =$ ..... [3]

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