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MATHEMATICS

0580/22

Paper 2 (Extended)

February/March 2022

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

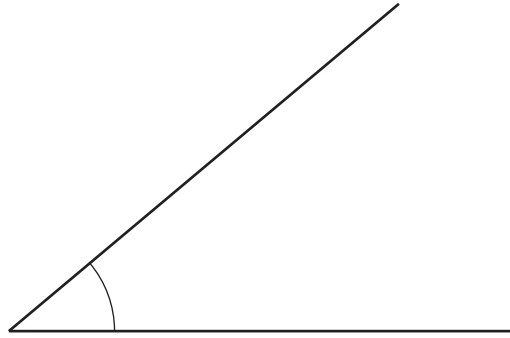
- The total mark for this paper is 70.
- The number of marks for each question or part question is shown in brackets [].

This document has **12** pages. Any blank pages are indicated.



2

1



Measure the marked angle.

..... [1]

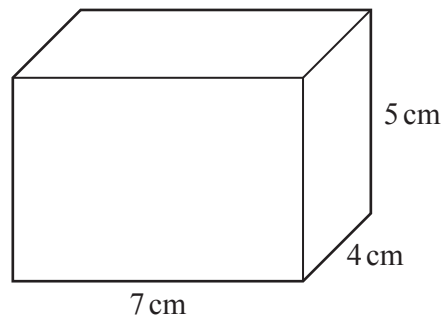
2 Work out $\sqrt{5} \times 6^2$.
Give your answer correct to 2 decimal places.

..... [2]

3 A journey starts at 21 15 one day and ends at 04 33 the next day.
Calculate the time taken, in hours and minutes.

..... h min [1]

4



NOT TO
SCALE

Calculate the **total** surface area of this cuboid.

..... cm^2 [3]

3

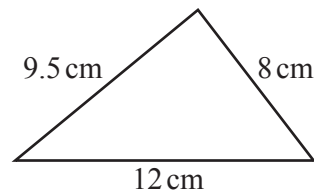
- 5 (a) Write down the gradient of the line $y = 5x + 7$.

..... [1]

- (b) Find the coordinates of the point where the line $y = 5x + 7$ crosses the y -axis.

(.....,) [1]

6



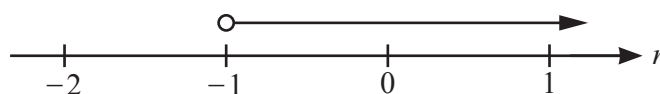
NOT TO
SCALE

Using a ruler and compasses only, construct this triangle.
Leave in your construction arcs.
The side of length 12 cm has been drawn for you.

.....

[2]

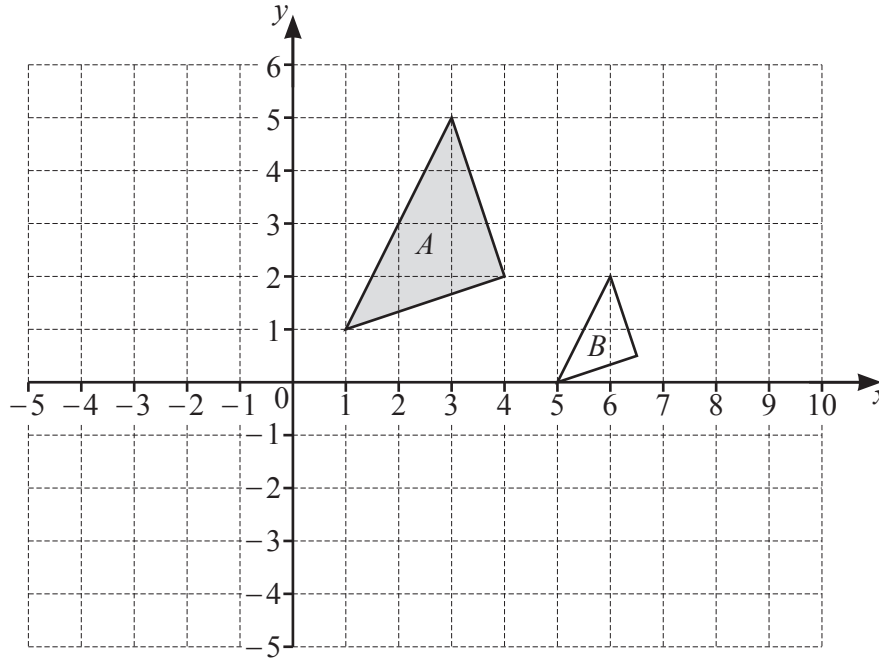
7



Write down the inequality, in terms of n , shown by the number line.

..... [1]

8



- (a) On the grid, draw the image of
- (i) triangle *A* after a reflection in the *y*-axis, [1]
 - (ii) triangle *A* after a translation by the vector $\begin{pmatrix} -3 \\ -4 \end{pmatrix}$. [2]
- (b) Describe fully the **single** transformation that maps triangle *A* onto triangle *B*.
-
- [3]

9 Factorise completely.

$$12a^3 - 21a$$

..... [2]

- 10 (a) The n th term of a sequence is $n^2 + 7$.

Find the first three terms of this sequence.

.....,, [2]

- (b) These are the first four terms of a different sequence.

15 7 -1 -9

Find the n th term of this sequence.

..... [2]

- 11 As the temperature increases, people eat more ice cream.

What type of correlation does this statement describe?

..... [1]

- 12 (a) Sanjay invests \$700 in an account paying simple interest at a rate of 2.5% per year.

Calculate the value of his investment at the end of 6 years.

\$ [3]

- (b) Meera invests \$700 in an account paying compound interest at a rate of $r\%$ per year.
At the end of 17 years the value of her investment is \$1030.35 .

Find the value of r .

$r =$ [3]

13 (a) Simplify $h^2 \times h^5$.

..... [1]

(b) Simplify $\left(\frac{7}{x}\right)^{-3}$.

..... [1]

(c) $a^8 \div a^p = a^2$

Find the value of p .

$p =$ [1]

14 Calculate the circumference of a circle with radius 4.7 cm.

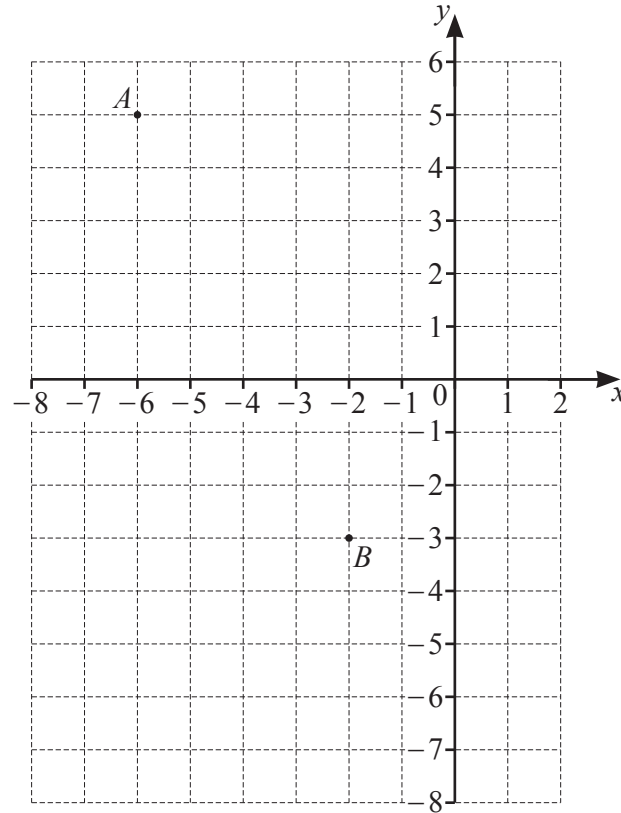
..... cm [2]

15 **Without using a calculator**, work out $2\frac{1}{3} \times \frac{11}{14}$.

You must show all your working and give your answer as a mixed number in its simplest form.

..... [3]

16



A is the point $(-6, 5)$ and B is the point $(-2, -3)$.

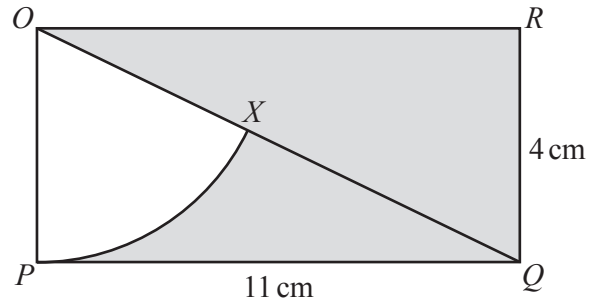
- (a) Find the equation of the straight line, l , that passes through point A and point B .
Give your answer in the form $y = mx + c$.

$$y = \dots\dots\dots [2]$$

- (b) Find the equation of the line that is perpendicular to l and passes through the origin.

$$\dots\dots\dots [2]$$

17

NOT TO
SCALE

The diagram shows a rectangle $OPQR$ with length 11 cm and width 4 cm. OQ is a diagonal and OPX is a sector of a circle, centre O .

Calculate the percentage of the rectangle that is shaded.

..... % [5]

18 Mrs Kohli buys a jacket, 2 shirts and a hat.

The jacket costs \$ x .

The shirts each cost \$24 less than the jacket and the hat costs \$16 less than the jacket.

Mrs Kohli spends exactly \$100.

Write down an equation in terms of x .

Solve this equation to find the cost of the jacket.

\$ [3]

9

- 19 y is inversely proportional to the square root of $(x + 4)$.
When $x = 5, y = 2$.

Find y when $x = 77$.

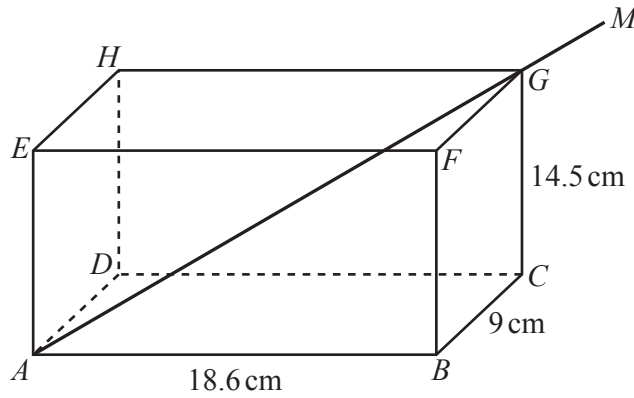
$$y = \dots\dots\dots [3]$$

- 20 Solve the simultaneous equations.
You must show all your working.

$$\begin{aligned} 3x + y &= 11 \\ x^2 - 2y &= 18 \end{aligned}$$

$$x = \dots\dots\dots y = \dots\dots\dots$$

$$x = \dots\dots\dots y = \dots\dots\dots [5]$$

NOT TO
SCALE

The diagram shows an open rectangular box $ABCDEFGH$.

$AB = 18.6$ cm, $BC = 9$ cm and $CG = 14.5$ cm.

A straight stick AGM rests against A and G and extends outside the box to M .

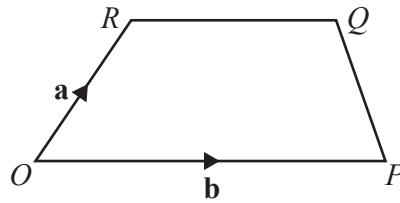
(a) Calculate the angle between the stick and the base of the box.

..... [4]

(b) $AM = 30$ cm.

Show that $GM = 4.8$ cm, correct to 1 decimal place.

[3]



NOT TO
SCALE

The diagram shows a trapezium $OPQR$.

O is the origin, $\vec{OR} = \mathbf{a}$ and $\vec{OP} = \mathbf{b}$.

$$|\vec{RQ}| = \frac{3}{5}|\vec{OP}|$$

(a) Find \vec{PQ} in terms of \mathbf{a} and \mathbf{b} in its simplest form.

$$\vec{PQ} = \dots\dots\dots [2]$$

(b) When PQ and OR are extended, they intersect at W .

Find the position vector of W .

$$\dots\dots\dots [2]$$

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