

CANDIDATE
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MATHEMATICS (US)

0444/21

Paper 2 (Extended)

May/June 2018

1 hour 30 minutes

Candidates answer on the Question Paper.

Additional Materials: Geometrical instruments

READ THESE INSTRUCTIONS FIRST

Write your Center number, candidate number and name on all the work you hand in.

Write in dark blue or black pen.

You may use an HB pencil for any diagrams or graphs.

Do not use staples, paper clips, glue or correction fluid.

DO NOT WRITE IN ANY BARCODES.

Answer **all** questions.

CALCULATORS MUST NOT BE USED IN THIS PAPER.

All answers should be given in their simplest form.

If work is needed for any question it must be shown in the space provided.

The number of points is given in parentheses [] at the end of each question or part question.

The total of the points for this paper is 70.

This document consists of **12** printed pages.

Formula List

For the equation

$$ax^2 + bx + c = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Lateral surface area, A , of cylinder of radius r , height h .

$$A = 2\pi rh$$

Lateral surface area, A , of cone of radius r , sloping edge l .

$$A = \pi rl$$

Surface area, A , of sphere of radius r .

$$A = 4\pi r^2$$

Volume, V , of pyramid, base area A , height h .

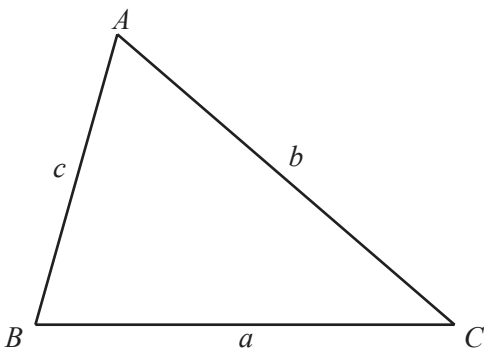
$$V = \frac{1}{3}Ah$$

Volume, V , of cone of radius r , height h .

$$V = \frac{1}{3}\pi r^2 h$$

Volume, V , of sphere of radius r .

$$V = \frac{4}{3}\pi r^3$$



$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$\text{Area} = \frac{1}{2}bc \sin A$$

1 Write down a prime number between 20 and 30.

..... [1]

2 Write 0.000 038 7 in scientific notation.

..... [1]

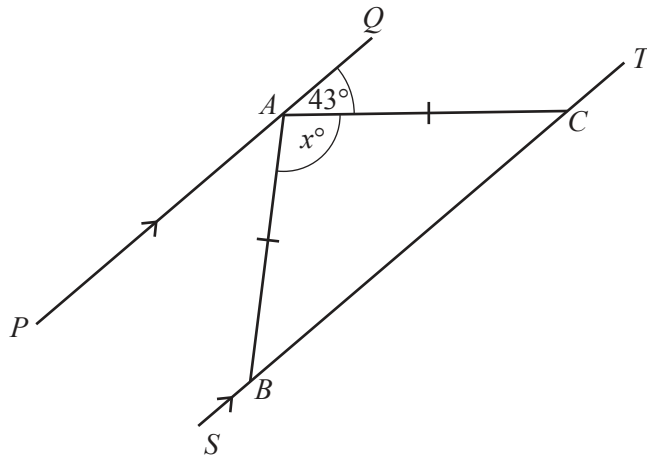
3 Work out $8^{\frac{2}{3}}$.

..... [1]

4 Find the value of $7x + 3y$ when $x = 12$ and $y = -6$.

..... [2]

5



NOT TO SCALE

The diagram shows two parallel lines PAQ and $SBCT$.
 $AB = AC$ and angle $QAC = 43^\circ$.

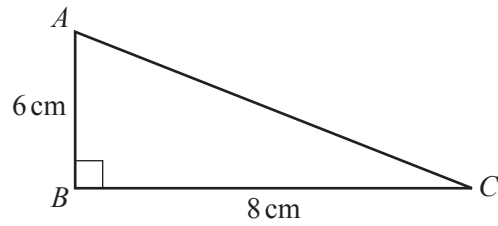
Find the value of x .

$x =$ [2]

- 6 Solve the equation $3 + \sqrt{y} = 14$.

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

7



NOT TO
SCALE

Work out the length of AC .

$$AC = \dots\dots\dots \text{ cm } [2]$$

- 8 Expand and simplify.

$$6(2y - 3) - 5(y + 1)$$

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

- 9 $3^{-q} \times \frac{1}{27} = 81$

Find the value of q .

$$q = \dots\dots\dots [2]$$

- 10 Dean invests \$200 for 6 years at a rate of 1.5% per year simple interest.

Calculate the total interest at the end of the 6 years.

\$ [2]

- 11 Simplify, giving your answer in scientific notation.

$$3.5 \times 10^p + 6.1 \times 10^{p+1}$$

..... [2]

- 12 Solve the inequality.

$$3n - 5 > 17 + 8n$$

..... [2]

- 13 Simplify $\frac{8x^{16}}{16x^8}$.

..... [2]

- 14 Simplify $\sqrt{48} + \sqrt{27}$.

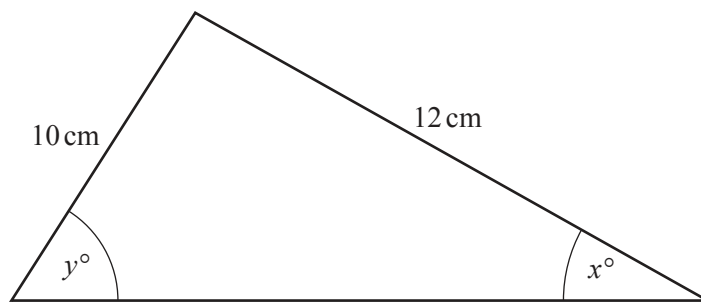
..... [2]

15 Work out $1\frac{3}{4} \times \frac{6}{35}$.

Give your answer as a fraction in its simplest form.

..... [3]

16



NOT TO
SCALE

$$\sin y^\circ = 0.6$$

Work out the value of x .

You must show all your working.

$x =$ [3]

- 17 y varies directly as $(x - 1)^2$.
When $x = 5$, $y = 4$.

Find y when $x = 7$.

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

- 18 $f(x) = 3 \sin(2x^\circ)$

- (a) Write down the amplitude and the period of $f(x)$.

$$\text{Amplitude} = \dots\dots\dots$$

$$\text{Period} = \dots\dots\dots [2]$$

- (b) The graph of $y = f(x)$ is mapped onto the graph of $y = g(x)$ by a stretch, factor 3, with the x -axis invariant.

Write down the function $g(x)$.

$$g(x) = \dots\dots\dots [1]$$

- 19 Write as a single fraction in its simplest form.

$$5 - \frac{2}{x-3}$$

$$\dots\dots\dots [3]$$

- 20 The price of a computer is \$672 after a reduction of 20%.

Work out the price before the reduction.

\$ [3]

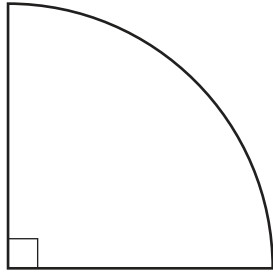
- 21 A is the point $(1, 0)$ and B is the point $(0, 2)$.

Find the equation of the line that passes through B and is perpendicular to the line AB .

Give your answer in the form $y = mx + b$.

$y =$ [3]

22

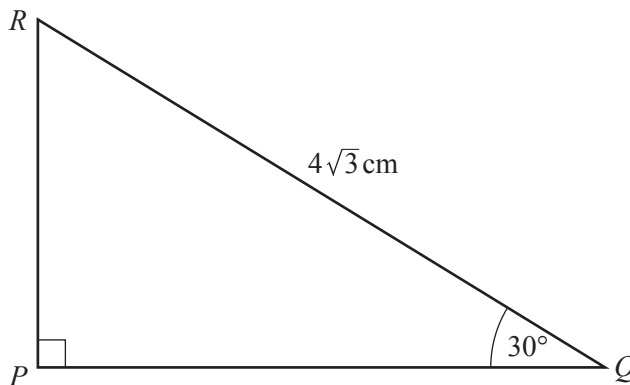
NOT TO
SCALE

The length of the arc is 4π cm and the area of the sector is $k\pi$ cm².

Find the value of k .

$k = \dots\dots\dots$ [3]

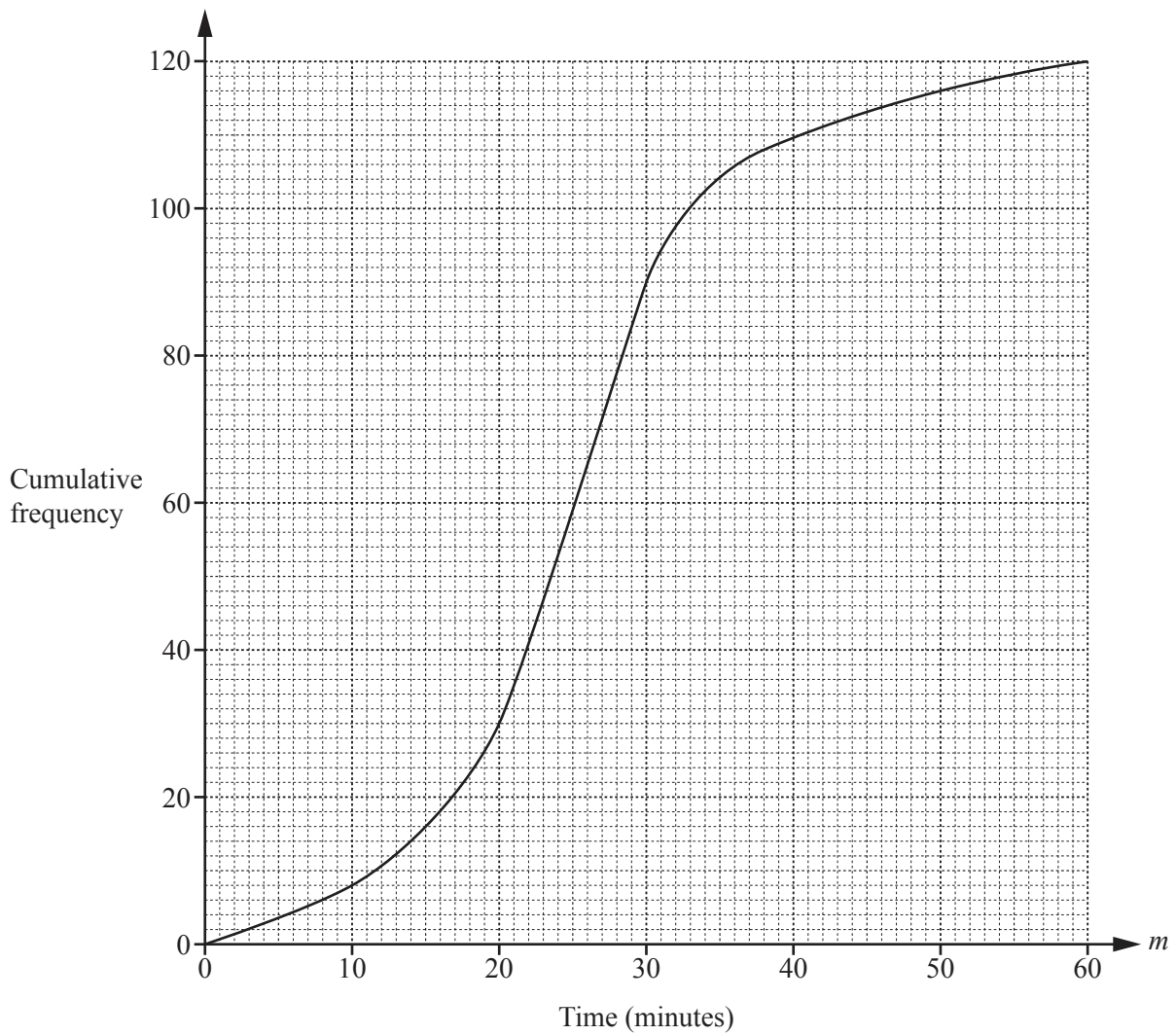
23

NOT TO
SCALE

Work out the length of PQ .

$PQ = \dots\dots\dots$ cm [4]

- 24 The cumulative frequency diagram shows information about the time, m minutes, taken by 120 students to complete some homework.



Use the cumulative frequency diagram to find an estimate of

- (a) the interquartile range,

..... min [2]

- (b) the number of students who took more than 50 minutes to complete the homework.

..... [2]

- 25 (a) A box contains 3 blue pens, 4 red pens, and 8 green pens only.
A pen is chosen at random from the box.

Find the probability that this pen is green.

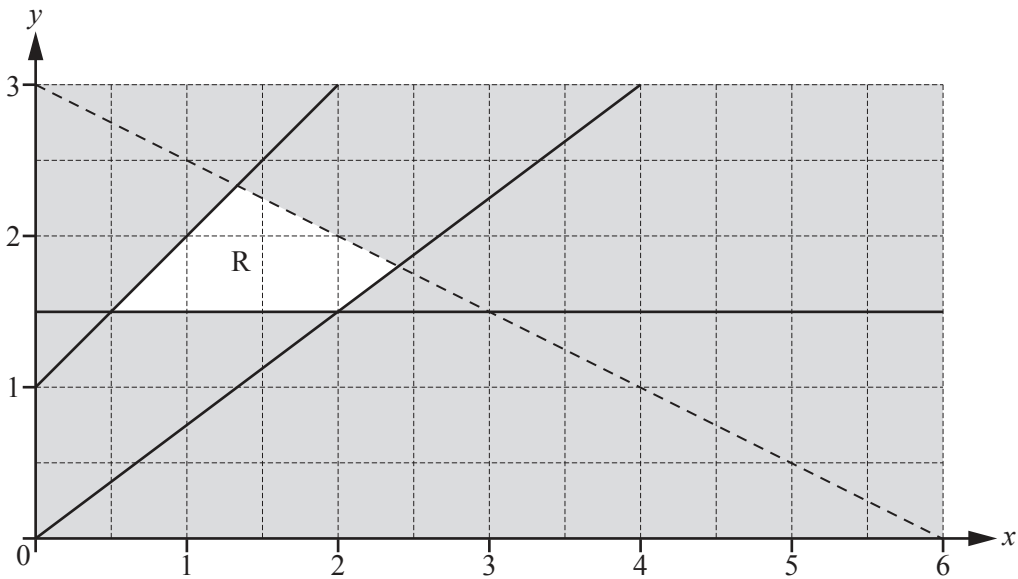
..... [1]

- (b) Another box contains 7 black pens and 8 orange pens only.
Two pens are chosen at random from this box without replacement.

Calculate the probability that at least one orange pen is chosen.

..... [3]

26



There are four inequalities that define the region R.
One of these is $y \leq x + 1$.

Find the other three inequalities.

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

Question 27 is printed on the next page.

- 27 20 people were asked how many times they visited the movie theater in one month. The table shows the results.

Number of movie theater visits	0	1	2	3
Frequency	3	4	9	4

- (a) Work out the mean.

..... [3]

- (b) Omar wants to show the information from the table in a pie chart.

Work out the sector angle for the people who did not visit the movie theater.

..... [2]

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