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0580/23

October/November 2019

1 hour 30 minutes

Additional Materials:	Electronic calculator	Geometrical instruments
	Tracing paper (optional)	

READ THESE INSTRUCTIONS FIRST

DO **NOT** WRITE IN ANY BARCODES.

For π , use either your calculator value or 3.142.

The total of the marks for this paper is 70.

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

- 1 Write down the temperature that is 7°C below -3°C .

..... $^{\circ}\text{C}$ [1]

- 2 Calculate $\sqrt{256^{0.25} + 4 \times 8}$.

..... [1]

- 3 Here is a list of numbers.

87

77

57

47

27

From this list, write down

- (a) a cube number,

..... [1]

- (b) a prime number.

..... [1]

- 4 Find the highest common factor (HCF) of 84 and 105.

..... [2]

- 5 Write in standard form.

- (a) 72000

..... [1]

- (b) 0.0018

..... [1]

- 6 Expand and simplify $(x+3)(x+5)$.

..... [2]

- 7 Find the gradient of the line that is perpendicular to the line $2y = 3 + 5x$.

..... [2]

- 8 When $\sin x^\circ = 0.36$, find

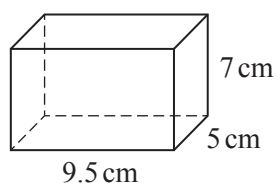
(a) the acute angle x° ,

..... [1]

(b) the obtuse angle x° .

..... [1]

- 9 A cuboid measures 5 cm by 7 cm by 9.5 cm.



NOT TO
SCALE

Work out the surface area of this cuboid.

..... cm^2 [3]

- 10** $5n$ is the mean of the three numbers 391, n and $n - 1$.

Find the value of n .

$n =$ [3]

- 11** Factorise.

(a) $12x + 15$

..... [1]

(b) $xy - 2x + 3y - 6$

..... [2]

- 12** A is the point (2, 1) and B is the point (9, 4).

Find the length of AB .

..... [3]

- 13** A straight line joins the points $(3k, 6)$ and $(k, -5)$.
The line has a gradient of 2.

Find the value of k .

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

- 14** Find the n th term of each sequence.

(a) $\frac{1}{2}, \frac{1}{4}, \frac{1}{6}, \frac{1}{8}, \frac{1}{10}, \dots$

$$\dots\dots\dots [1]$$

(b) $1, 5, 25, 125, 625, \dots$

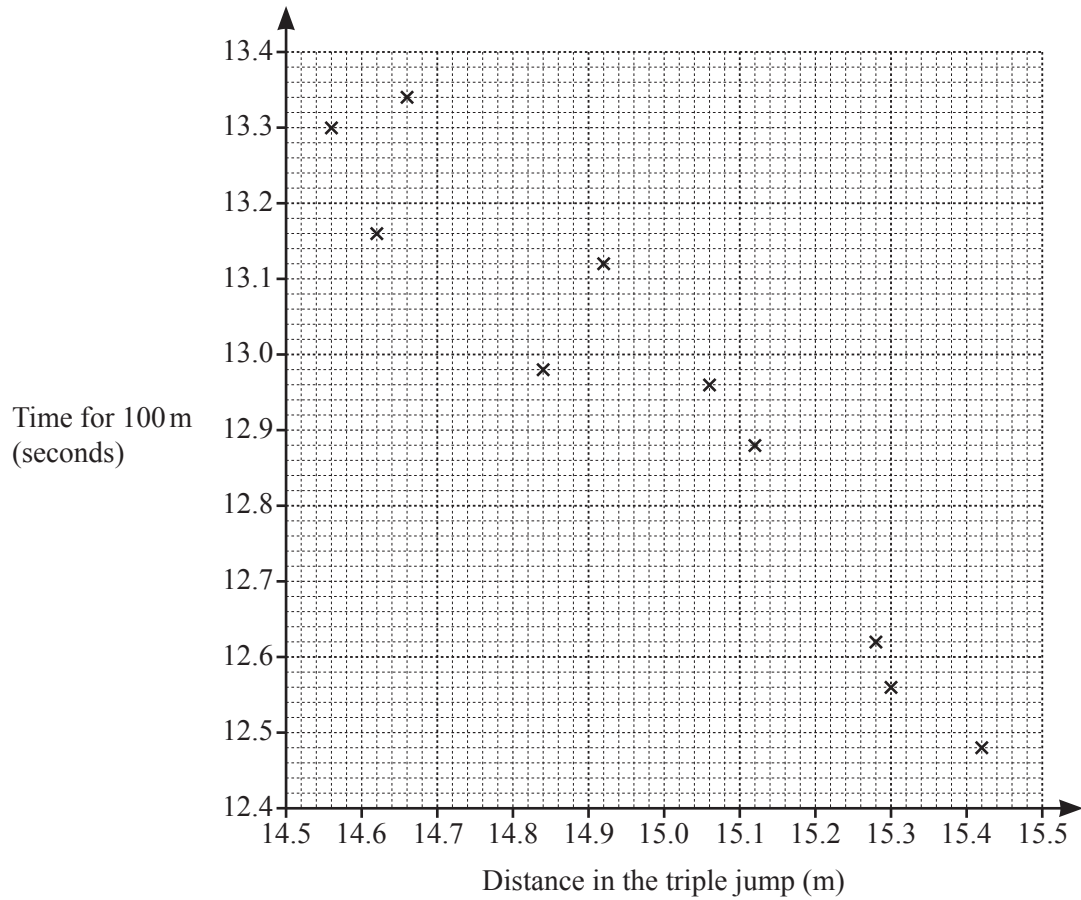
$$\dots\dots\dots [2]$$

- 15** **Without using a calculator**, work out $\frac{2}{3} + \frac{1}{4} \times \frac{2}{3}$.

Write down all the steps of your working and give your answer as a fraction in its simplest form.

$$\dots\dots\dots [4]$$

- 16 Ten athletes compete in both the 100 metre race and the triple jump. Their results are shown in the scatter diagram.



- (a) One of these athletes jumps 15.12 m in the triple jump.

Write down his time for the 100 metre race.

..... s [1]

- (b) The values for two other athletes are shown in the table.

Distance in the triple jump (m)	14.74	15.2
Time for 100 m (seconds)	13.2	12.76

On the scatter diagram, plot these points.

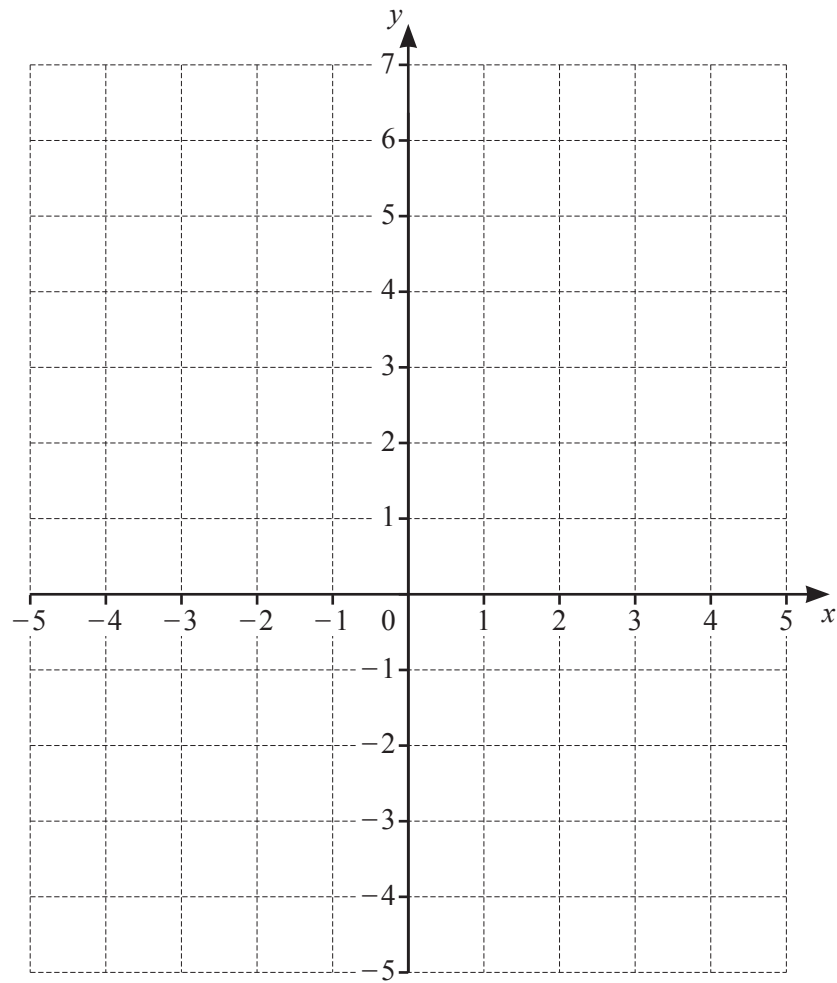
[1]

- (c) On the scatter diagram, draw a line of best fit.

[1]

- (d) What type of correlation is shown in the scatter diagram?

..... [1]



By shading the **unwanted** regions on the grid, draw and label the region R that satisfies the following inequalities.

$$-2 < x \leq 3$$

$$y \leq x + 3$$

[4]

18 (a) $M = \{x : x \text{ is an integer and } 2 \leq x < 6\}$

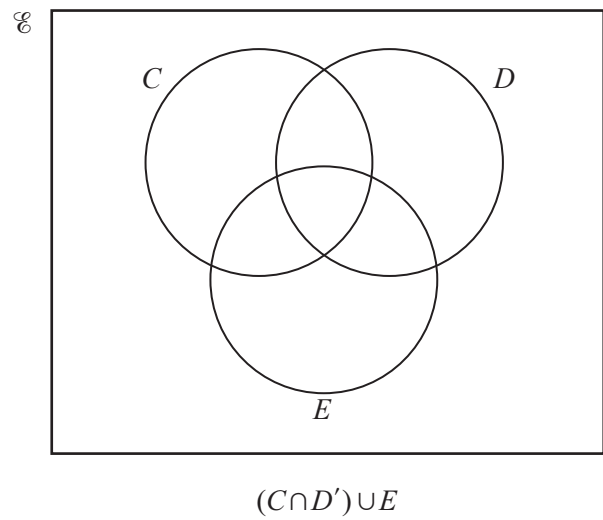
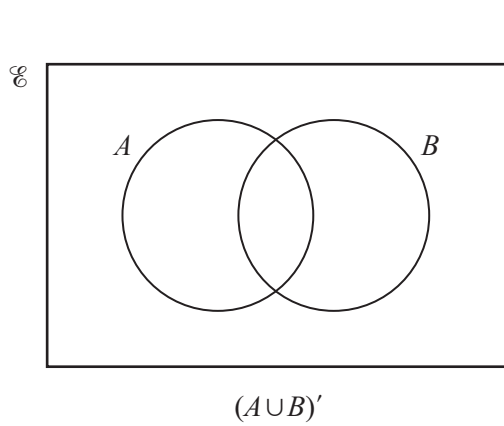
(i) Find $n(M)$.

..... [1]

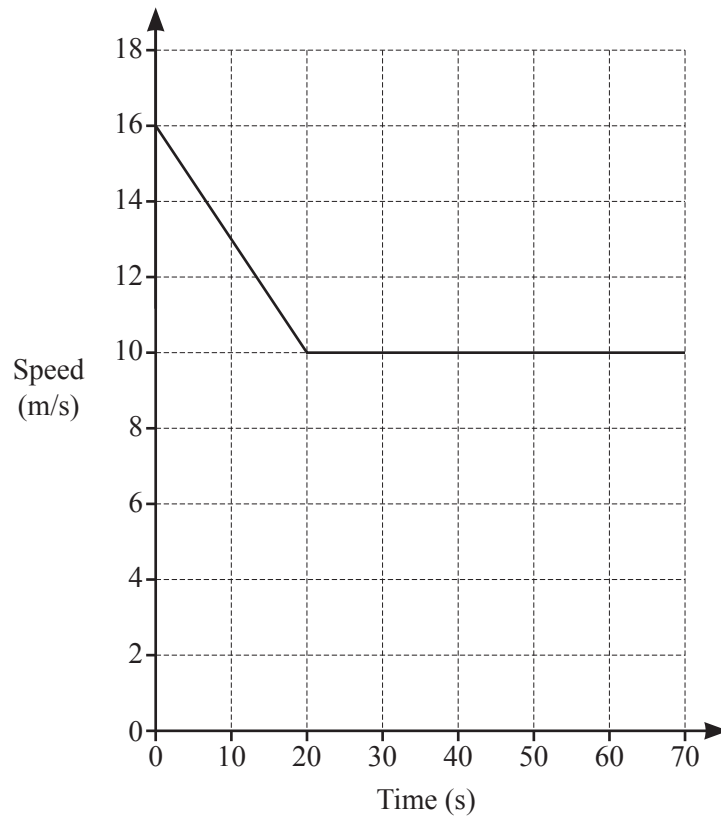
(ii) Write down a set N where $N \subset M$ and $N \neq \emptyset$.

{.....} [1]

(b) In each Venn diagram, shade the required region.



[2]



The diagram shows the speed–time graph for 70 seconds of a car journey.

- (a) Calculate the deceleration of the car during the first 20 seconds.

..... m/s^2 [1]

- (b) Calculate the total distance travelled by the car during the 70 seconds.

..... m [3]

- 20** t is inversely proportional to the square of $(x + 1)$.
When $x = 2$, $t = 5$.

(a) Write t in terms of x .

$$t = \dots\dots\dots [2]$$

(b) When $t = 1.8$, find the positive value of x .

$$x = \dots\dots\dots [2]$$

- 21 (a)** Work out the inverse of the matrix $\begin{pmatrix} -3 & 10 \\ 1 & -5 \end{pmatrix}$.

$$\begin{pmatrix} & \\ & \end{pmatrix} [2]$$

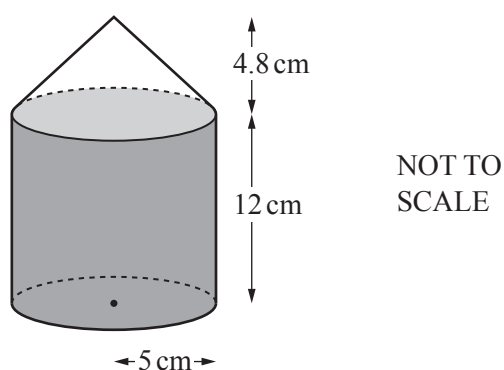
(b) Work out the value of x and the value of y in this matrix calculation.

$$\begin{pmatrix} 1 & 5 \\ 2 & y \end{pmatrix} \begin{pmatrix} -4 & 1 \\ 2 & 9 \end{pmatrix} = \begin{pmatrix} x & 46 \\ 6 & 65 \end{pmatrix}$$

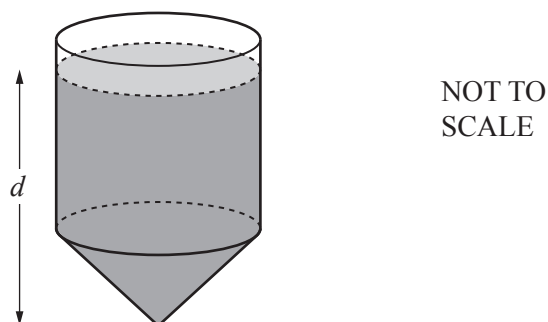
$$x = \dots\dots\dots$$

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

- 22 A container is made from a cylinder and a cone, each of radius 5 cm.
The height of the cylinder is 12 cm and the height of the cone is 4.8 cm.



The cylinder is filled completely with water.
The container is turned upside down as shown below.



Calculate the depth, d , of the water.

[The volume, V , of a cone with radius r and height h is $V = \frac{1}{3}\pi r^2 h$.]

$d = \dots\dots\dots$ cm [5]

Question 23 is printed on the next page.

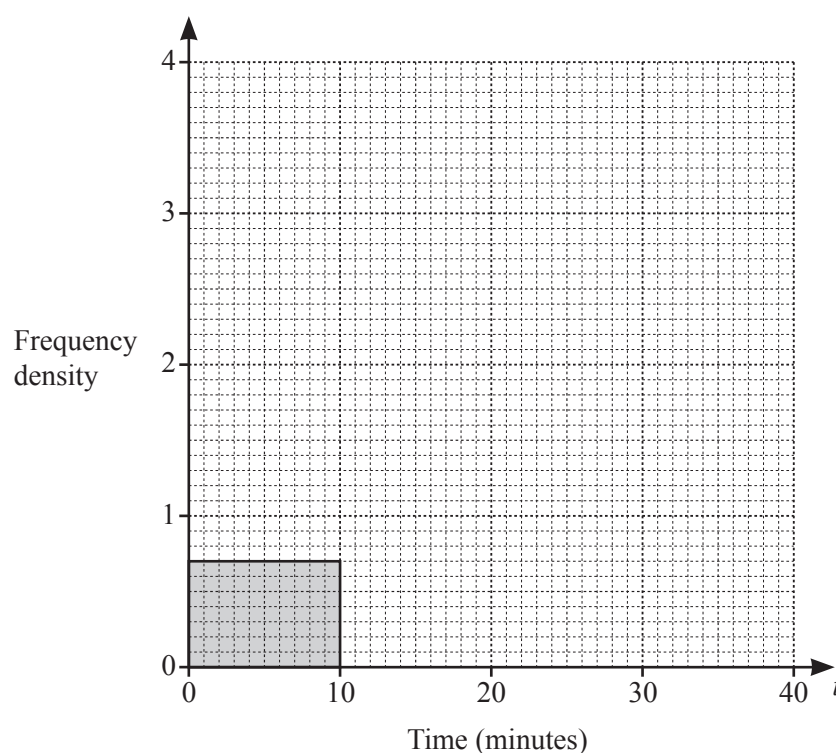
- 23 The time, t minutes, it takes each of 50 students to travel to school is recorded. The table shows the results.

Time (t minutes)	$0 < t \leq 10$	$10 < t \leq 15$	$15 < t \leq 20$	$20 < t \leq 40$
Frequency	7	19	16	8

- (a) Write down the modal class.

..... $< t \leq$ min [1]

- (b) On the grid, complete the histogram to show the information in the table.



[3]

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