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0580/22

February/March 2018

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 “We eat more ice cream as the temperature rises.”

What type of correlation is this?

..... [1]

- 2 Write 0.000 052 3 in standard form.

..... [1]

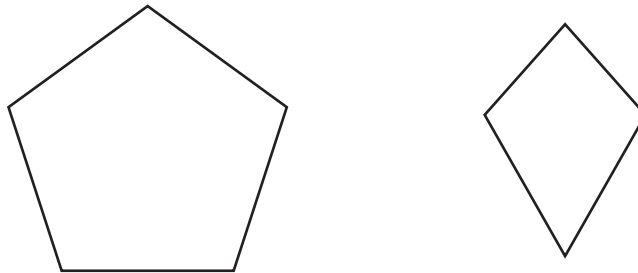
- 3 Calculate $\sqrt{17.8} - 1.3^{2.5}$.

..... [1]

- 4 Write the recurring decimal $0.\dot{8}$ as a fraction.

..... [1]

5



The diagram shows a regular pentagon and a kite.

Complete the following statements.

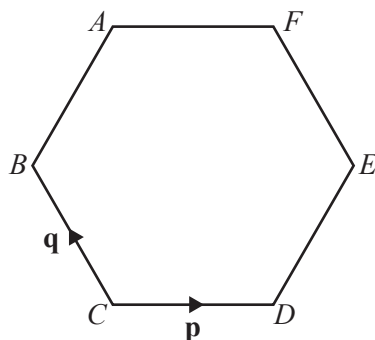
(a) The regular pentagon has lines of symmetry. [1]

(b) The kite has rotational symmetry of order [1]

- 6 Factorise completely.
 $15k^2m - 20m^4$

..... [2]

7



The diagram shows a regular hexagon $ABCDEF$.

$\overrightarrow{CD} = \mathbf{p}$ and $\overrightarrow{CB} = \mathbf{q}$.

Find $\overrightarrow{CA}$, in terms of $\mathbf{p}$ and $\mathbf{q}$, giving your answer in its simplest form.

$\overrightarrow{CA} =$ [2]

- 8 Newton has a population of 23 000.
 The population decreases exponentially at a rate of 1.4% per year.
 Calculate the population of Newton after 5 years.

..... [2]

9 $2^p = \frac{1}{8^4}$

Find the value of p .

$p = \dots\dots\dots$ [2]

- 10 y is inversely proportional to x .
When $x = 9$, $y = 8$.

Find y when $x = 6$.

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

- 11 Dev makes 600 cakes.
18% of the 600 cakes go to a hotel and $\frac{2}{3}$ of the 600 cakes go to a supermarket.

Calculate how many cakes he has left.

$\dots\dots\dots$ [3]

- 12 Without using your calculator, work out $\frac{7}{8} + \frac{1}{6}$.

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

..... [3]

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

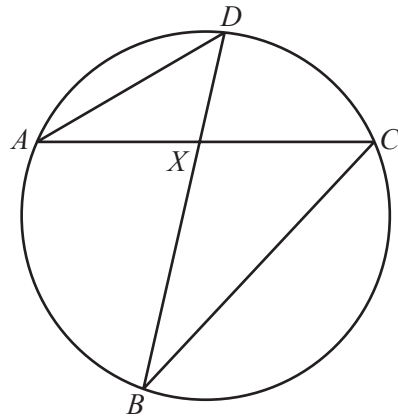
$$2x + \frac{1}{2}y = 13$$

$$3x + 2y = 17$$

$x =$

$y =$ [3]

14

NOT TO
SCALE

A , B , C and D are points on the circumference of the circle.
 AC and BD intersect at X .

(a) Complete the statement.

Triangle ADX is to triangle BCX .

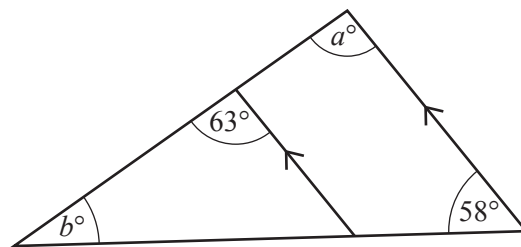
[1]

(b) The area of triangle ADX is 36 cm^2 and the area of triangle BCX is 65.61 cm^2 .
 $AX = 8.6 \text{ cm}$ and $DX = 7.2 \text{ cm}$.

Find BX .

$BX = \dots\dots\dots \text{ cm}$ [3]

15

NOT TO
SCALE

Complete the statements.

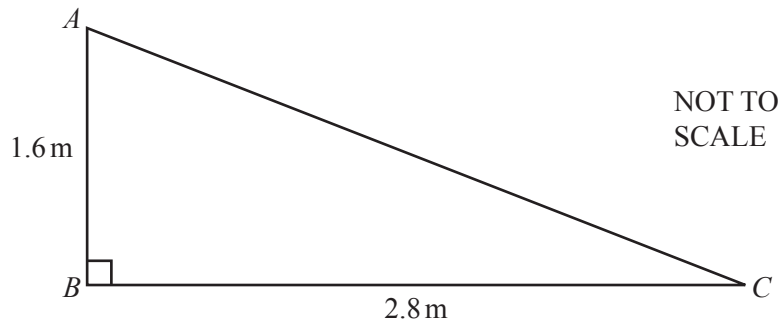
$a = \dots\dots\dots$ because

.....

$b = \dots\dots\dots$ because

..... [4]

16



- (a) Find the area of triangle ABC .

..... m^2 [2]

- (b) Calculate AC .

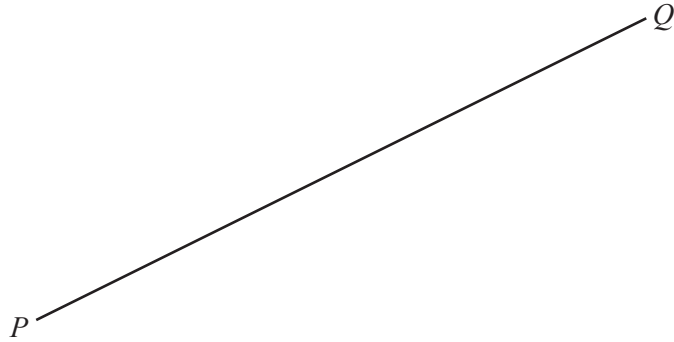
$AC =$ m [2]

- 17 Solve the equation $2x^2 + 7x - 3 = 0$.
Show all your working and give your answers correct to 2 decimal places.

$x =$ or $x =$ [4]

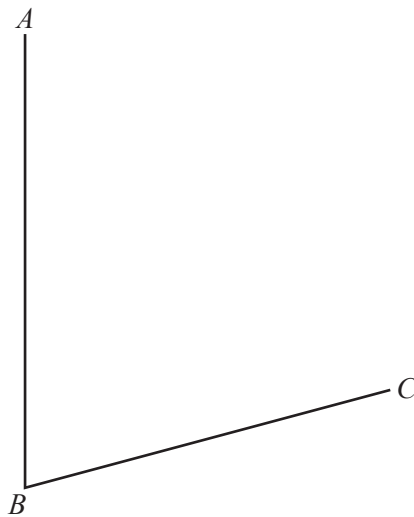
18 In this question, **use a straight edge and compasses only** and show all your construction arcs.

(a) Construct the perpendicular bisector of PQ .



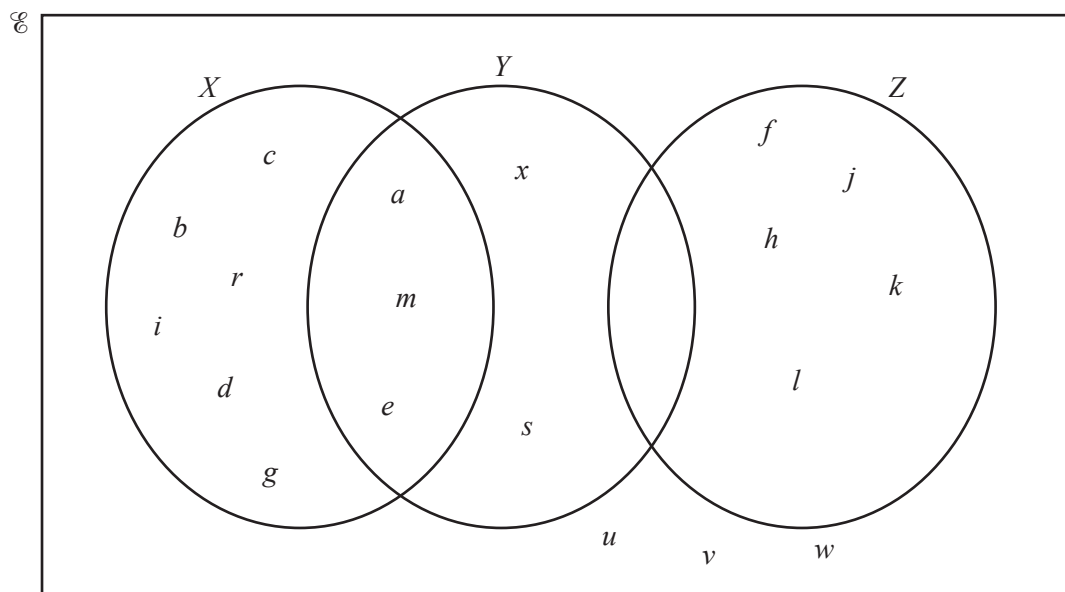
[2]

(b) Construct the bisector of angle ABC .



[2]

19



(a) Use set notation to complete the statements for the Venn diagram above.

(i) $c \dots\dots\dots X$ [1]

(ii) $\dots\dots\dots = \{a, m, e\}$ [1]

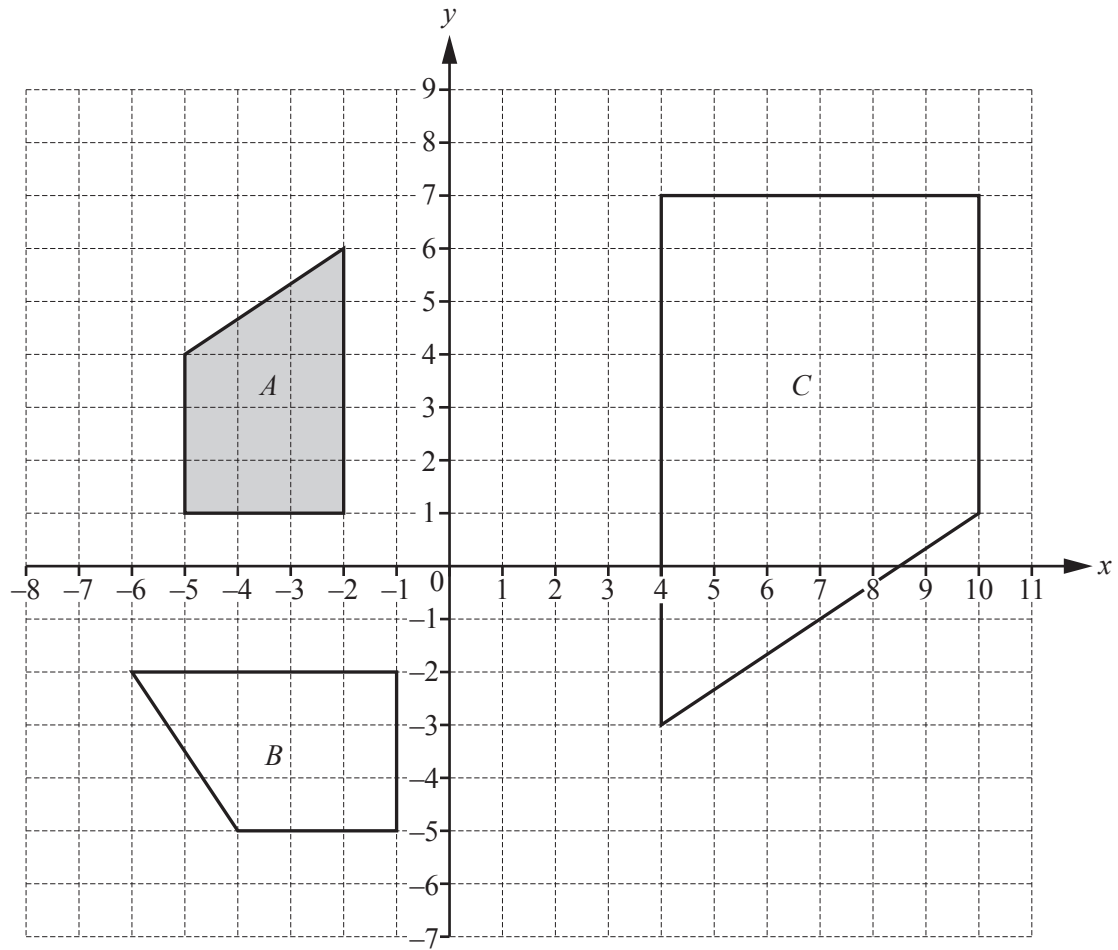
(iii) $Y \cap Z = \dots\dots\dots$ [1]

(b) List the elements of $(X \cup Y \cup Z)'$.

$\dots\dots\dots$ [1]

(c) Find $n(X' \cap Z)$.

$\dots\dots\dots$ [1]



Describe fully the **single** transformation that maps

- (a) shape *A* onto shape *B*,

.....
 [3]

- (b) shape *A* onto shape *C*.

.....
 [3]

21

$f(x) = 7 - x$

$g(x) = 4x + 2$

$h(x) = 15 - x^2$

(a) Find $ff(2)$.

..... [2]

(b) Find $gf(x)$ in its simplest form.

..... [2]

(c) Find $h(2x)$ in its simplest form.

..... [2]

Question 22 is printed on the next page.

- 22 Samira and Sonia each have a bag containing 20 sweets.
In each bag, there are 5 red, 6 green and 9 yellow sweets.

(a) Samira chooses one sweet at random from her bag.

Write down the probability that she chooses a yellow sweet.

..... [1]

(b) Sonia chooses two sweets at random, without replacement, from her bag.

(i) Show that the probability that she chooses two green sweets is $\frac{3}{38}$.

[2]

(ii) Calculate the probability that the sweets she chooses are **not** both the same colour.

..... [4]

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