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MATHEMATICS **0580/33**

Paper 3 (Core) **May/June 2024**

2 hours

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.

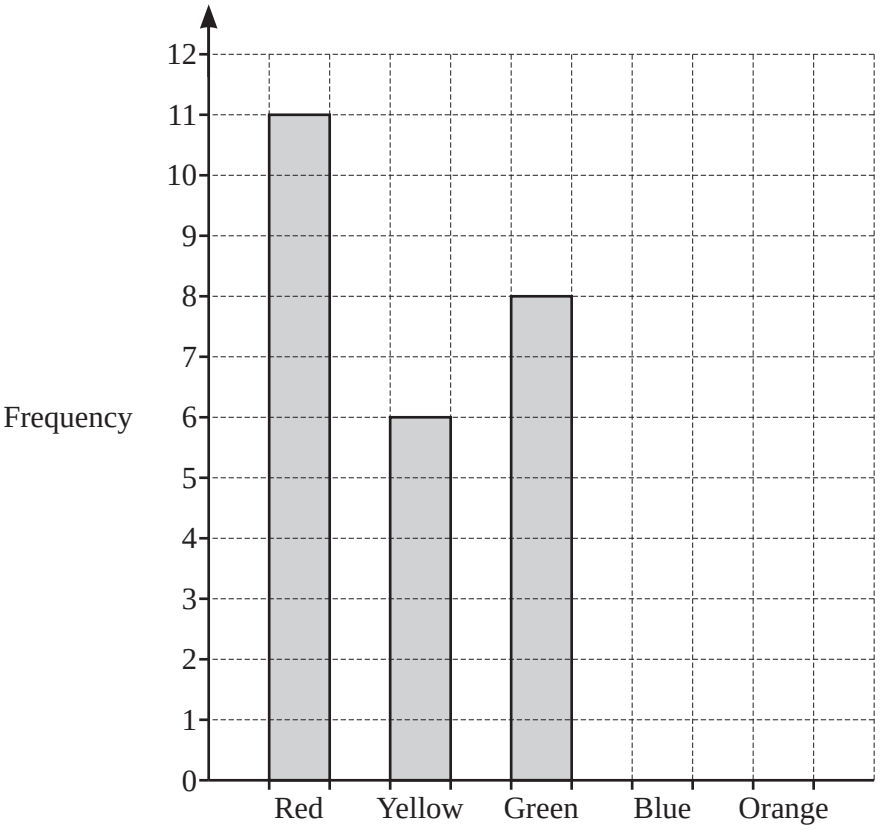
INFORMATION

- The total mark for this paper is 104.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **20** pages. Any blank pages are indicated.

DC (LK/JG) 329292/2

1 **(a)** 40 football players vote on the colour of new shirts.
The results for red, yellow and green are shown in the bar chart.



(i) Twice as many football players vote blue than vote orange.

Complete the bar chart.

[3]

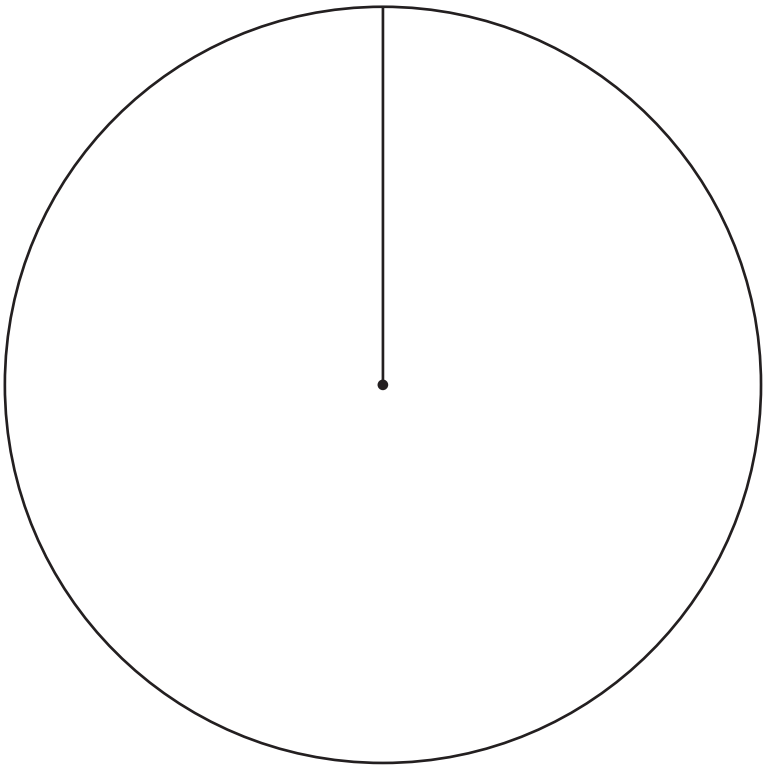
(ii) Write down the mode.

..... [1]

(b) 40 hockey players vote on the colour of new shirts.
The table shows the results.

Colour	Frequency
White	21
Grey	12
Pink	7

(i) Complete the pie chart.



[4]

(ii) Work out the percentage of hockey players who vote grey.

..... % [1]

2 **(a)** Here is part of the timetable for buses from the station to the city centre.
All buses take the same time to travel from the station to the city centre.

Station	09 24	11 06
City centre	10 03	.....

(i) Complete the timetable.

[2]

(ii) Beth walks 4 km from her home to the station at a speed of 6 km/h.
She wants to travel on the 09 24 bus.

Work out the latest time she can leave her home.

..... [3]

(iii) 45 seats on the bus are occupied.
This is $\frac{3}{5}$ of the total number of seats on the bus.

Work out the total number of seats on the bus.

..... [2]

(b) Beth buys 2.4 kg of onions costing \$1.25 per kilogram and 4.5 kg of potatoes.
The total cost is \$11.64 .

Find the cost of 1 kg of potatoes.

\$ ..... [3]

(c) (i) One day 140 people enter a shop.
The ratio adults : children = 3 : 2.

Find the number of adults who enter the shop.

..... [2]

(ii) The price of a television in this shop is $624.
37.5% of this price is profit.

Calculate the profit on this television.

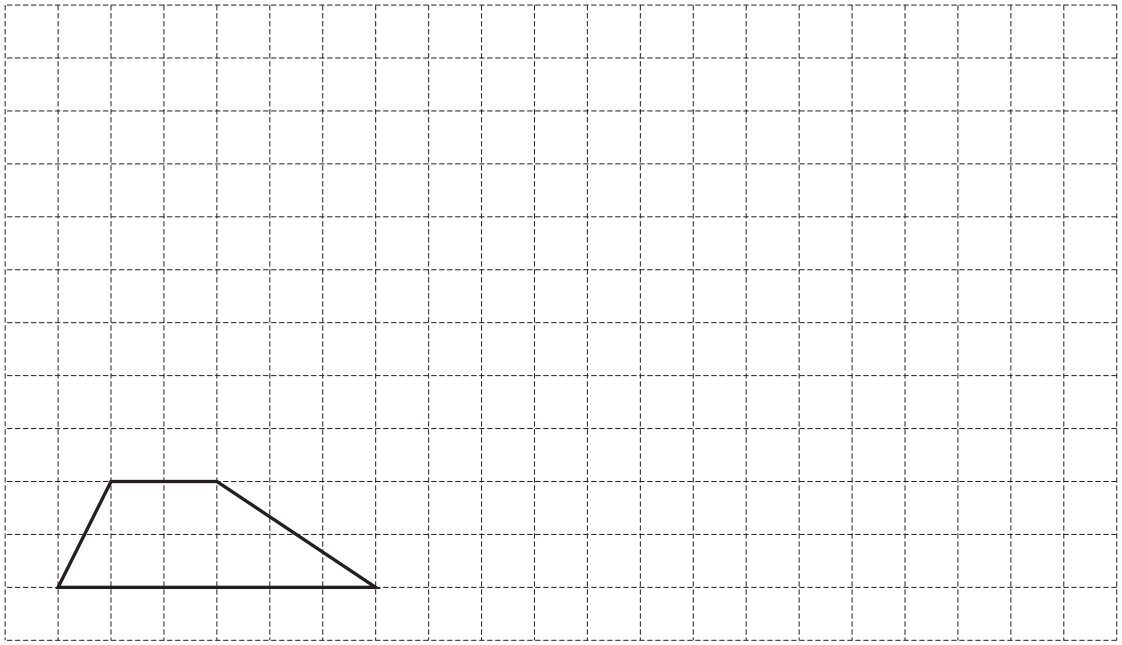
$ ..... [1]

(iii) The price of a phone in this shop is $420.
This price increases by 12%.

Calculate the new price.

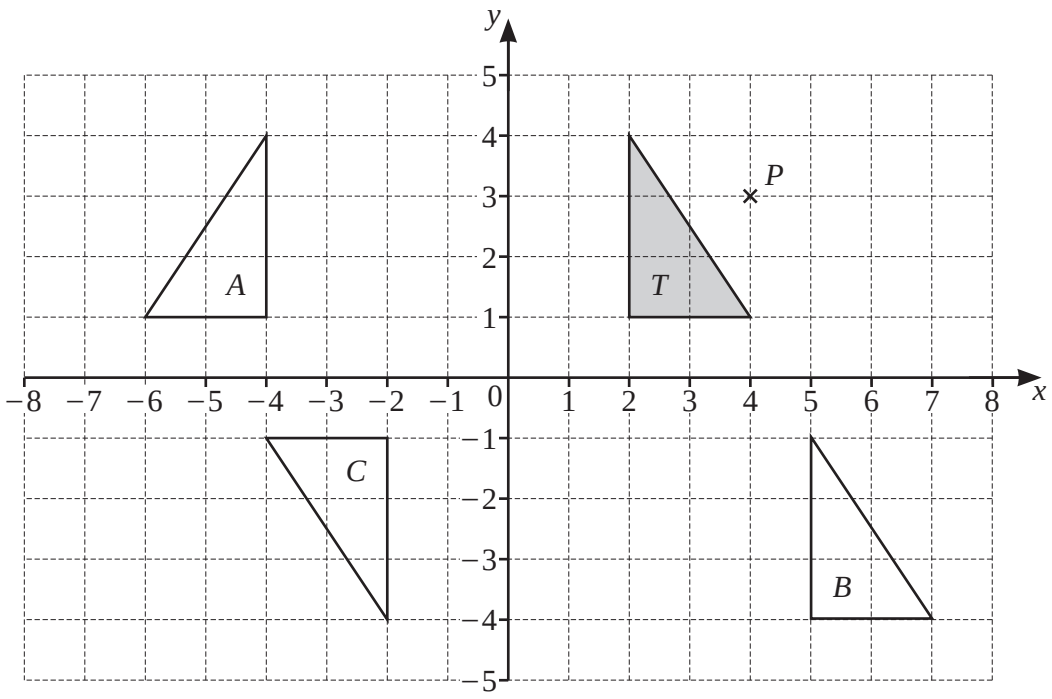
$ ..... [2]

3 **(a)** The grid shows a trapezium.



On the grid, draw an enlargement of the trapezium with scale factor 3. [2]

(b) The diagram shows four triangles, *A*, *B*, *C* and *T*, and a point *P* on a grid.



(i) Write down the coordinates of point *P*.

(..... , ...) [1]

(ii) Describe fully the **single** transformation that maps

(a) triangle *T* onto triangle *A*

.....

..... [2]

(b) triangle *T* onto triangle *B*

.....

..... [2]

(c) triangle *T* onto triangle *C*.

.....

..... [3]

4 **(a)** Write down the value of the 8 in the number 39 829.

..... [1]

(b) Write down all the factors of 18.

..... [2]

(c) Show that 57 is **not** a prime number.

[1]

(d) $\sqrt{x} = 64$

Find the value of x.

$x =$ ..... [1]

(e) Find the first multiple of 40 that is greater than 620.

..... [1]

(f) Find the reciprocal of $\frac{2}{3}$.

..... [1]

(g) Find a fraction between $\frac{1}{5}$ and $\frac{1}{4}$.

..... [1]

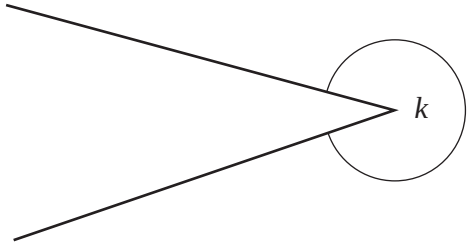
(h) Write down an irrational number with a value between 9 and 10.

..... [1]

(i) Find the highest common factor (HCF) of 72 and 180.

..... [2]

5 **(a)**



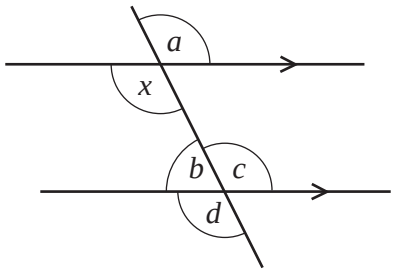
(i) Measure angle k.

..... [1]

(ii) Write down the mathematical name for this type of angle.

..... [1]

(b) The diagram shows a pair of parallel lines and a straight line.
Angles a, b, c, d and x are labelled.



NOT TO SCALE

Complete the statements.

Angle ..... is alternate to angle x.

Angle ..... is corresponding to angle x. [2]

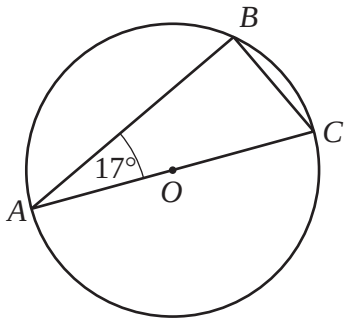
(c) The diagram shows a parallelogram.

NOT TO SCALE

Find the value of y.

$y =$ ..... [1]

(d)



NOT TO SCALE

A, *B* and *C* lie on a circle, centre *O*.

Find angle *ACB*.

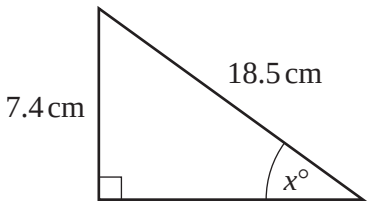
Angle *ACB* = ... [2]

(e) The interior angle of a regular polygon is 171°.

Work out the number of sides of this polygon.

..... [2]

(f)



NOT TO SCALE

Calculate the value of *x*.

x = ... [2]

6 **(a)** In a sport, teams are given points using the formula

number of points = number of wins × 4 + number of draws × 2 + bonus points.

One team has 15 wins, 7 draws and 6 bonus points.

Calculate the total number of points for this team.

..... [2]

(b) Solve.

$\frac{x}{2} = 18$

$x =$ ..... [1]

(c) Solve.

$4x + 12 = 18$

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

(d) Expand and simplify.

$6(3x - 4) + 5(x - 2)$

..... [2]

(e) $T = 5r - 6$

Make r the subject of this formula.

$r =$ ..... [2]

(f) Bo has a green bag and a blue bag.
Each bag contains some marbles.

The green bag has x marbles.
There are 5 times as many marbles in the blue bag than in the green bag.

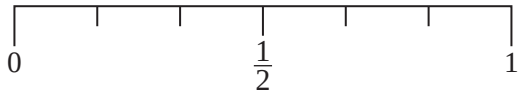
Bo now adds 6 marbles to each bag.
There are now 4 times as many marbles in the blue bag than in the green bag.

Use this information to write down an equation and solve it to find the value of x.

$x =$ ..... [5]

7 **(a)** Li spins a fair 6-sided spinner numbered 1 to 6.

(i) On the probability scale, draw an arrow (↓) to show the probability that the spinner lands on the number 2.



[1]

(ii) Find the probability that the spinner lands on a prime number.

..... [1]

(iii) Find the probability that the spinner lands on the number 7.

..... [1]

(b) A bag contains 3 red balls and 12 green balls.
Li picks a ball at random.

Find the probability that it is a green ball.
Give your answer as a fraction in its simplest form.

..... [2]

(c) Li spins two fair 4-sided spinners, each numbered 1 to 4.
The two numbers are multiplied to give the score.

×	1	2	3	4
1	1	2	3	4
2	2	4	6	8
3	3	6	9	12
4	4	8	12	16

Find the probability that the score is

(i) an even number

..... [1]

(ii) an integer

..... [1]

(iii) at least 10.

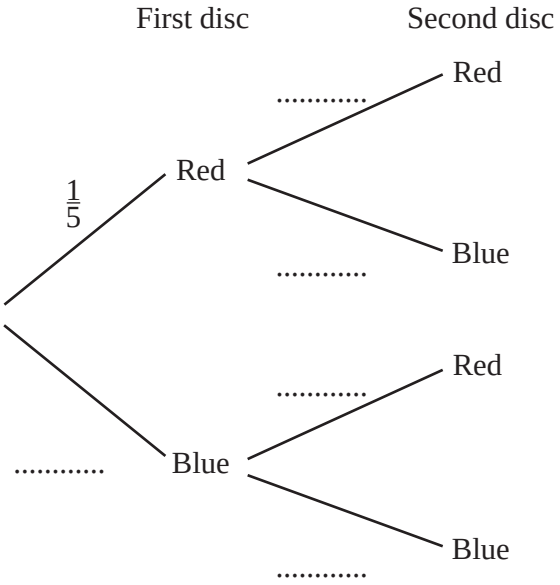
..... [1]

(d) A bag contains red discs and blue discs.

The probability that a disc picked at random is red is $\frac{1}{5}$.

Li picks a disc at random, notes its colour and then replaces it in the bag.
She then picks another disc at random.

(i) Complete the tree diagram.

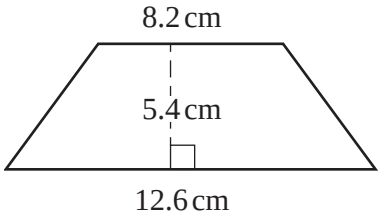


[2]

(ii) Work out the probability that both of the discs she picks are blue.

..... [2]

8 (a)

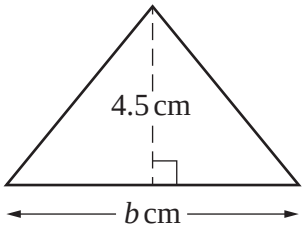


NOT TO SCALE

Find the area of this trapezium.

..... cm^2 [2]

(b)



NOT TO SCALE

The area of this triangle is $15.3\,cm^2$.

Find the value of b.

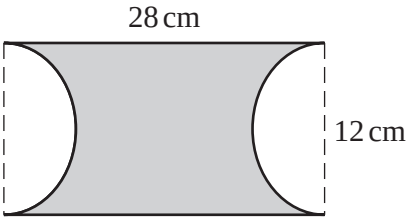
$b =$ ..... [2]

(c) A circle has a circumference of 58.6 cm.

Find the radius of this circle.

..... cm [2]

(d)



NOT TO SCALE

The diagram shows a rectangle with two semicircles removed.

Calculate the shaded area.

..... cm^2 [4]

9 **(a)** Line L has a gradient of 4 and passes through the point (0, 3).

Write down the equation of line L in the form $y = mx + c$.

$y =$ ..... [1]

(b) Line G has the equation $y = 2 - 6x$.
Line G passes through the point $(a, 5)$.

Find the value of a.

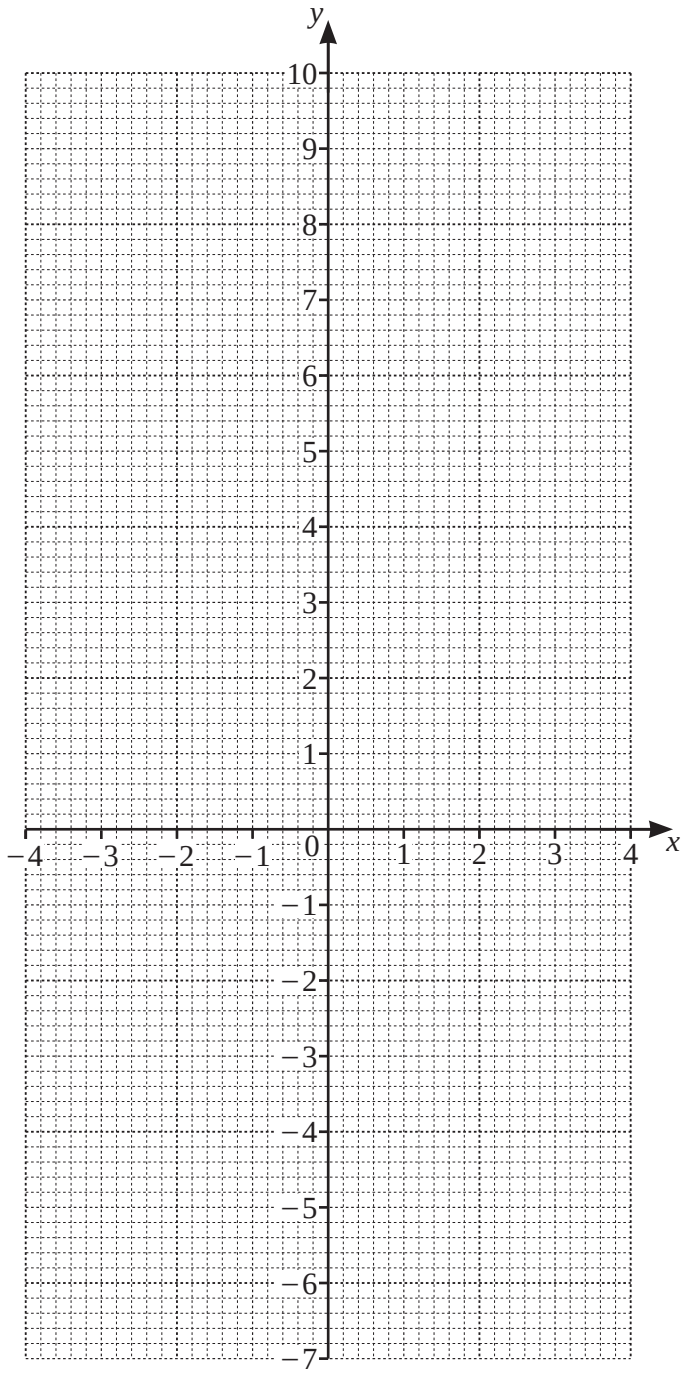
$a =$ ..... [3]

(c) **(i)** Complete the table of values for $y = x^2 - 6$.

x	−4	−3	−2	−1	0	1	2	3	4
y	10		−2	−5		−5	−2		10

[2]

(ii) On the grid, draw the graph of $y = x^2 - 6$ for $-4 \leqslant x \leqslant 4$.



[4]

(iii) Write down the equation of the line of symmetry of the graph.

..... [1]

(iv) Use your graph to solve the equation $x^2 - 6 = 0$ for $x > 0$.

$x =$ ..... [1]

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