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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.

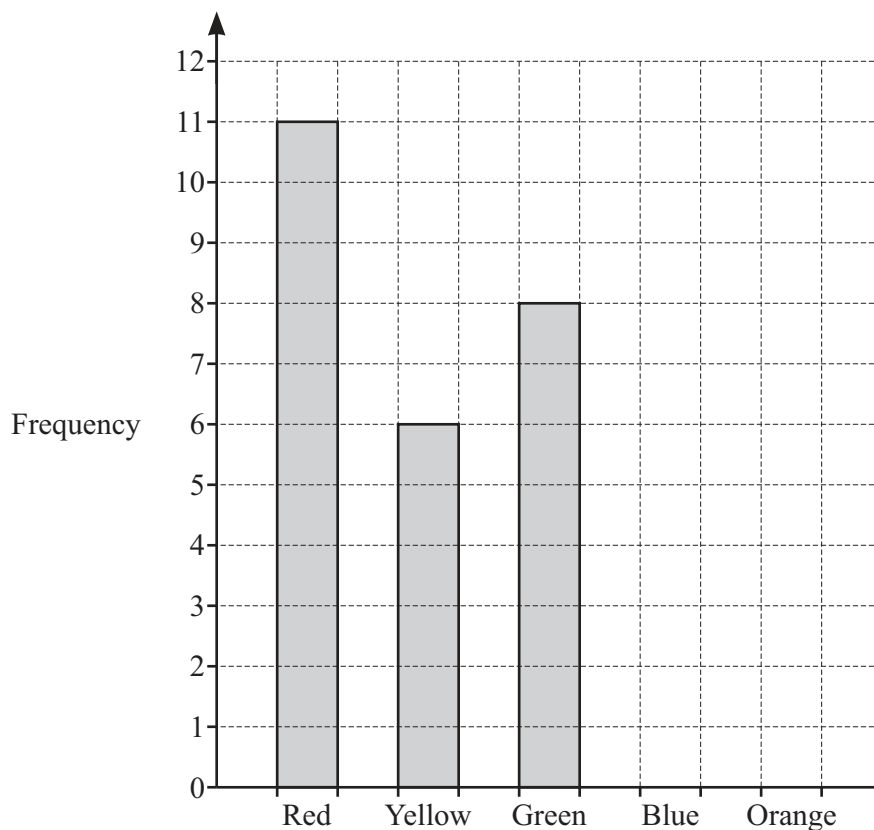
INFORMATION

- 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.



- 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]

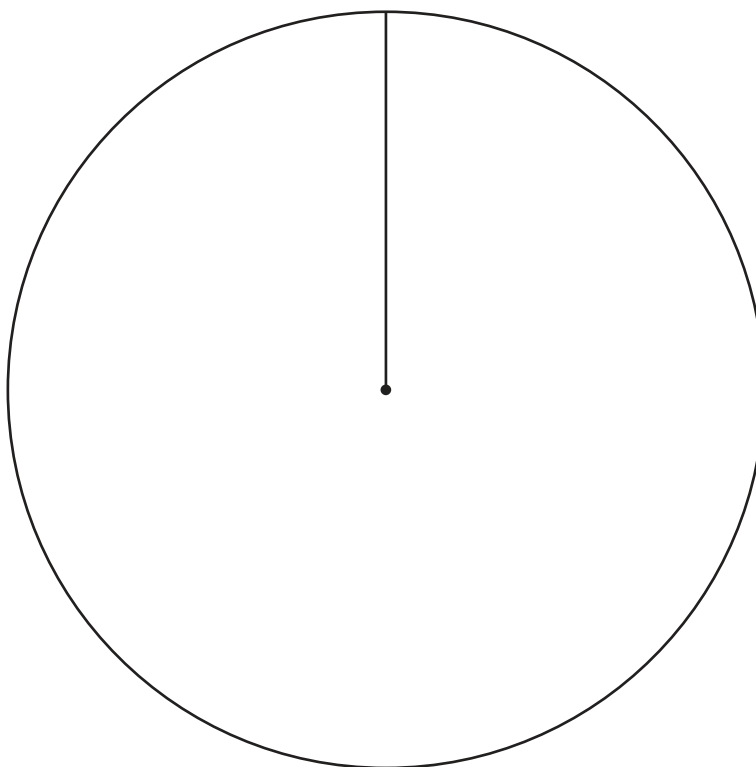




- (b) 40 hockey players vote on the colour of new shirts.
The table shows the results.

| 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%.

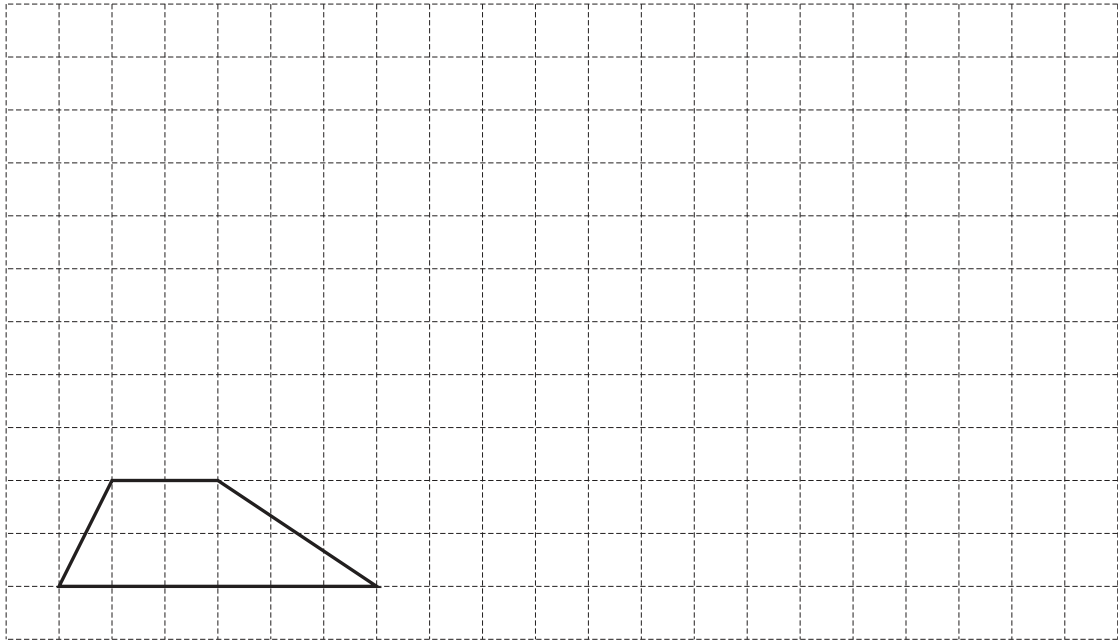
Calculate the new price.

\$ [2]





3 (a) The grid shows a trapezium.



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

[2]

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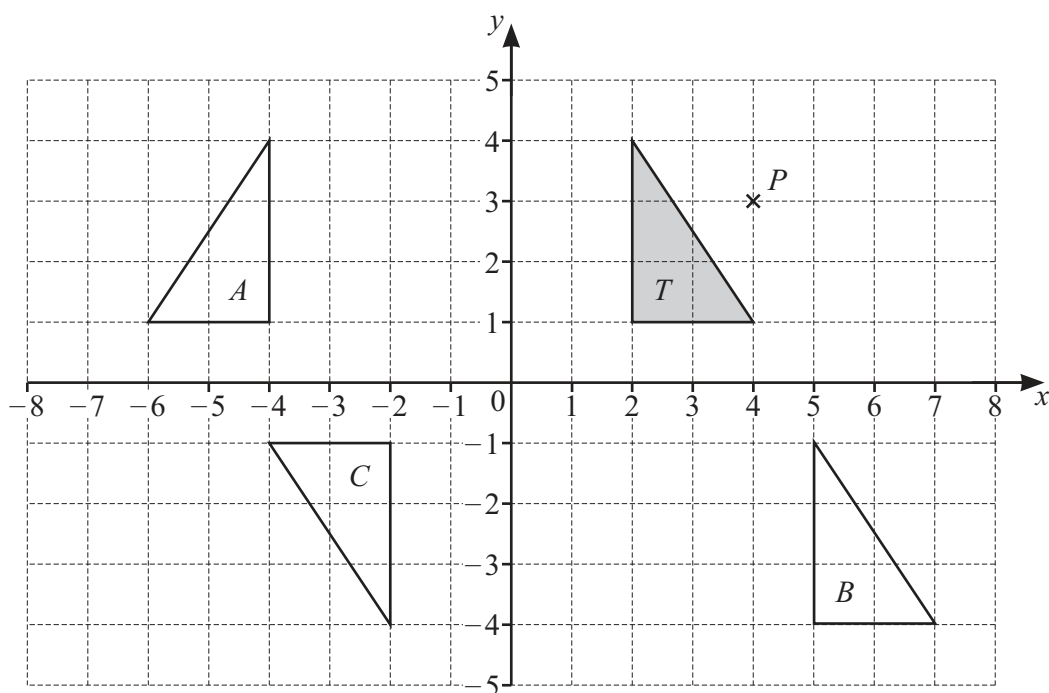
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- (b) The diagram shows four triangles, A , B , C and T , and a point P on a grid.



- (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]

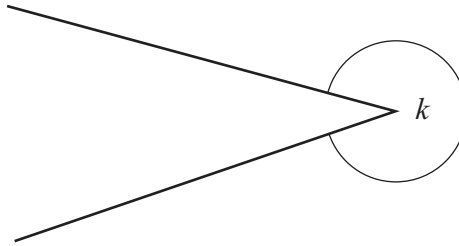
(i) Find the highest common factor (HCF) of 72 and 180.

..... [2]





5 (a)



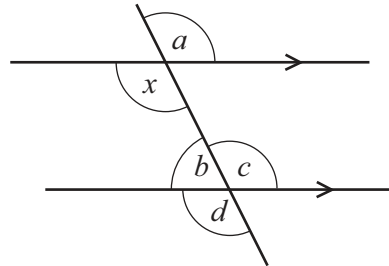
(i) Measure angle k .

..... [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.



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Complete the statements.

Angle is alternate to angle x .

Angle is corresponding to angle x . [2]

(c) The diagram shows a parallelogram.



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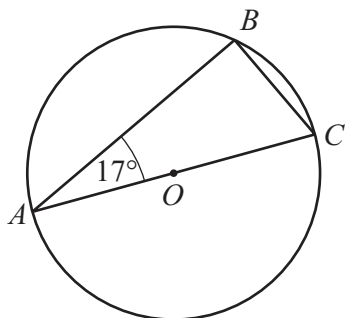
Find the value of y .

$y =$ [1]





(d)



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

Find angle ACB .

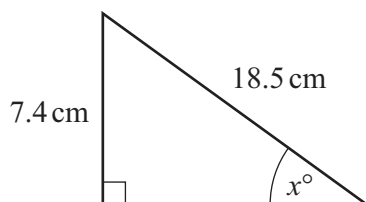
Angle $ACB = \dots\dots\dots$ [2]

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

Work out the number of sides of this polygon.

$\dots\dots\dots$ [2]

(f)



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Calculate the value of x .

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





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

$$\text{number of points} = \text{number of wins} \times 4 + \text{number of draws} \times 2 + \text{bonus points.}$$

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 .

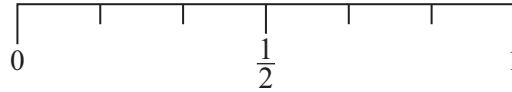
$x =$ [5]





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]

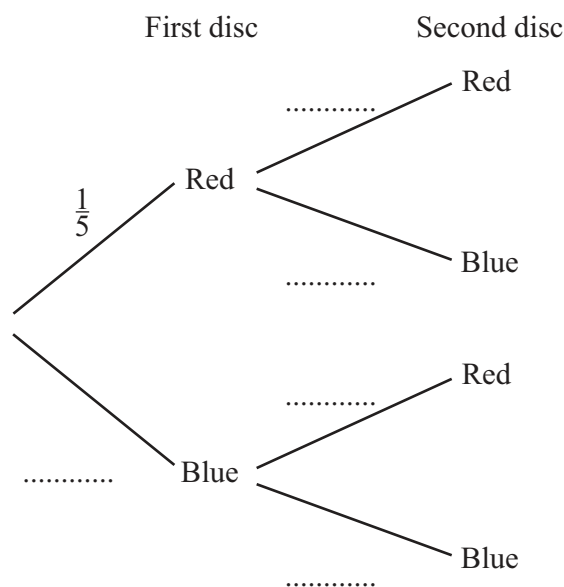


- (d) A bag contains red discs and blue discs.

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.



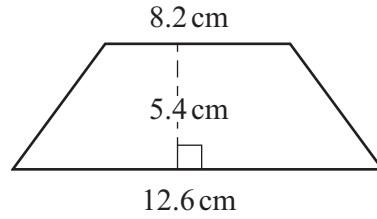
[2]

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

..... [2]



8 (a)

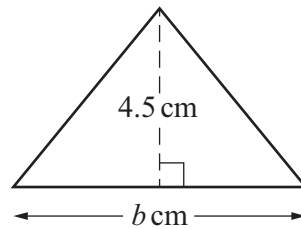


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Find the area of this trapezium.

..... cm^2 [2]

(b)



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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 .

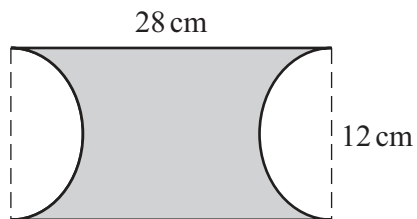
Find the radius of this circle.

..... cm [2]





(d)



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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 $y = mx + c$.

$y = \dots\dots\dots$ [1]

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

Find the value of a .

$a = \dots\dots\dots$ [3]

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

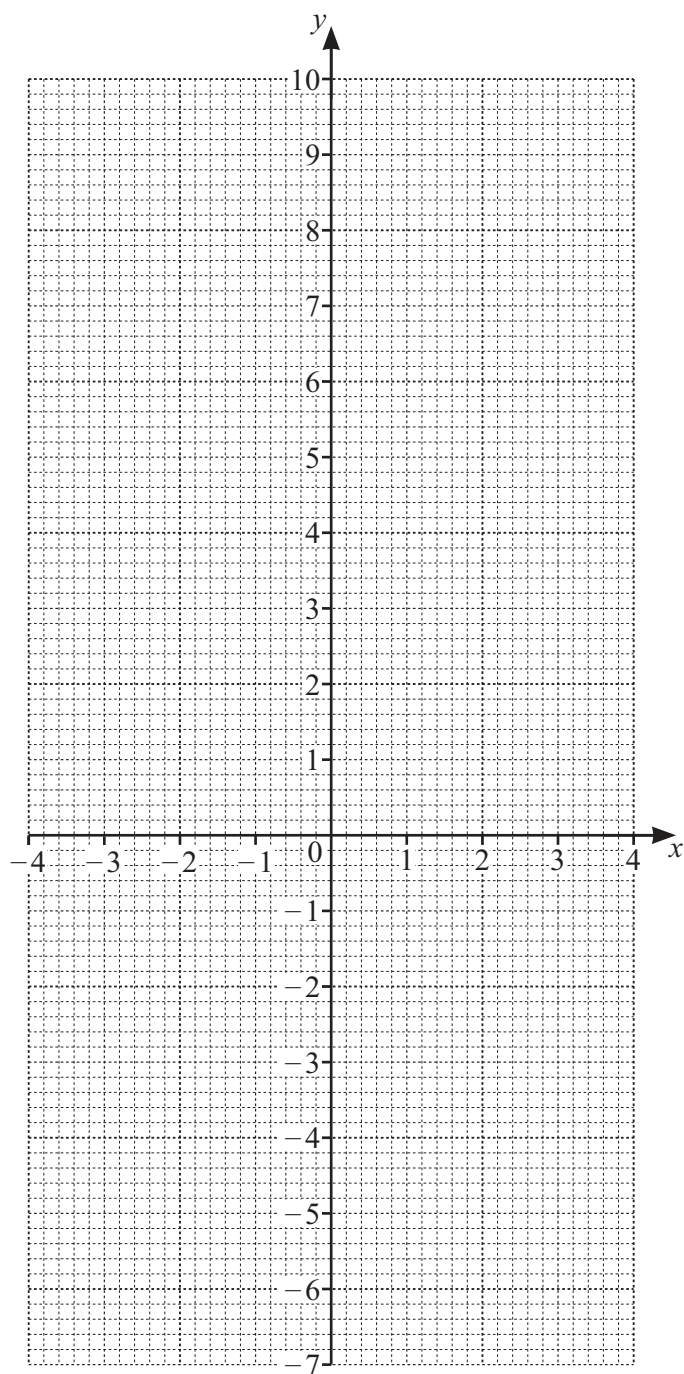
| | | | | | | | | | |
|-----|----|----|----|----|---|----|----|---|----|
| x | -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 |
| y | 10 | | -2 | -5 | | -5 | -2 | | 10 |

[2]

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



[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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