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MATHEMATICS **0580/02**

Paper 2 (Extended) **For examination from 2020**

SPECIMEN PAPER **1 hour 30 minutes**

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 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 70.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **14** pages. Blank pages are indicated.

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1 A train leaves Zurich at 2 pm and arrives in Vienna at 7 am next day.

Work out the time the train takes.

. hm in [1]

2 In a box of eggs, are broken

Work out the percentage of broken eggs in the box

. . % [1]

3 Here is a list of numbers.

Put a ring round the number with the largest value.

0·8 $\frac{1}{3}$ 0·3 $\frac{3}{10}$ 35% [1]

4 Chi says that 8 cm^2 is the same as 8 mm^2.

Explain why Chi is wrong.

. . . [1]

5 $y = mx + c$.

Find the value of y when $m = -2$, $x = -7$ and $c = -3$.

$y =$ . . [2]

6 The number of cars parked in a car park at 9 am is recorded for 20 days.

4 10 12 16 13 20 17 17 18 14

Complete the stem-and-leaf diagram.

10 |.....

11 |.....

12 |.....

13 |.....

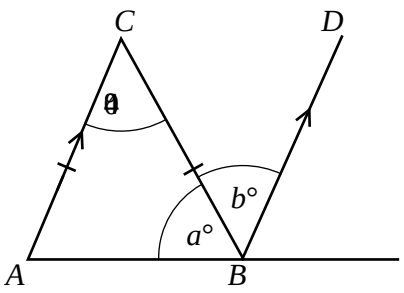
Key: 12|3 represents 123 cars

[2]

7 **Using a ruler and pair of compasses only**, construct a triangle with sides 5 cm, 8 cm and 10 cm.
Leave in your construction arcs.

[2]

8



NOT TO SCALE

Triangle *ABC* is isosceles.
AC is parallel to *BD*.

Find the value of *a* and the value of *b*.

a = . . .

b = . . . [2]

9 Rearrange the formula $5w - 3y + 7 = 0$ to make w the subject.

w = . . . [2]

10 Explain why $\sqrt{3}$ is irrational.

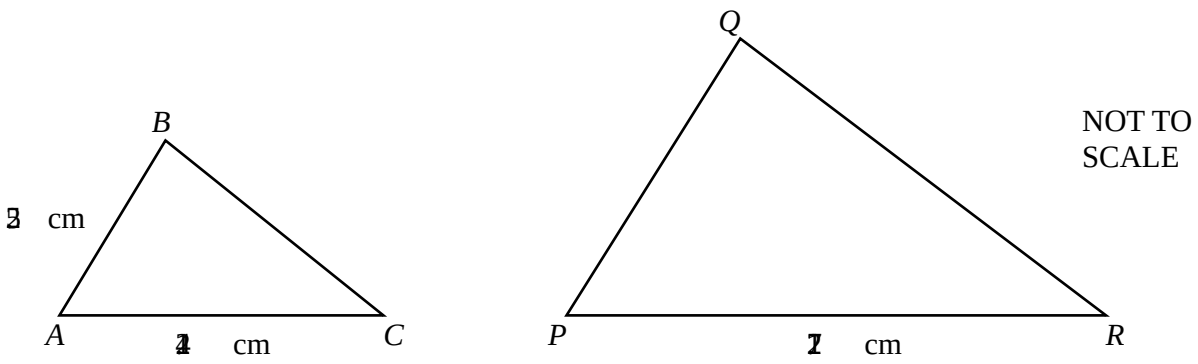
. . . . . [1]

11 The mass, m kilograms, of a box is 24 kg correct to the nearest kilogram.

Complete this statement about the value of m.

. $\leqslant m <$. [2]

12 Triangle ABC is similar to triangle PQR.



Find PQ.

$PQ =$. cm [2]

13 Solve the inequality $n + 7 < 5n - 8$.

. [2]

14 **Without using your calculator**, work out $1\frac{7}{12} + \frac{13}{20}$.

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

. [3]

15 Here is a sequence of numbers.

7, 5, 3, 1, −1, …

(a) Find the next term in this sequence.

. [1]

(b) Find an expression for the *n*th term of this sequence.

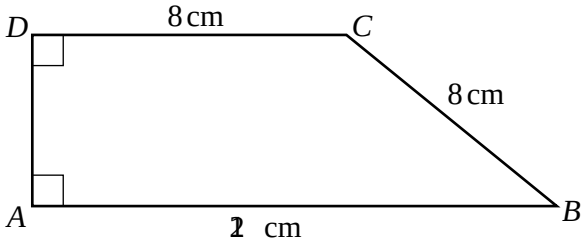
. [2]

16 A hexagon has five angles that each measure 150°.

Calculate the size of the sixth angle.

. [3]

17 Calculate the area of this trapezium.

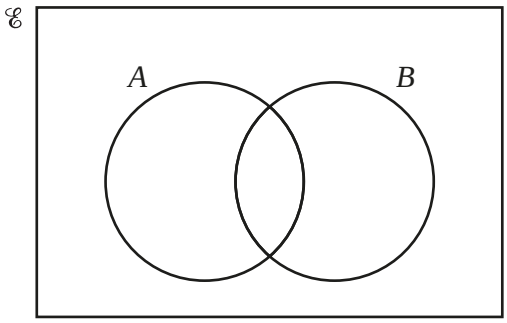


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. cm^2 [4]

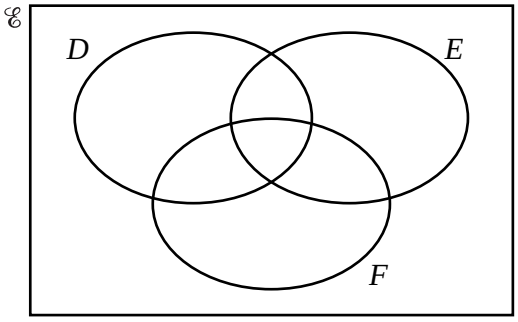
18 Shade the region in each of the Venn diagrams below.

(a)



$A' \cup B$ [1]

(b)



$(D \cap E)' \cap F$. [1]

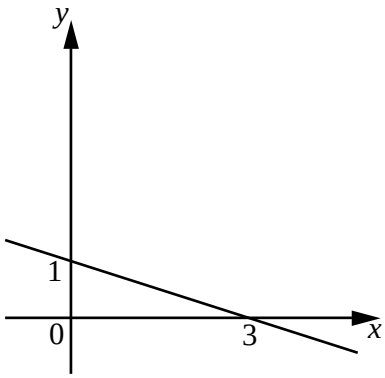
19 Use a calculator to find the decimal value of $\dfrac{\sqrt{29-3\times 32^{0.4}}}{3}$.

. [1]

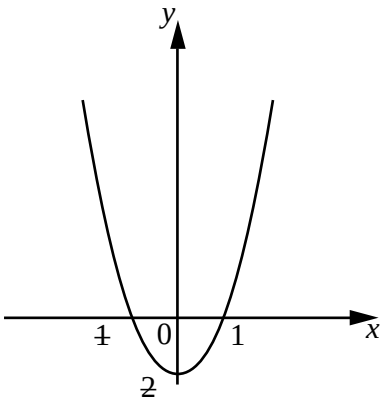
20 Write the recurring decimal $0.3\dot{2}$ as a fraction.
You must show all your working.

. [2]

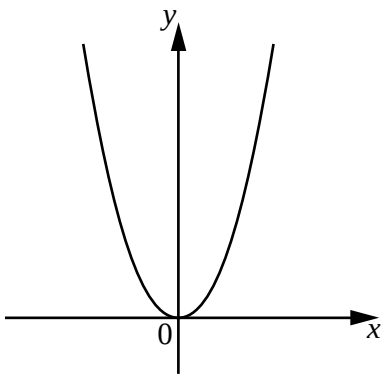
21 The diagrams A, B, C, D, E and F are six graphs of different functions.



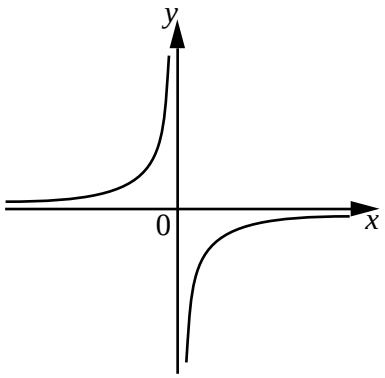
A



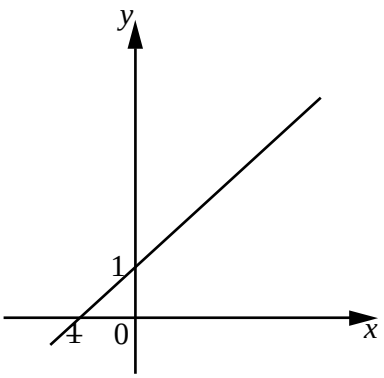
B



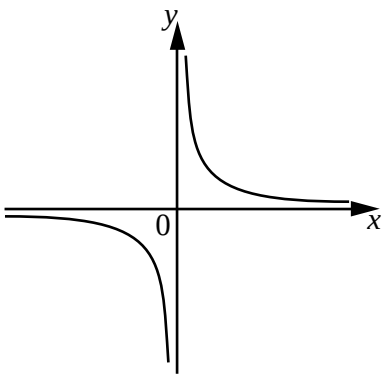
C



D



E



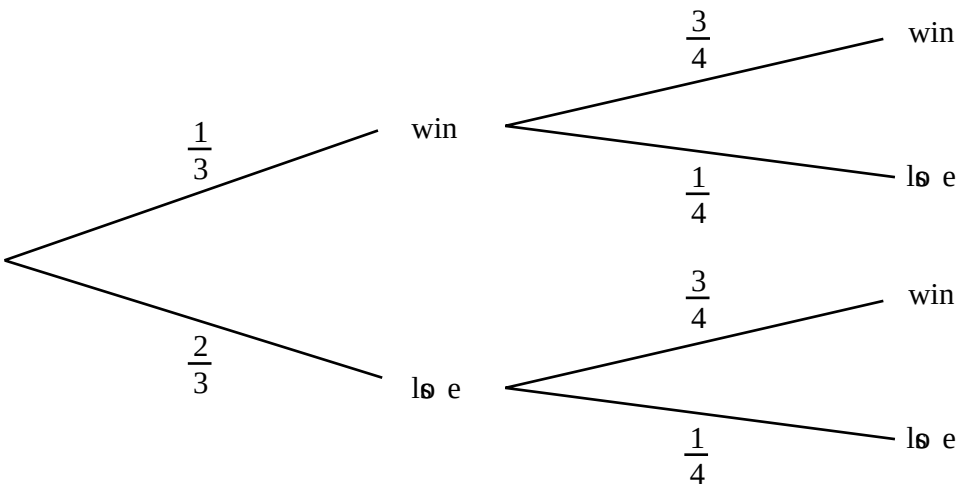
F

Complete the table to identify the correct graph for each function.
One has been entered for you.

Function	$y = x + 1$	$y = 1 - \frac{x}{3}$	$y = 2x^2$	$y = -\frac{4}{x}$
Diagram	E			

[3]

22 A soccer team plays two matches.
The tree diagram shows the probability of the team winning or losing the matches.



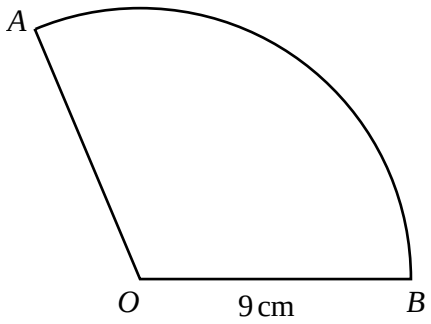
Find the probability that the soccer team wins at least one of the two matches.

. . [3]

23 AB is an arc of a circle, centre O, radius 9 cm.

The length of the arc AB is 6π cm.
The area of sector AOB is $k\pi$ cm^2.

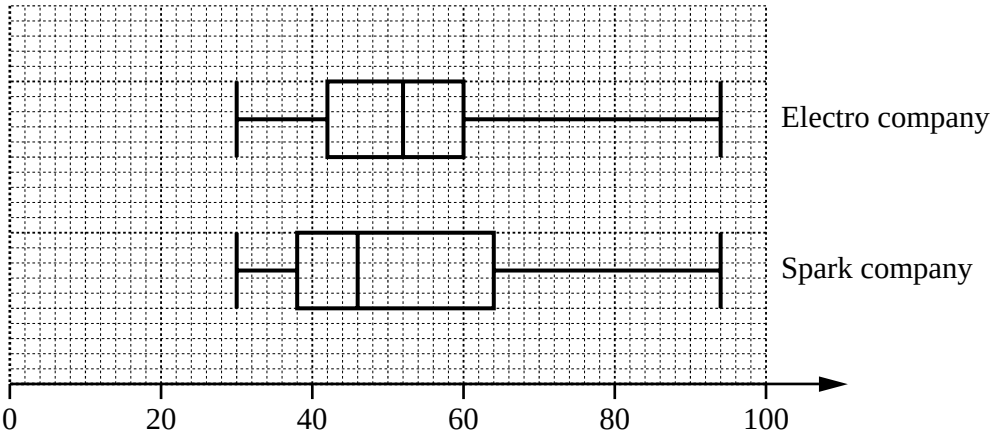
Find the value of k.



NOT TO SCALE

$k =$ . . [3]

24 These box and whisker plots show the monthly electricity costs for 100 different households who use Electro company or Spark company.



Tom says that the monthly costs with Electro company are lower and vary less than with Spark company.

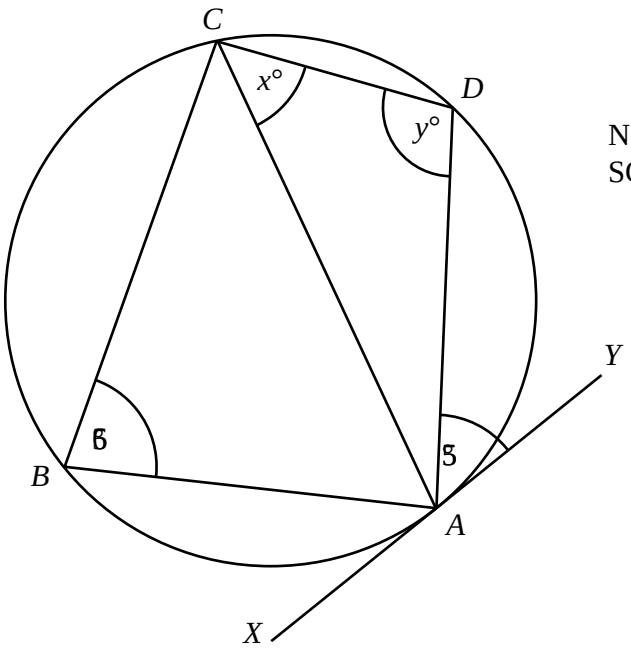
Is Tom correct?
Justify your answer with reference to the box and whisker plots.

[4]

25 Find the minimum point of $y = x^2 + 4x - 3$ by completing the square.

(,) [4]

26



A, *B*, *C* and *D* are points on the circumference of the circle.
The line *XY* is a tangent to the circle at *A*.

(a) Find the value of *x*, giving a reason for your answer.

$x =$ because

[2]

(b) Find the value of *y*, giving a reason for your answer.

$y =$ because

[2]

27 **(a)** Simplify $(27x^6)^{\frac{1}{3}}$.

. [2]

(b) Find the value of $(64x^4)^{0.5} \times 4x^{-2}$.

. . [3]

28 Solve the simultaneous equations.
You must show all your working.

$$y = 5x^2 + 4x - 9$$
$$y = 4x + 1$$

$x =$. $y =$.

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

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