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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.

2

1 A train leaves Zurich at 2.00 pm and arrives in Vienna at 7.30 pm on the same day.

Work out the time the train takes.

. hm []

2 In a box of 1000 sweets, 300 are blue.

Work out the percentage of blue sweets in the box.

. % []

3 Here is a list of numbers.

Put a ring round the number with the largest value.

0.008 $\frac{1}{3}$ 0.0001 $\frac{3}{10}$ 3% []

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

Explain why Chai is wrong.

. []

5 $y = mx + c$.

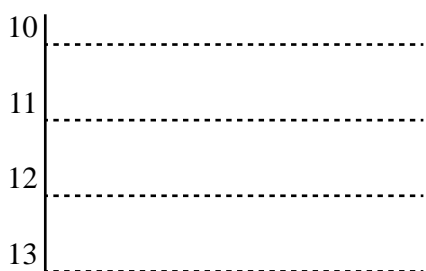
Find the value of y when $m = -2$, $x = -7$ and $c = -3$.

$y = \dots$ [2]

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

1 0 2 1 6 3 0 2 0 1 8 14

Complete the stem-and-leaf diagram.



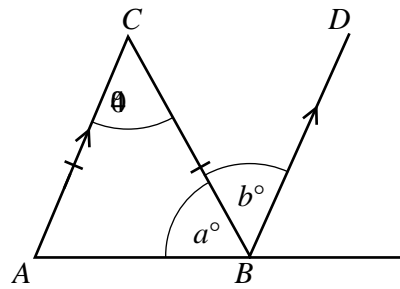
Key: 12|3 represents 123 cars

[2]

7 Using a ruler and pair of compasses only, construct a triangle with sides 5 cm, 8 cm and \dots cm. Leave in your construction lines.

[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.

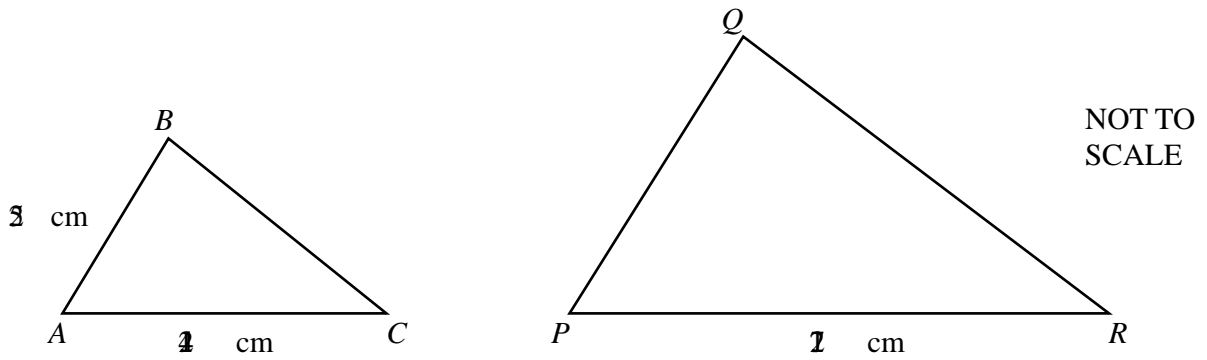
. [1]

11 The mass, m kg, of a substance is directly proportional to the area, A m², of its surface.

Complete this statement about the value of m .

When $A = 10$, $m = 2$.
 When $A = 25$, $m = 5$.
 When $A = 40$, $m = 8$.
 When $A = 60$, $m = 12$.
 When $A = 80$, $m = 16$.
 When $A = 100$, $m = 20$.
 When $A = 120$, $m = 24$.
 When $A = 140$, $m = 28$.
 When $A = 160$, $m = 32$.
 When $A = 180$, $m = 36$.
 When $A = 200$, $m = 40$.
 When $A = 220$, $m = 44$.
 When $A = 240$, $m = 48$.
 When $A = 260$, $m = 52$.
 When $A = 280$, $m = 56$.
 When $A = 300$, $m = 60$.
 When $A = 320$, $m = 64$.
 When $A = 340$, $m = 68$.
 When $A = 360$, $m = 72$.
 When $A = 380$, $m = 76$.
 When $A = 400$, $m = 80$.
 When $A = 420$, $m = 84$.
 When $A = 440$, $m = 88$.
 When $A = 460$, $m = 92$.
 When $A = 480$, $m = 96$.
 When $A = 500$, $m = 100$.
 When $A = 520$, $m = 104$.
 When $A = 540$, $m = 108$.
 When $A = 560$, $m = 112$.
 When $A = 580$, $m = 116$.
 When $A = 600$, $m = 120$.
 When $A = 620$, $m = 124$.
 When $A = 640$, $m = 128$.
 When $A = 660$, $m = 132$.
 When $A = 680$, $m = 136$.
 When $A = 700$, $m = 140$.
 When $A = 720$, $m = 144$.
 When $A = 740$, $m = 148$.
 When $A = 760$, $m = 152$.
 When $A = 780$, $m = 156$.
 When $A = 800$, $m = 160$.
 When $A = 820$, $m = 164$.
 When $A = 840$, $m = 168$.
 When $A = 860$, $m = 172$.
 When $A = 880$, $m = 176$.
 When $A = 900$, $m = 180$.
 When $A = 920$, $m = 184$.
 When $A = 940$, $m = 188$.
 When $A = 960$, $m = 192$.
 When $A = 980$, $m = 196$.
 When $A = 1000$, $m = 200$.
 When $A = 1020$, $m = 204$.
 When $A = 1040$, $m = 208$.
 When $A = 1060$, $m = 212$.
 When $A = 1080$, $m = 216$.
 When $A = 1100$, $m = 220$.
 When $A = 1120$, $m = 224$.
 When $A = 1140$, $m = 228$.
 When $A = 1160$, $m = 232$.
 When $A = 1180$, $m = 236$.
 When $A = 1200$, $m = 240$.
 When $A = 1220$, $m = 244$.
 When $A = 1240$, $m = 248$.
 When $A = 1260$, $m = 252$.
 When $A = 1280$, $m = 256$.
 When $A = 1300$, $m = 260$.
 When $A = 1320$, $m = 264$.
 When $A = 1340$, $m = 268$.
 When $A = 1360$, $m = 272$.
 When $A = 1380$, $m = 276$.
 When $A = 1400$, $m = 280$.
 When $A = 1420$, $m = 284$.
 When $A = 1440$, $m = 288$.
 When $A = 1460$, $m = 292$.
 When $A = 1480$, $m = 296$.
 When $A = 1500$, $m = 300$.
 When $A = 1520$, $m = 304$.
 When $A = 1540$, $m = 308$.
 When $A = 1560$, $m = 312$.
 When $A = 1580$, $m = 316$.
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 When $A = 1640$, $m = 328$.
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 When $A = 1740$, $m = 348$.
 When $A = 1760$, $m = 352$.
 When $A = 1780$, $m = 356$.
 When $A = 1800$, $m = 360$.
 When $A = 1820$, $m = 364$.
 When $A = 1840$, $m = 368$.
 When $A = 1860$, $m = 372$.
 When $A = 1880$, $m = 376$.
 When $A = 1900$, $m = 380$.
 When $A = 1920$, $m = 384$.
 When $A = 1940$, $m = 388$.
 When $A = 1960$, $m = 392$.
 When $A = 1980$, $m = 396$.
 When $A = 2000$, $m = 400$.
 When $A = 2020$, $m = 404$.
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 When $A = 2100$, $m = 420$.
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 When $A = 2140$, $m = 428$.
 When $A = 2160$, $m = 432$.
 When $A = 2180$, $m = 436$.
 When $A = 2200$, $m = 440$.
 When $A = 2220$, $m = 444$.
 When $A = 2240$, $m = 448$.
 When $A = 2260$, $m = 452$.
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 When $A = 2520$, $m = 504$.
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 When $A = 2580$, $m = 516$.
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 When $A = 2680$, $m = 536$.
 When $A = 2700$, $m = 540$.
 When $A = 2720$, $m = 544$.
 When $A = 2740$, $m = 548$.
 When $A = 2760$, $m = 552$.
 When $A = 2780$, $m = 556$.
 When $A = 2800$, $m = 560$.
 When $A = 2820$, $m = 564$.
 When $A = 2840$, $m = 568$.
 When $A = 2860$, $m = 572$.
 When $A = 2880$, $m = 576$.
 When $A = 2900$, $m = 580$.
 When $A = 2920$, $m = 584$.
 When $A = 2940$, $m = 588$.
 When $A = 2960$, $m = 592$.
 When $A = 2980$, $m = 596$.
 When $A = 3000$, $m = 600$.
 When $A = 3020$, $m = 604$.
 When $A = 3040$, $m = 608$.
 When $A = 3060$, $m = 612$.
 When $A = 3080$, $m = 616$.
 When $A = 3100$, $m = 620$.
 When $A = 3120$, $m = 624$.
 When $A = 3140$, $m = 628$.
 When $A = 3160$, $m = 632$.
 When $A = 3180$, $m = 636$.
 When $A = 3200$, $m = 640$.
 When $A = 3220$, $m = 644$.
 When $A = 3240$, $m = 648$.
 When $A = 3260$, $m = 652$.
 When $A = 3280$, $m = 656$.
 When $A = 3300$, $m = 660$.
 When $A = 3320$, $m = 664$.
 When $A = 3340$, $m = 668$.
 When $A = 3360$, $m = 672$.
 When $A = 3380$, $m = 676$.
 When $A = 3400$, $m = 680$.
 When $A = 3420$, $m = 684$.
 When $A = 3440$, $m = 688$.
 When $A = 3460$, $m = 692$.
 When $A = 3480$, $m = 696$.
 When $A = 3500$, $m = 700$.
 When $A = 3520$, $m = 704$.
 When $A = 3540$, $m = 708$.
 When $A = 3560$, $m = 712$.
 When $A = 3580$, $m = 716$.
 When $A = 3600$, $m = 720$.
 When $A = 3620$, $m = 724$.
 When $A = 3640$, $m = 728$.
 When $A = 3660$, $m = 732$.
 When $A = 3680$, $m = 736$.
 When $A = 3700$, $m = 740$.
 When $A = 3720$, $m = 744$.
 When $A = 3740$, $m = 748$.
 When $A = 3760$, $m = 752$.
 When $A = 3780$, $m = 756$.
 When $A = 3800$, $m = 760$.
 When $A = 3820$, $m = 764$.
 When $A = 3840$, $m = 768$.
 When $A = 3860$, $m = 772$.
 When $A = 3880$, $m = 776$.
 When $A = 3900$, $m = 780$.
 When $A = 3920$, $m = 784$.
 When $A = 3940$, $m = 788$.
 When $A = 3960$, $m = 792$.
 When $A = 3980$, $m = 796$.
 When $A = 4000$, $m = 800$.
 When $A = 4020$, $m = 804$.
 When $A = 4040$, $m = 808$.
 When $A = 4060$, $m = 812$.
 When $A = 4080$, $m = 816$.
 When $A = 4100$, $m = 820$.
 When $A = 4120$, $m = 824$.
 When $A = 4140$, $m = 828$.
 When $A = 4160$, $m = 832$.
 When $A = 4180$, $m = 836$.
 When $A = 4200$, $m = 840$.
 When $A = 4220$, $m = 844$.
 When $A = 4240$, $m = 848$.
 When $A = 4260$, $m = 852$.
 When $A = 4280$, $m = 856$.
 When $A = 4300$, $m = 860$.
 When $A = 4320$, $m = 864$.
 When $A = 4340$, $m = 868$.
 When $A = 4360$, $m = 872$.
 When $A = 4380$, $m = 876$.
 When $A = 4400$, $m = 880$.
 When $A = 4420$, $m = 884$.
 When $A = 4440$, $m = 888$.
 When $A = 4460$, $m = 892$.
 When $A = 4480$, $m = 896$.
 When $A = 4500$, $m = 900$.
 When $A = 4520$, $m = 904$.
 When $A = 4540$, $m = 908$.
 When $A = 4560$, $m = 912$.
 When $A = 4580$, $m = 916$.
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 When $A = 4900$, $m = 980$.
 When $A = 4920$, $m = 984$.
 When $A = 4940$, $m = 988$.
 When $A = 4960$, $m = 992$.
 When $A = 4980$, $m = 996$.
 When $A = 5000$, $m = 1000$.

12 Triangle ABC is similar to triangle PQR .



Find PQ .

$PQ = \dots$ cm [2]

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

$n > \dots$ [2]

6

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 n th term of this sequence.

. [1]

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

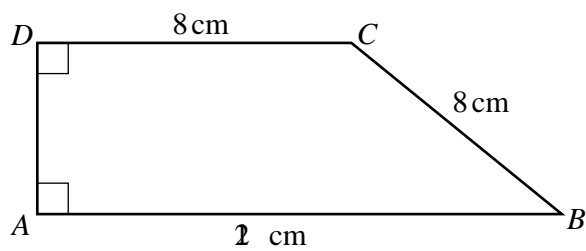
. [2]

16 A hexagon has five angles that each measure 15° .

Calculate the size of the sixth angle.

. [3]

17 Calculate the area of this trapezium.

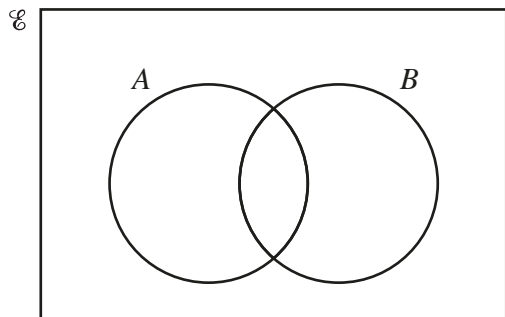


NOT TO SCALE

cm² [4]

18 Shade the region indicated by the Venn diagrams below.

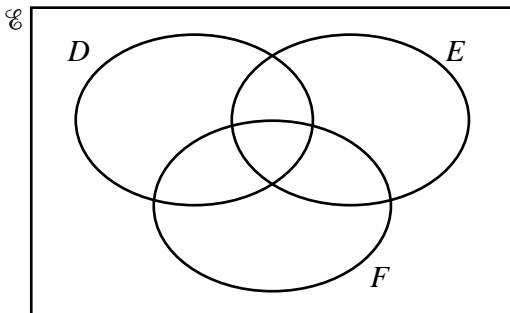
(a)



$A' \cup B$

[1]

(b)



$(D \cap E)' \cap F$

[1]

8

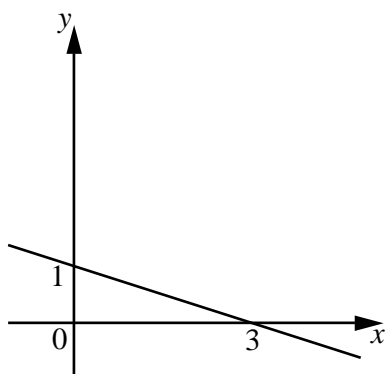
19 Use a calculator to find the decimal value of $\frac{\sqrt{29-3 \times 32^{0.4}}}{3}$.

[1]

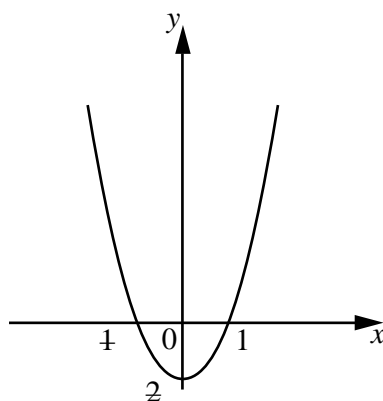
20 Write the recurring decimal $0.3\dot{2}$ as a fraction.
You must show all your working.

[2]

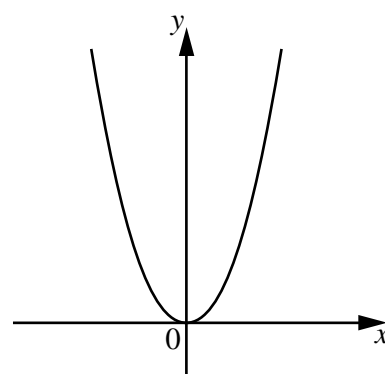
21 The diagrams A, B, C, D, E and F are six graphs of different functions.



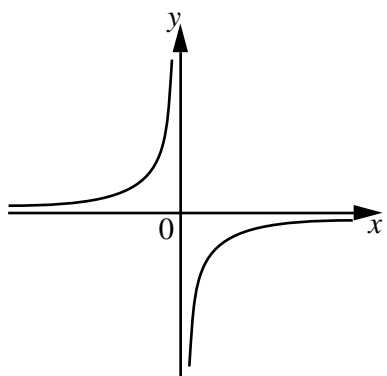
A



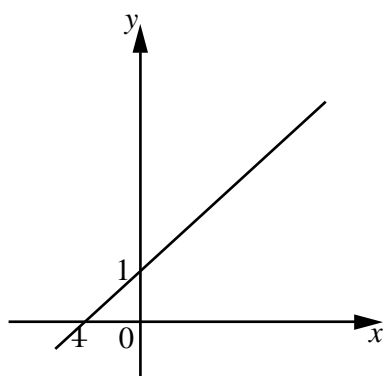
B



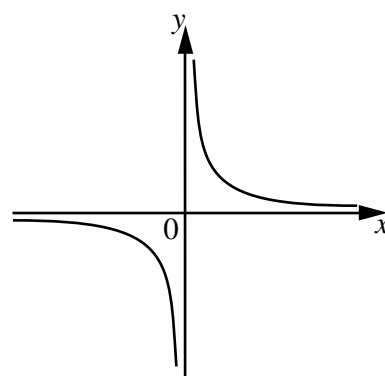
C



D



E



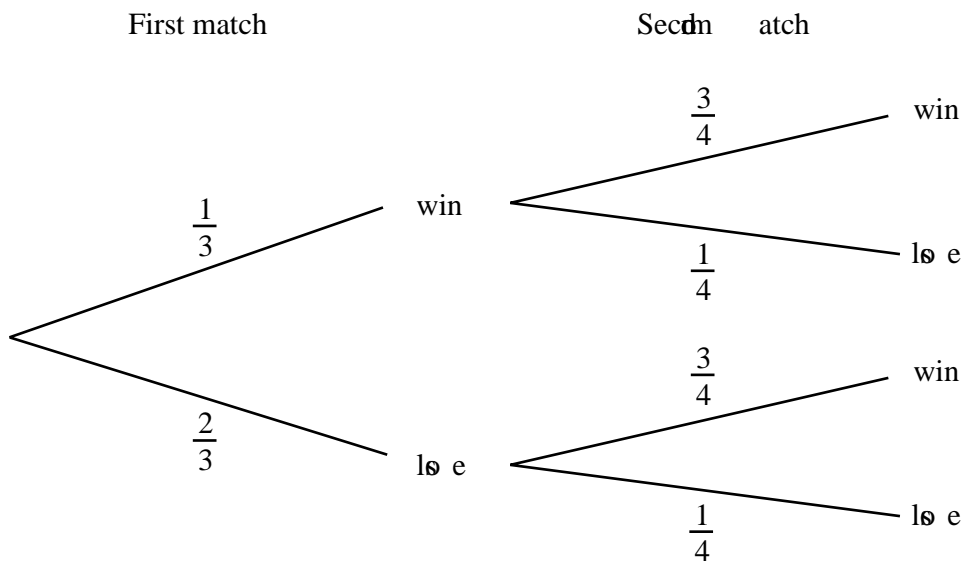
F

Complete the table to identify the correct graph for each function. One has been done 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 the team wins or loses a match.



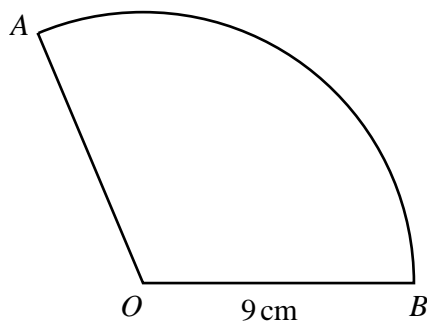
Find the probability that the soccer team wins at least one of the two matches.

. . . [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 $k\pi$ cm².

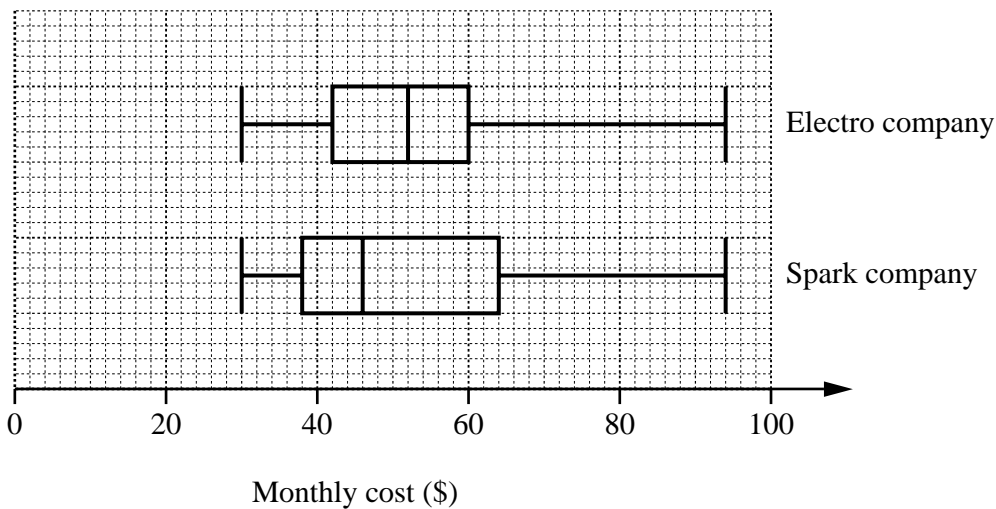
Find the value of k .



NOT TO SCALE

$k =$. . . [3]

24 The table below shows the monthly electricity costs for 10 different households with the Electro company and Spark company.



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

Is Tom correct?

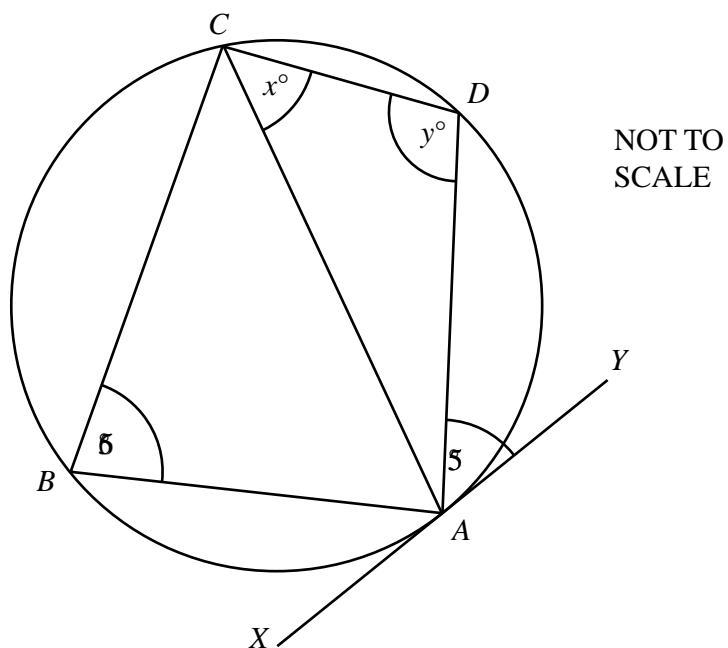
Justify your answer with reference to the table and whiskers.

[4]

25 Find the turning 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 reasons for your answer.

$x = 5$ because

. [2]

(b) Find the value of y , giving reasons for your answer.

$y = 5$ because

. [2]

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

[2]

(b) Find the value of $(6x^4)^{0.5} \times 4x^{-2}$.

[3]

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

$$\begin{aligned} y &= 5x^2 + 4x - 9 \\ y &= 4x + 1 \end{aligned}$$

$$x = .$$

$$y = .$$

$$x = .$$

$$y = .$$

[5]

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