





4 Cheryl recorded the midday temperatures in Seoul for one week in January.

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Temperature (°C)	-4	-5	-3	-11	-8	-3	-1

(a) Write down the mode.

Answer(a) ..... °C [1]

(b) On how many days was the temperature lower than the mode?

Answer(b) ..... [1]

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5 Without using a calculator, work out  $\frac{1}{4} + \frac{1}{6}$ .

Write down all the steps in your working and give your answer as a fraction in its simplest form.

Answer ..... [2]

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6 Write 15.0782 correct to

(a) one decimal place,

Answer(a) ..... [1]

(b) the nearest 10.

Answer(b) ..... [1]

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4

- 7 The population of Dubai at the end of 2012 was 2.1 million.  
This was predicted to increase at a rate of 6% each year.

Calculate the predicted population of Dubai at the end of 2015.

Answer ..... million [3]

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- 8 On a ship, the price of a gift is 24 euros (€) or \$30.

What is the difference in the price on a day when the exchange rate is €1 = \$1.2378?  
Give your answer in dollars, correct to the nearest cent.

Answer \$ ..... [3]

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5

9 (a) Write  $2.8 \times 10^2$  as an ordinary number.

Answer(a) .....

(b) Work out  $2.5 \times 10^8 \times 2 \times 10^{-2}$ .  
Give your answer in standard form.

Answer(b) ..... [2]

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10 Solve the equation.

$$\frac{x+5}{x} = \frac{7}{3}$$

Answer  $x =$  ..... [3]

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11 (a) Simplify  $x^8 \div x^2$ .

Answer(a) .....

(b) Simplify  $\left(\frac{x^6}{27}\right)^{\frac{1}{3}}$ .

Answer(b) ..... [2]

12 Solve the simultaneous equations.

$$0.4x - 5y = 27$$

$$2x + 0.2y = 9$$

Answer  $x =$  .....

$y =$  ..... [3]

13  $y$  varies directly with  $\sqrt{x + 5}$ .  
 $y = 4$  when  $x = -1$ .

Find  $y$  when  $x = 11$ .

Answer  $y =$  ..... [3]

14

$$\mathbf{A} = \begin{pmatrix} 2 & 8 \\ 1 & 4 \end{pmatrix}$$

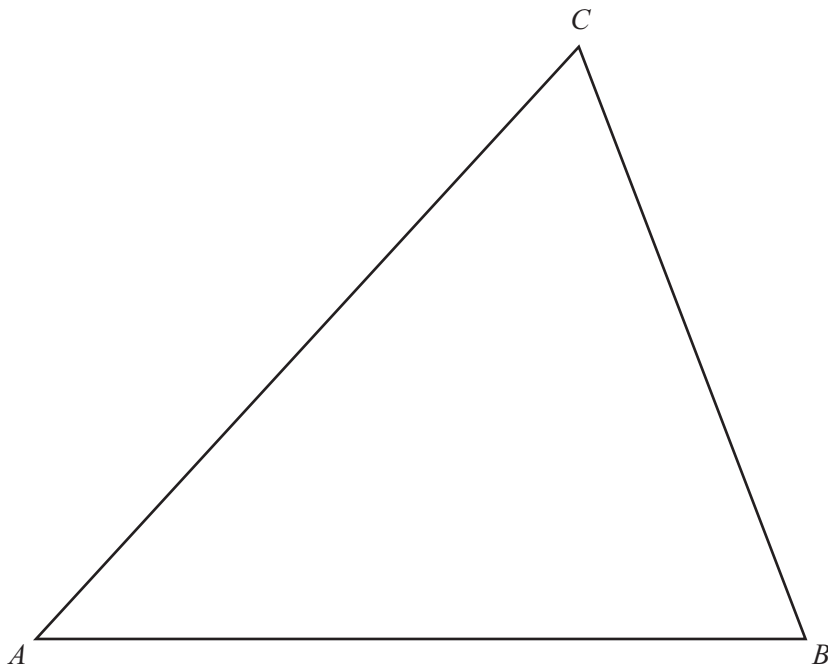
Work out  $\mathbf{A}^2 - 4\mathbf{A}$ .

Answer

$$\begin{pmatrix} & \\ & \end{pmatrix}$$

[3]

15



(a) Using compasses and straight edge only, construct

(i) the perpendicular bisector of  $AC$ ,

[2]

(ii) the bisector of angle  $ACB$ .

[2]

(b) Shade the region inside the triangle which is

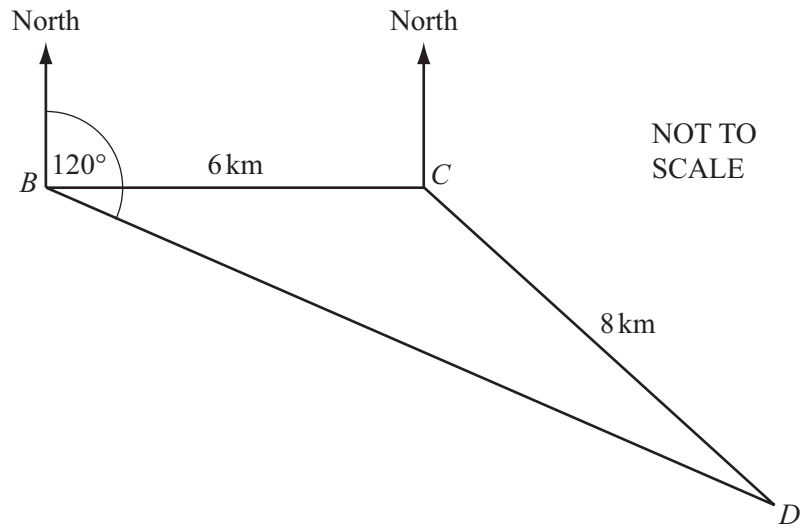
- nearer to  $A$  than to  $C$

 and

- nearer to  $AC$  than to  $BC$ .

[1]

- 16 A helicopter flies from its base  $B$  to deliver supplies to two oil rigs at  $C$  and  $D$ .  
 $C$  is 6 km due east of  $B$  and the distance from  $C$  to  $D$  is 8 km.  
 $D$  is on a bearing of  $120^\circ$  from  $B$ .

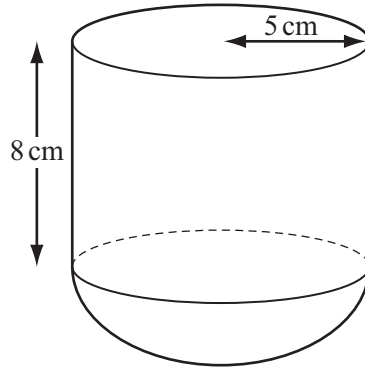


Find the bearing of  $D$  from  $C$ .

Answer ..... [5]



17 The diagram shows a child's toy.



NOT TO SCALE

The shape of the toy is a cylinder of radius 5 cm and height 8 cm on top of a hemisphere of radius 5 cm.

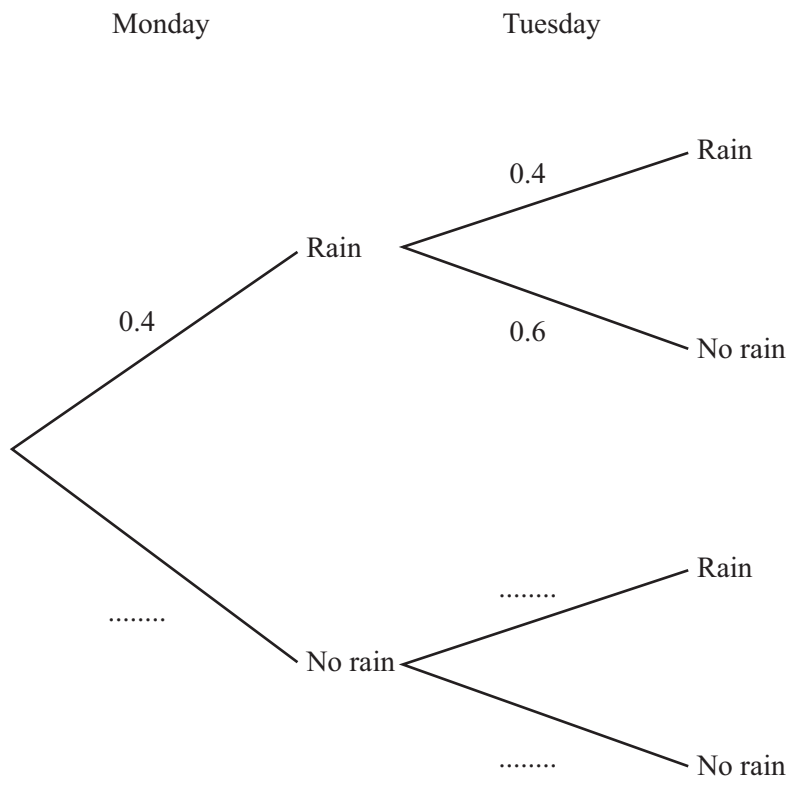
Calculate the volume of the toy.

[The volume,  $V$ , of a sphere with radius  $r$  is  $V = \frac{4}{3}\pi r^3$ .]

Answer ..... cm<sup>3</sup> [5]

18 If it rains today the probability that it will rain tomorrow is 0.4 .  
If it does not rain today the probability that it will rain tomorrow is 0.2 .  
On Sunday it rained.

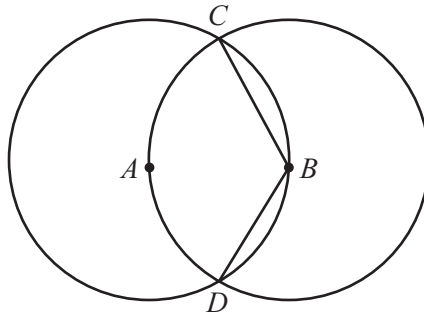
(a) Complete the tree diagram for Monday and Tuesday.



[2]

(b) Find the probability that it rains on at least one of the two days shown in the tree diagram.

Answer(b) ..... [3]



NOT TO SCALE

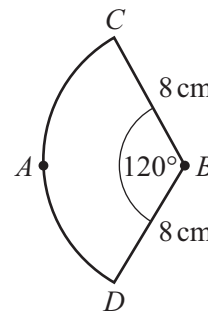
Two circles, centres  $A$  and  $B$ , are each of radius 8 cm and intersect at  $C$  and  $D$ . Each circle passes through the centre of the other circle.

(a) Explain why angle  $CBD$  is  $120^\circ$ .

Answer(a)

[1]

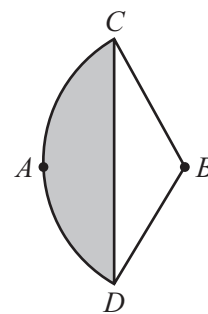
(b) For the circle, centre  $B$ , find the area of the sector  $BCD$ .



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Answer(b) .....  $\text{cm}^2$  [2]

(c) (i) Find the area of the shaded segment  $CAD$ .



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Answer(c)(i) .....  $\text{cm}^2$  [3]

(ii) Find the area of overlap of the two circles.

Answer(c)(ii) .....  $\text{cm}^2$  [1]

Question 20 is printed on the next page.

20  $f(x) = 3x - 2$        $g(x) = \frac{2}{x + 1}$ ,  $x \neq -1$

(a) Find  $gf(2)$ .

*Answer(a)* ..... [2]

(b) Solve  $g(x) = 10$ .

*Answer(b)*  $x =$  ..... [2]

(c) Simplify.

$$f(2x) - f(x + 2)$$

*Answer(c)* ..... [3]

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