

1 Sheila can pay her hotel bill in Euros (€) or Pounds (£).
The bill was €425 or £365 when the exchange rate was £1 = €1.14 .

In which currency was the bill cheaper?
Show all your working.

Answer [2]

2 The Ocean View Hotel has 300 rooms numbered from 100 to 399.
A room is chosen at random.

Find the probability that the room number ends in zero.

Answer [2]

3 The time in Lisbon is the same as the time in Funchal.
A plane left Lisbon at 08 30 and arrived in Funchal at 10 20.
It then left Funchal at 12 55 and returned to Lisbon.
The return journey took 15 minutes more.

What time did the plane arrive in Lisbon?

Answer [2]

4 Use a calculator to find

(a) $\sqrt{5\frac{5}{24}}$,

Answer(a) [1]

(b) $\frac{\cos 40^\circ}{7}$.

Answer(b) [1]

5 Write the following in order of size, **smallest** first.

$(1.5)^{\frac{2}{3}}$ $\left(\frac{2}{3}\right)^{1.5}$ $\left(\frac{2}{3}\right)^{-1.5}$ $\left(-\frac{2}{3}\right)^{\frac{2}{3}}$

Answer < < < [2]

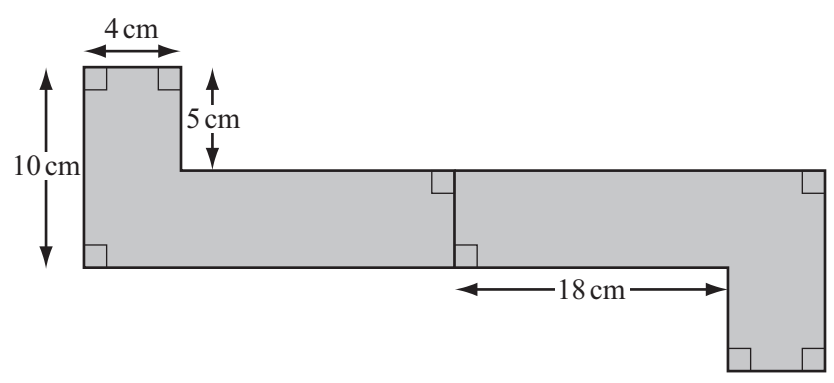
6 The volumes of two similar cones are $36\pi \text{ cm}^3$ and $288\pi \text{ cm}^3$.
The base radius of the smaller cone is 3 cm.

Calculate the base radius of the larger cone.

Answer cm [3]

4

7



NOT TO
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The shaded shape has rotational symmetry of order 2.

Work out the shaded area.

Answer cm² [3]

8 The mass, m , of a sphere varies directly with the **cube** of its radius, r .
 $m = 160$ when $r = 2$.

Find m when $r = 5$.

Answer $m =$ [3]

5

9 Calculate, giving your answers in standard form,

(a) $2 \times (5.5 \times 10^4)$,

Answer(a) [2]

(b) $(5.5 \times 10^4) - (5 \times 10^4)$.

Answer(b) [2]

10 Find the value of $2x + y$ for the simultaneous equations.

$$3x + 5y = 48$$

$$2x - y = 19$$

Answer $2x + y =$ [4]

11 The sum of the prime numbers less than 8 is equal to 17.

(a) Find the sum of the prime numbers less than 21.

Answer(a) [2]

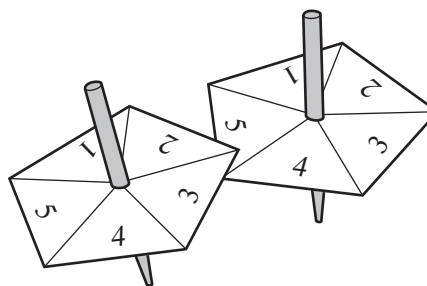
(b) The sum of the prime numbers less than x is 58.

Find an integer value for x .

Answer(b) $x =$ [2]

12 Two spinners have sections numbered from 1 to 5. Each is spun once and each number is equally likely. The possibility diagram is shown below.

Second spinner	5	+	+	+	+	+
	4	+	+	+	+	+
	3	+	+	+	+	+
	2	+	+	+	+	+
	1	+	+	+	+	+
		1	2	3	4	5
		First spinner				



Find the probability that

(a) both spinners show the same number,

Answer(a) [2]

(b) the sum of the numbers shown on the two spinners is 7.

Answer(b) [2]

13 Write as a single fraction in its simplest form.

$$\frac{x+3}{x-3} - \frac{x-1}{x+1}$$

Answer [4]

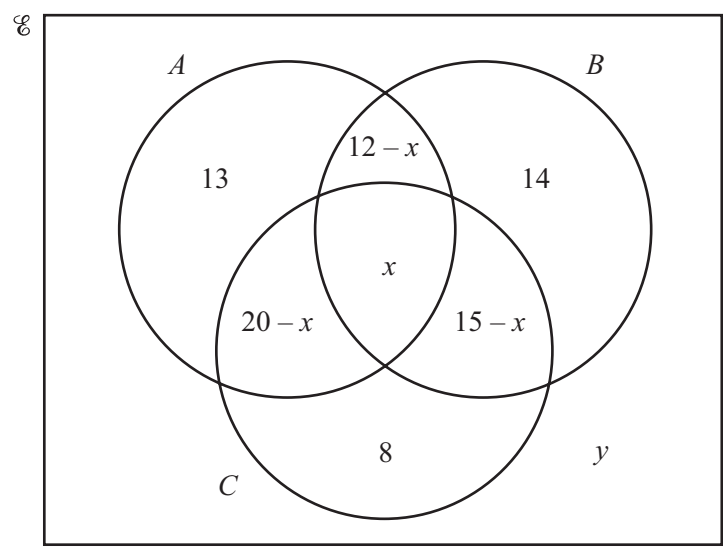
14 (a) Solve $3n + 23 < n + 41$.

Answer(a) [2]

(b) Factorise completely $ab + bc + ad + cd$.

Answer(b) [2]

15



The Venn diagram shows the number of elements in sets A , B and C .

(a) $n(A \cup B \cup C) = 74$

Find x .

Answer(a) $x = \dots\dots\dots$ [2]

(b) $n(E) = 100$

Find y .

Answer(b) $y = \dots\dots\dots$ [1]

(c) Find the value of $n((A \cup B)' \cap C)$.

Answer(c) $\dots\dots\dots$ [1]

16

$$f(x) = x + \frac{2}{x} - 3, \quad x \neq 0$$

$$g(x) = \frac{x}{2} - 5$$

Find

(a) $fg(18)$,

Answer(a) [2]

(b) $g^{-1}(x)$.

Answer(b) $g^{-1}(x) =$ [2]

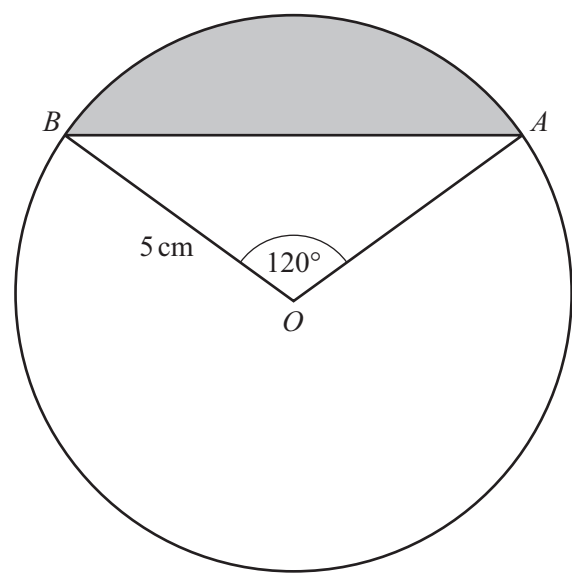
17 $M = \begin{pmatrix} 2 & 3 \\ 3 & 6 \end{pmatrix}$ $N = \begin{pmatrix} 2 & 1 & 5 \\ 1 & 7 & 2 \end{pmatrix}$

(a) Work out MN .

Answer(a) [2]

(b) Find M^{-1} , the inverse of M .

Answer(b) [2]

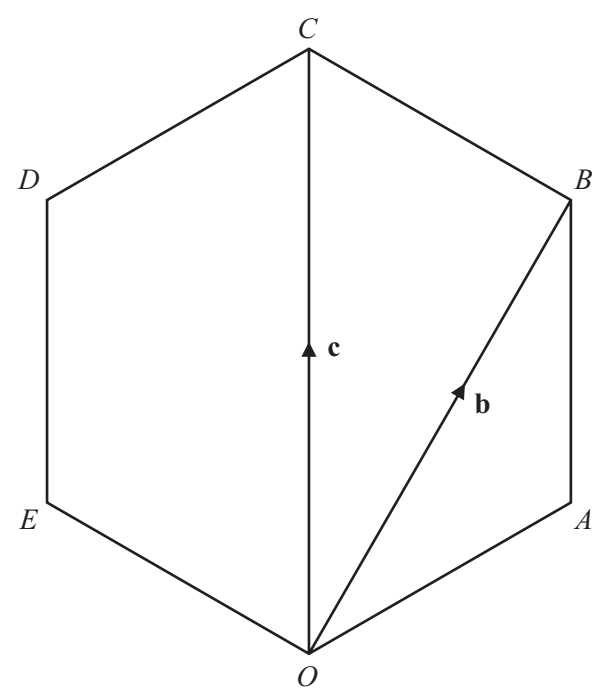


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A and B lie on a circle centre O , radius 5 cm .
Angle $AOB = 120^\circ$.

Find the area of the shaded segment.

Answer cm^2 [4]



OABCDE is a regular polygon.

(a) Write down the geometrical name for this polygon.

Answer(a) [1]

(b) O is the origin. $\vec{OB} = \mathbf{b}$ and $\vec{OC} = \mathbf{c}$.

Find, in terms of \mathbf{b} and \mathbf{c} , in their simplest form,

(i) \vec{BC} ,

Answer(b)(i) $\vec{BC} = \dots\dots\dots$ [1]

(ii) \vec{OA} ,

Answer(b)(ii) $\vec{OA} = \dots\dots\dots$ [2]

(iii) the position vector of E.

Answer(b)(iii) [1]

Question 20 is printed on the next page.

20 (a)

$$y = \sqrt{8 + \frac{4}{x}}$$

Find y when $x = 2$.
Give your answer correct to 4 decimal places.

Answer(a) $y =$ [2]

(b) Rearrange $y = \sqrt{8 + \frac{4}{x}}$ to make x the subject.

Answer(b) $x =$ [4]

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