

- 1 One January day in Munich, the temperature at noon was 3°C .
At midnight the temperature was -8°C .

Write down the difference between these two temperatures.

Answer $^{\circ}\text{C}$ [1]

- 2 (a) Calculate $\sqrt{5.7} - 1.03^2$.

Write down all the numbers displayed on your calculator.

Answer(a) [1]

- (b) Write your answer to **part (a)** correct to 3 decimal places.

Answer(b) [1]

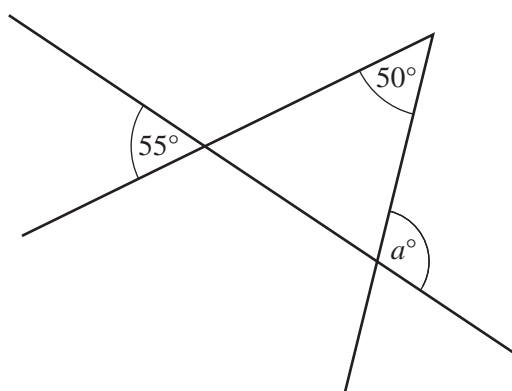
- 3 Pedro and Eva do their homework.
Pedro takes 84 minutes to do his homework.

The ratio Pedro's time : Eva's time = 7 : 6.

Work out the number of minutes Eva takes to do her homework.

Answer min [2]

4



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Use the information in the diagram to find the value of a .

Answer $a =$ [2]

5 Show that $1\frac{1}{2} \div \frac{3}{16} = 8$.

Do not use a calculator and show all the steps of your working.

Answer

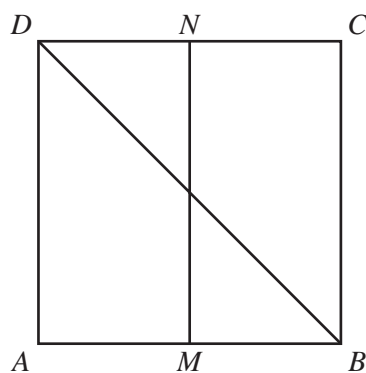
[2]

6 Factorise completely.

$$12xy - 3x^2$$

Answer [2]

7



The diagram shows a square $ABCD$.

M is the midpoint of AB and N is the midpoint of CD .

(a) Complete the statement.

The line MN is the locus of points inside the square which are

..... [1]

(b) Shade the region inside the square containing points which are nearer to AB than to BC **and** nearer to A than to B .

[1]

- 8 Solve the inequality.

$$3x - 1 \leq 11x + 2$$

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Answer [2]

- 9 An equilateral triangle has sides of length 16.1 cm, correct to the nearest millimetre.

Find the lower and upper bounds of the perimeter of the triangle.

Answer Lower bound = cm

Upper bound = cm [2]

- 10 Factorise completely.

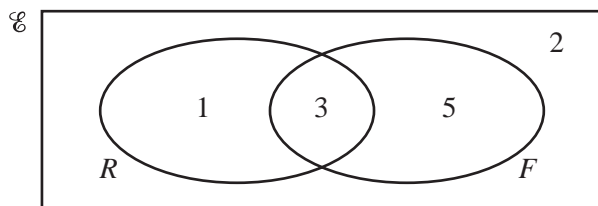
$$ap + bp - 2a - 2b$$

Answer [2]

- 11 Write $(27x^{12})^{\frac{1}{3}}$ in its simplest form.

Answer [2]

12



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11 students are asked if they like rugby (R) and if they like football (F).
The Venn diagram shows the results.

(a) A student is chosen at random.

What is the probability that the student likes rugby **and** football?

Answer(a) [1]

(b) On the Venn diagram shade the region $R' \cap F'$. [1]

13 Martina changed 200 Swiss francs (CHF) into euros (€).
The exchange rate was €1 = 1.14 CHF.

Calculate how much Martina received.
Give your answer correct to the nearest euro.

Answer €..... [3]

14 Bruce invested \$420 at a rate of 4% per year compound interest.

Calculate the **total** amount Bruce has after 2 years.
Give your answer correct to 2 decimal places.

Answer \$..... [3]

- 15 A sphere has a volume of 80 cm^3 .

Calculate the radius of the sphere.

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

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Answer cm [3]

- 16 A water pipe has a circular cross section of radius 0.75 cm .
Water flows through the pipe at a rate of 16 cm/s .

Calculate the time taken for 1 litre of water to flow through the pipe.

Answer s [3]

17 Find the equation of the line passing through the points $(0, -1)$ and $(3, 5)$.

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Answer [3]

18 (a) Factorise $x^2 + x - 30$.

Answer(a) [2]

(b) Simplify $\frac{(x-5)(x+4)}{x^2+x-30}$.

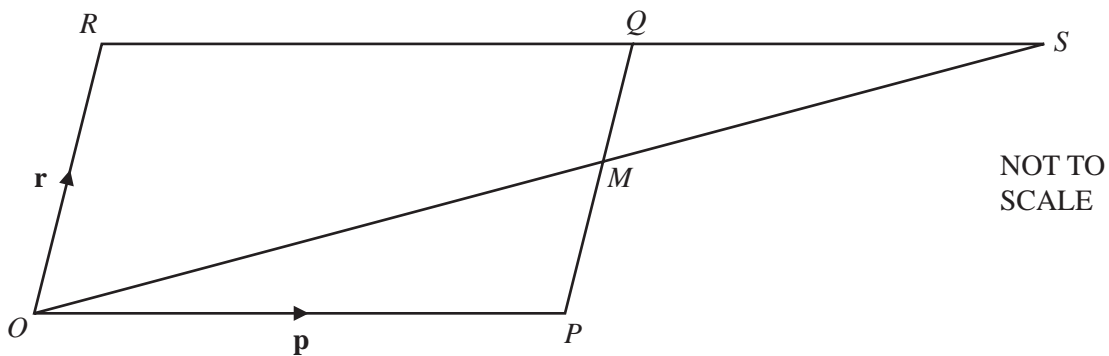
Answer(b) [1]

- 19 t varies inversely as the square root of u .
 $t = 3$ when $u = 4$.

Find t when $u = 49$.

Answer $t = \dots\dots\dots$ [3]

20



$OPQR$ is a parallelogram, with O the origin.
 M is the midpoint of PQ .
 \vec{OM} and \vec{RQ} are extended to meet at S .
 $\vec{OP} = \mathbf{p}$ and $\vec{OR} = \mathbf{r}$.

- (a) Find, in terms of \mathbf{p} and \mathbf{r} , in its simplest form,

- (i) \vec{OM} ,

Answer(a)(i) $\vec{OM} = \dots\dots\dots$ [1]

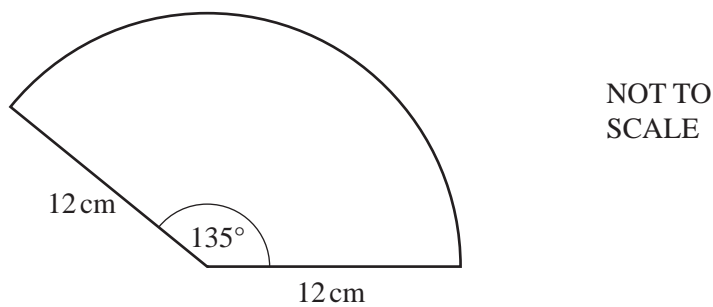
- (ii) the position vector of S .

Answer(a)(ii) $\dots\dots\dots$ [1]

- (b) When $\vec{PT} = -\frac{1}{2}\mathbf{p} + \mathbf{r}$, what can you write down about the position of T ?

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

21



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The diagram shows a sector of a circle of radius 12 cm with an angle of 135° .

Calculate the perimeter of the sector.

Answer cm [3]

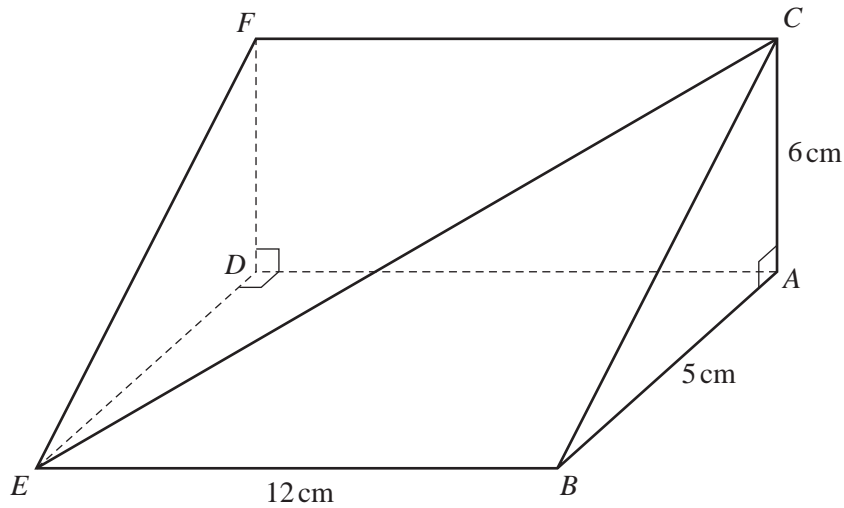
22 Write as a single fraction in its simplest form.

$$\frac{2}{x+3} + \frac{3}{x+2}$$

Answer [3]

23

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The diagram shows a triangular prism of length 12 cm.
Triangle ABC is a cross section of the prism.
Angle $BAC = 90^\circ$, $AC = 6$ cm and $AB = 5$ cm.

Calculate the angle between the line CE and the base $ABED$.

Answer [4]

24 $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$ $B = \begin{pmatrix} 4 & 3 \\ 1 & 2 \end{pmatrix}$

Find

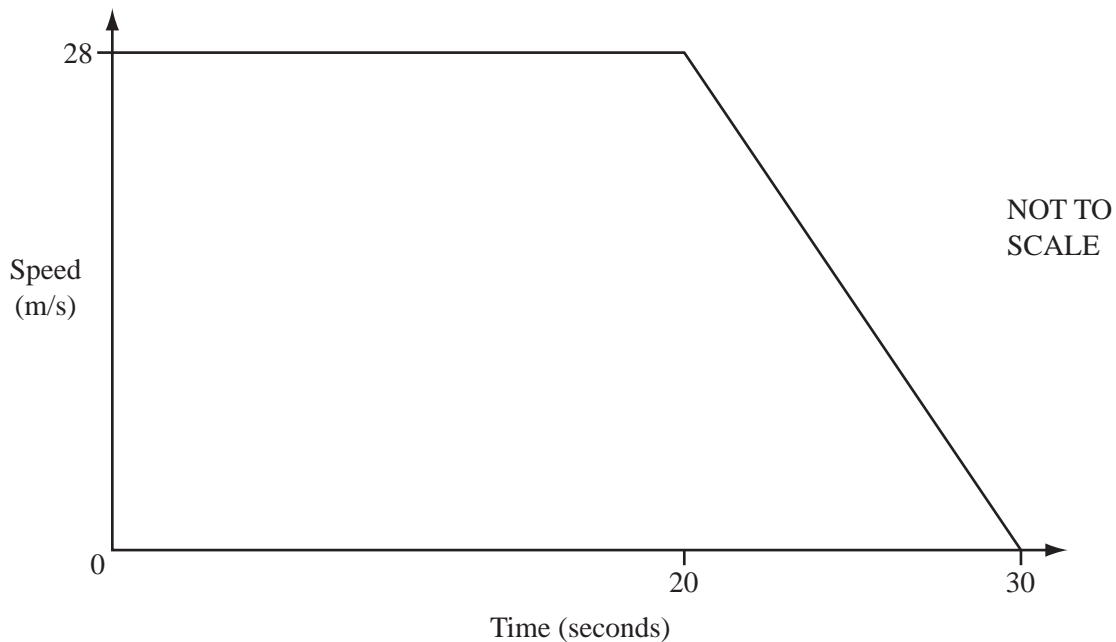
(a) AB ,

Answer(a) $AB =$ [2]

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

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

25



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The diagram shows the speed-time graph of a car.
It travels at 28 m/s for 20 seconds and then decelerates until it stops after a further 10 seconds.

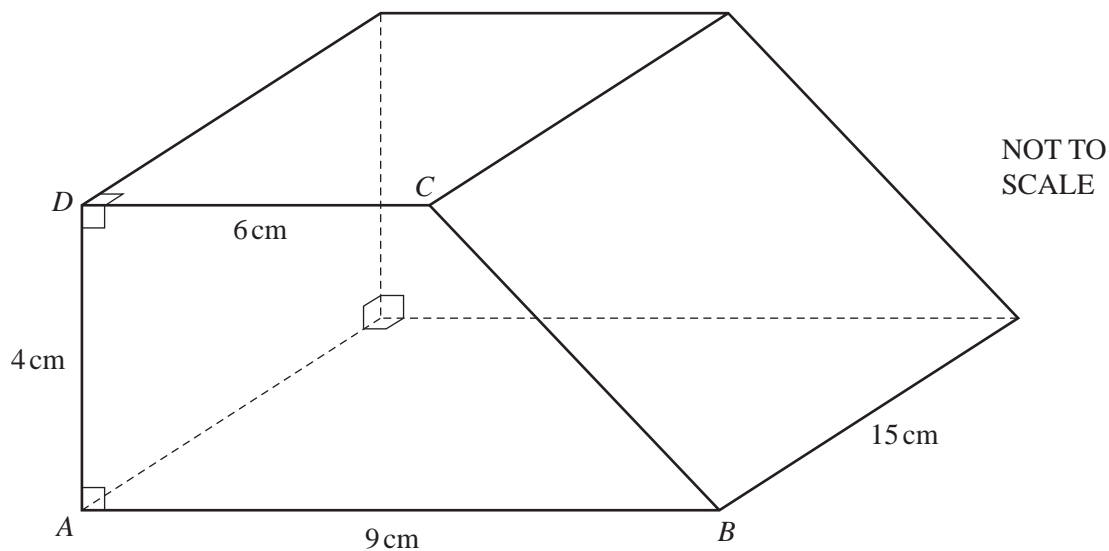
(a) Calculate the deceleration of the car.

Answer(a) m/s² [1]

(b) Calculate the distance travelled during the 30 seconds.

Answer(b) m [3]

Question 26 is printed on the next page.



The diagram shows a solid prism of length 15 cm.
 The cross section of the prism is the trapezium $ABCD$.
 Angle $DAB = \text{angle } CDA = 90^\circ$.
 $AB = 9 \text{ cm}$, $DC = 6 \text{ cm}$ and $AD = 4 \text{ cm}$.

Calculate the **total** surface area of the prism.

Answer cm^2 [5]

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