



- 1 One January day in Munich, the temperature at noon was  $3^{\circ}\text{C}$ .  
At midnight the temperature was  $-8^{\circ}\text{C}$ .

Write down the difference between these two temperatures.

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

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- 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]

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

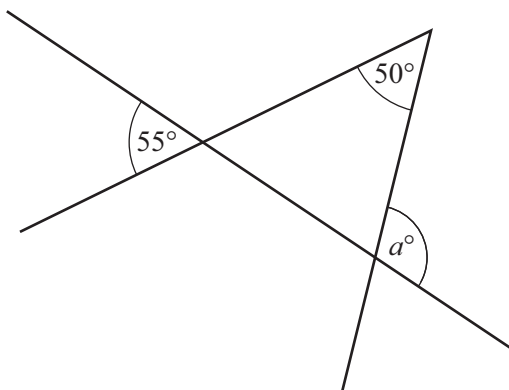
The ratio Pedro's time : Eva's time = 7 : 6.

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]

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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

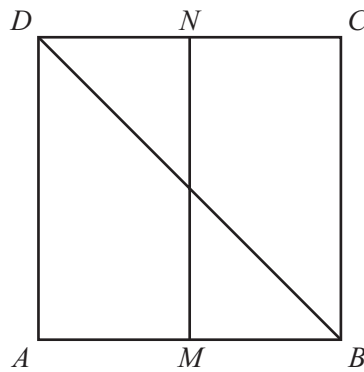
[2]

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.

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

Answer ..... [2]

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- 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]

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- 10 Factorise completely.

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

Answer ..... [2]

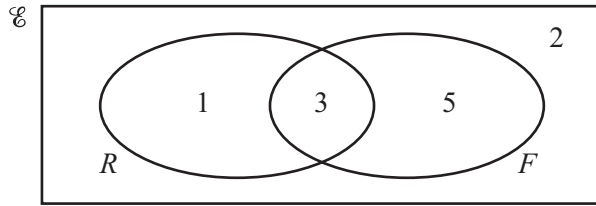
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- 11 Write
- $(27x^{12})^{\frac{1}{3}}$
- in its simplest form.

Answer ..... [2]

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12



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  $80 \text{ cm}^3$ .

Calculate the radius of the sphere.

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

*Answer* ..... cm [3]

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

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

*Answer* ..... s [3]

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

Answer ..... [3]

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

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

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

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

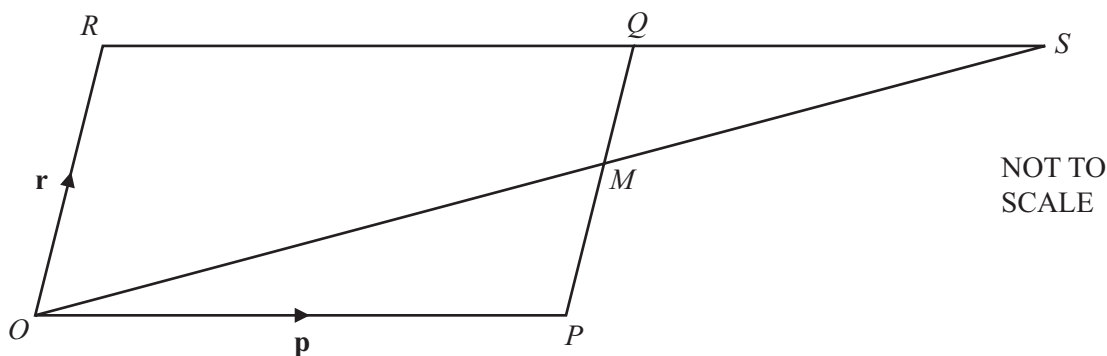
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- 19  $t$  varies inversely as the square root of  $u$ .  
 $t = 3$  when  $u = 4$ .

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  $PQ$ .  
 $OM$  and  $RQ$  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  $S$ .

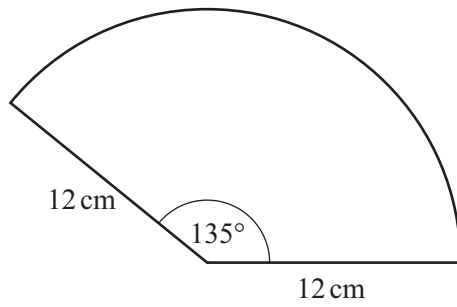
Answer(a)(ii)  $\dots\dots\dots$  [1]

- (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  $135^\circ$ .

Calculate the perimeter of the sector.

Answer ..... cm [3]

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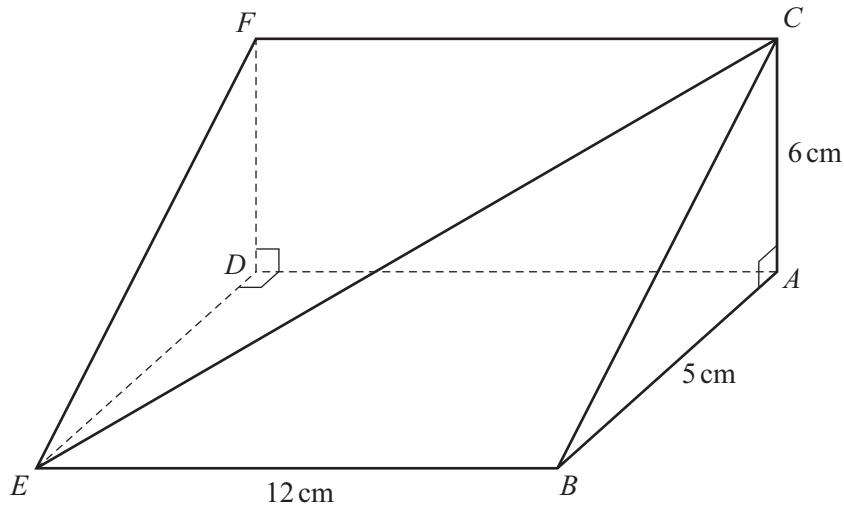
22 Write as a single fraction in its simplest form.

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

Answer ..... [3]

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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

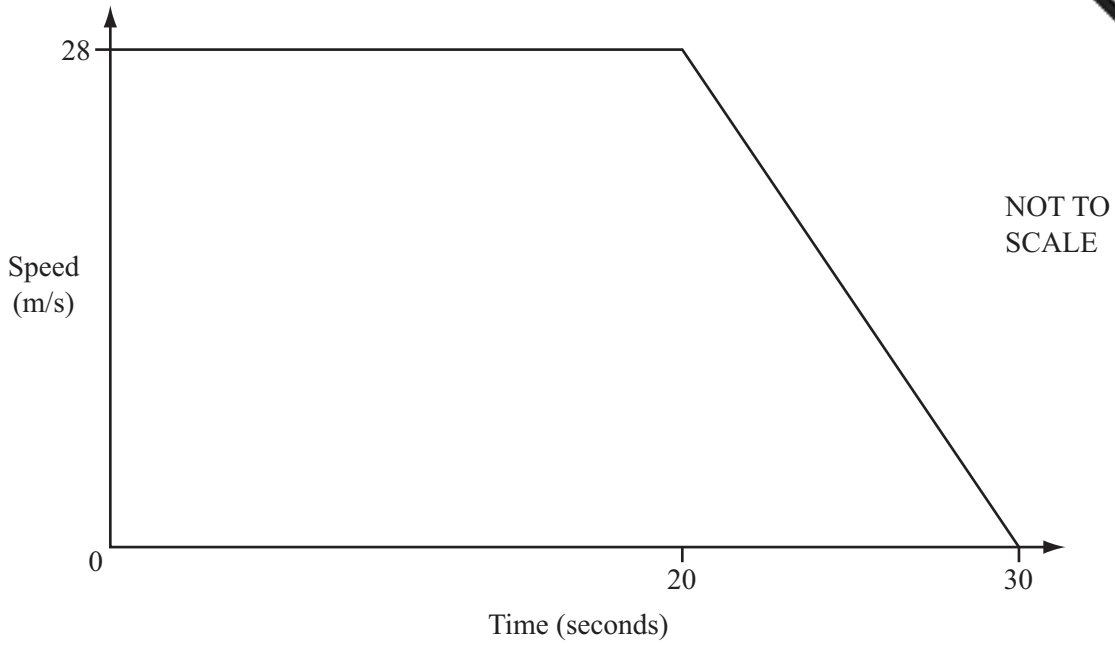
(a)  $AB$ ,

Answer(a)  $AB =$  [2]

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

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

25



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.

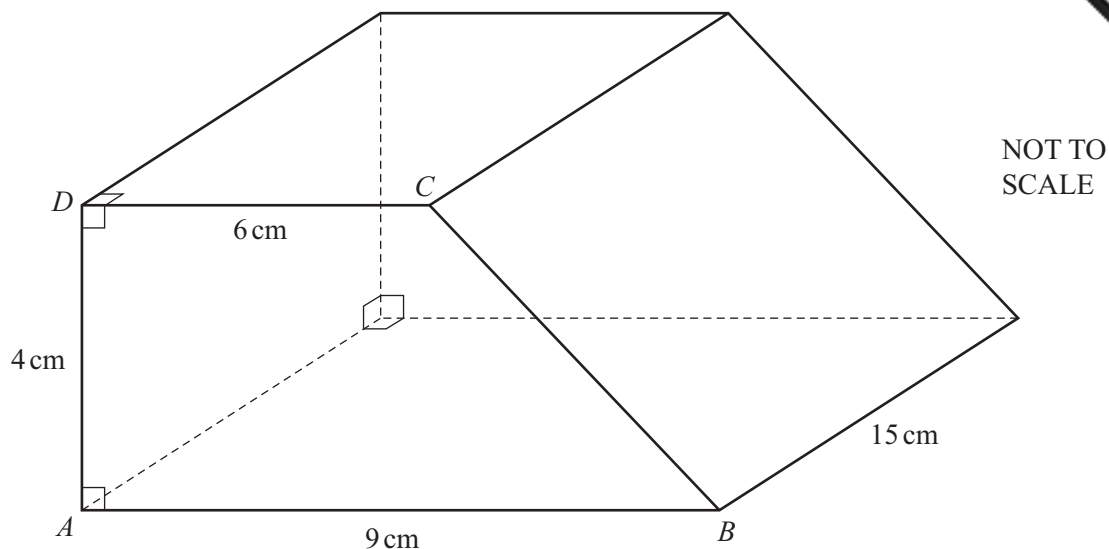
(a) Calculate the deceleration of the car.

Answer(a) ..... m/s<sup>2</sup> [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 .....  $\text{cm}^2$  [5]

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