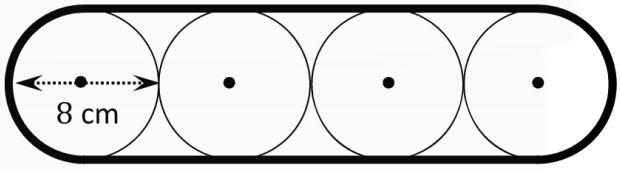
Question 10 **(Suggested maximum time: 10 minutes)**

(a) Work out the circumference of a circle with a **diameter** of 8 cm.
Give your answer correct to one decimal place.

The rubber track for a toy digger goes around four circular wheels of diameter 8 cm, as shown.



(b) Calculate the length of the rubber track that goes around the four wheels.
Give your answer correct to one decimal place.

Every time the wheels turn fully, the digger travels a distance equal to one wheel's circumference.

(c) Work out how many times each wheel will turn **fully** when the digger travels a distance equal to the length of its rubber track.

Question 7 **(Suggested maximum time: 15 minutes)**

(a) The line j has a slope of $\frac{2}{5}$. The line n is **perpendicular** to j.

(i) Write down the size of the angle between the lines j and n.

(ii) The line n goes through the point $(6, -1)$.
Write down the **equation** of the line n. You do not need to simplify your answer.

(b) The equations of two other lines, k and l, are given in the table below.

(i) Complete the table by filling in the **slope** of each line and the **point** where each line crosses the y-axis. There is space for more work on the next page.

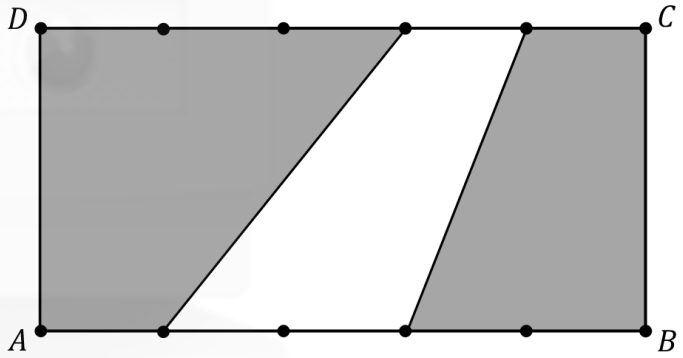
	Equation	**Slope**	**Point where the line crosses the y-axis**
Line k	$y = x - 1$		
Line l	$2x - 3y = 6$		

(ii) Use **algebra** to find the point of intersection of the lines k and l.

Line k: $y = x - 1$

Line l: $2x - 3y = 6$

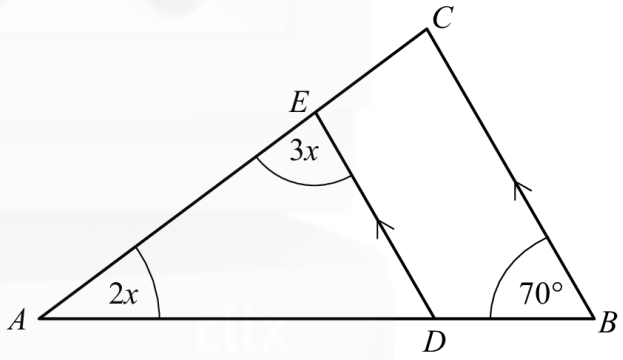
(b) The diagram below shows the rectangle $ABCD$.
$[AB]$ and $[CD]$ are each divided into five equal parts.
Some of the endpoints of these parts are joined by line segments, as shown.



Find the **percentage** of the area of $ABCD$ that is **shaded**. Show all of your working out.

Question 7 **(Suggested maximum time: 5 minutes)**

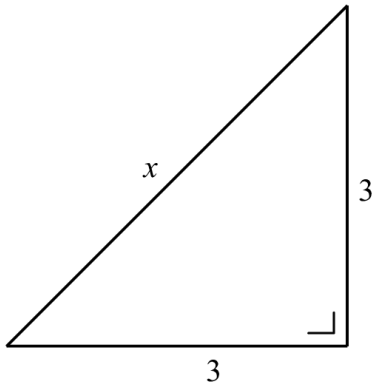
The diagram shows the triangle ABC.
DE is parallel to BC.
The sizes of some of the angles are shown.



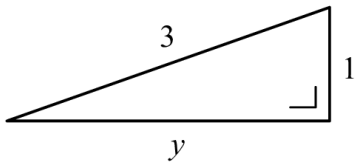
(a) Find the value of x.

(b) Given that $|AE| = 100$, $|AC| = 130$, and $|DE| = 74$, find the value of $|BC|$.

(i) Use the diagram on the right to calculate the value of x.
Give your answer in surd form.

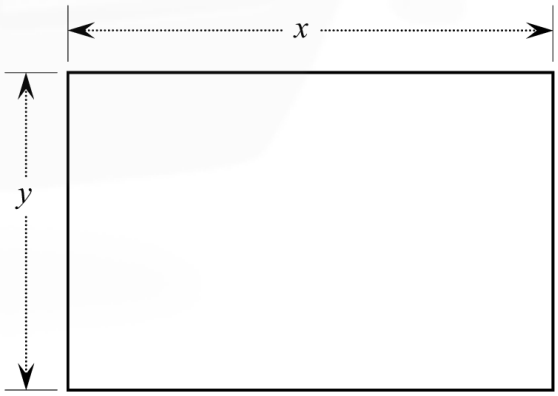


(ii) Use the diagram below to calculate the value of y. Give your answer in surd form.



(iii) A rectangle with sides of length x and y is drawn using the values of x and y from parts **(i)** and **(ii)**, as shown below.

Write the **perimeter** of this rectangle in the form $a\sqrt{2}$, where $a \in \mathbb{N}$.

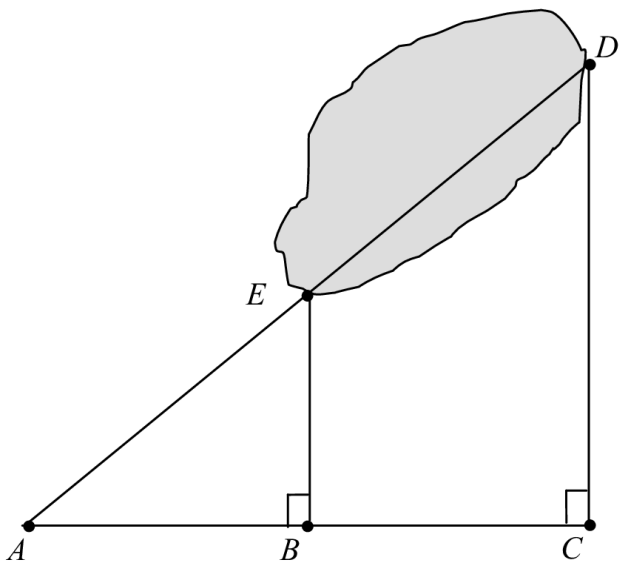


Question 9 **(Suggested maximum time: 5 minutes)**

Three paths, [AE], [BE] and [CD], have been constructed to provide access to a lake from a road AC as shown in the diagram.

The lengths of the paths from the road to the lake are as follows:

$|AE| = 120$ m
$|BE| = 80$ m
$|CD| = 200$ m.



(i) Explain how these measurements can be used to find $|ED|$.

(ii) Find $|ED|$.