1. Simplify each of these surds.

(a) $\sqrt{18}$ (b) $\sqrt{12}$ (c) $\sqrt{27}$ (d) $\sqrt{50}$
(e) $\sqrt{45}$ (f) $\sqrt{20}$ (g) $\sqrt{8}+\sqrt{32}$ (h) $\sqrt{27}-\sqrt{3}$

2. Simplify each of these expressions. Leave your answers in the form $a\sqrt{b}$.

(a) $\sqrt{50}+\sqrt{32}$ (b) $5\sqrt{3}-\sqrt{27}$

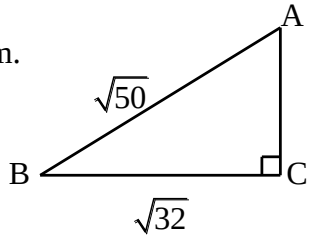
3. Evaluate without a calculator

(a) $\sqrt{17}^{\,2}$ (b) $2\sqrt{2}^{\,2}$ (c) $\sqrt{2}^{\,3}$

4. Express with a rational denominator

(a) $\frac{1}{\sqrt{3}}$ (b) $\frac{10}{\sqrt{5}}$ (c) $\frac{6}{\sqrt{2}}$

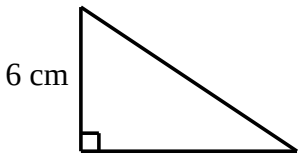
5. Find the length of AC, leaving your answer as a surd in its simplest form.



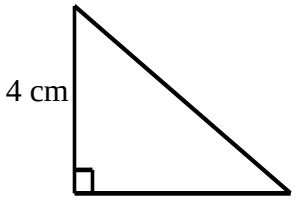
6. The scale of a map is $1:20000$.
The length of a loch on the map is 14 cm.
How long is the actual loch? Give your answer in km.

7. Find the area of each of these triangles:

(a)



(b)



8. A circle has radius $5{\cdot}6$ cm. Calculate:

(a) Its circumference (b) Its area

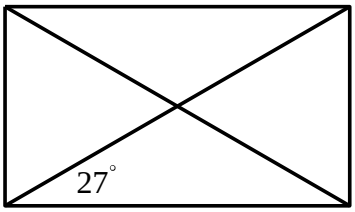
9. A circle has diameter $7{\cdot}8$ cm. Calculate:

(a) Its circumference (b) Its area

10. (a) 5 books cost £75. Find the cost of 7 such books.
(b) A farmer has enough food to last 8 cows for 45 days.
If he sells 2 cows, how long will the food last the remaining cows?

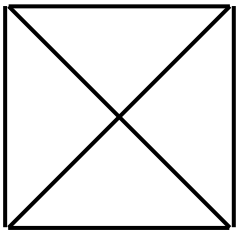
11. Copy each of the following figures and fill in the size of all remaining angles.

(a)



[Rectangle]

(b)

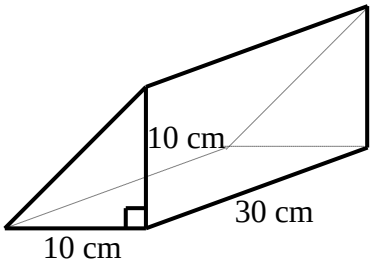


[Square]

12. Write each of these numbers in standard form:

(a) $610\,000$ (b) $0{\cdot}000132$ (c) $17{\cdot}4$

13. The cross-section of this prism is an isosceles right-angled triangle with equal sides of 10 cm and the prism has length 30 cm.



(a) To obtain the volume of a prism we multiply the area of the cross-section by the length.
Find the volume of this prism in cubic centimetres. How many litres would this be?
(b) Calculate the total surface area of this prism in square centimetres.

14. Given that $1+2+3+4+.....+n=\frac{1}{2}n\ \ n+1$, find the value of:

(a) $1+2+3+4+.....+10.$
(b) $1+2+3+4+.....+20.$
(c) By using your answers to (a) and (b), find the value of $11+12+13+.....+20.$

15. An equilateral triangle has sides of length 8 units.

(a) Calculate its altitude.

(b) Calculate its perimeter.