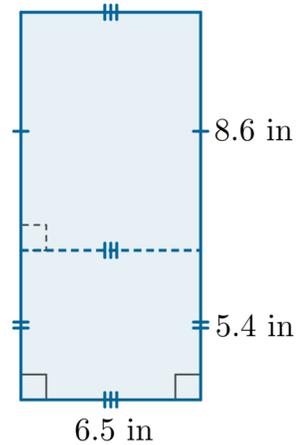


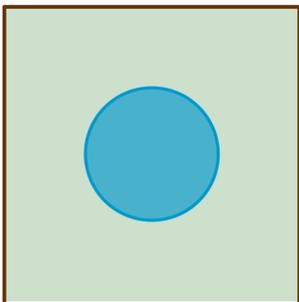
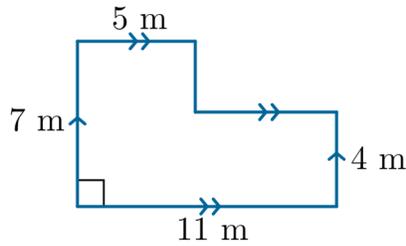
# MEASUREMENT CALCULATIONS

EXTEND YOUR UNDERSTANDING

1) Determine the perimeter and area of the figure shown on the right.



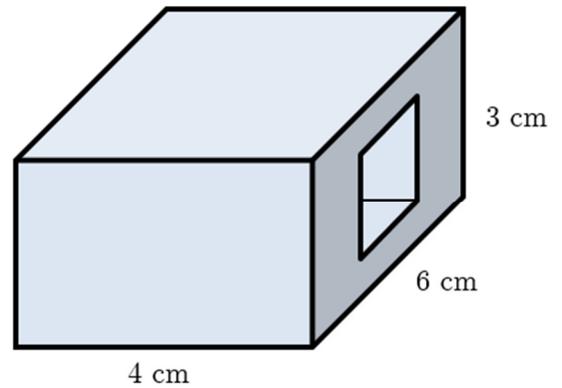
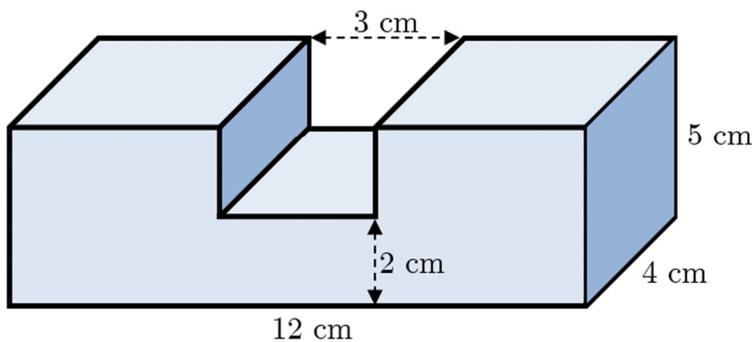
2) Find the area and perimeter of the figure shown below.



3) A circular pool with a radius of 9' is to be placed in the centre of a square backyard measuring  $40' \times 40'$ , as shown on the left. The remainder of the yard will be covered by grass.

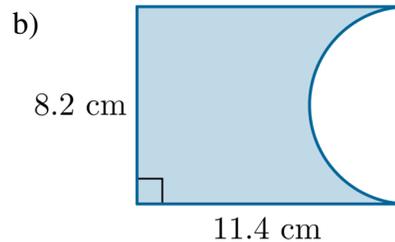
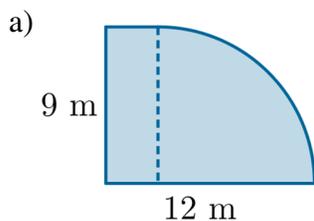
- Determine the area of the yard covered by grass.
- Three sides of the yard will be fenced. If the homeowner can install fence at a cost of \$28 per linear foot, find the total cost of installing the fence.
- If the depth of the water in the pool is 4', calculate the volume of water in the pool.

4) A solid rectangular prism has a section removed throughout its width, as shown on the right. If the face of the missing section is a square with side length 2 cm, determine the volume of the solid.

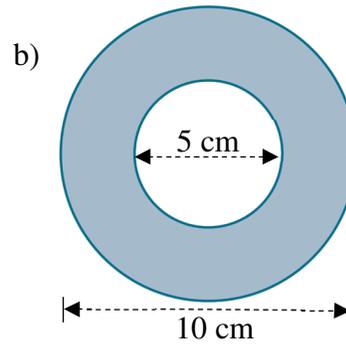
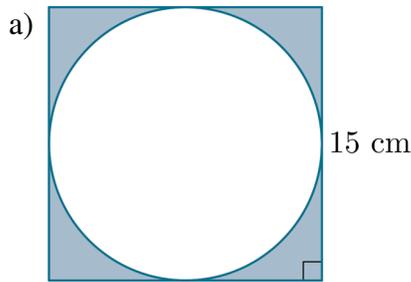


5) A building block is shown on the left. Determine the total volume of the block.

6) Determine the perimeter and area of the figure.



7) Determine the area of the shaded region.



8) A square has a perimeter of 152 inches. Determine the area of the square.

9) A square has an area of  $295.84 \text{ cm}^2$ . Find the perimeter of the square.

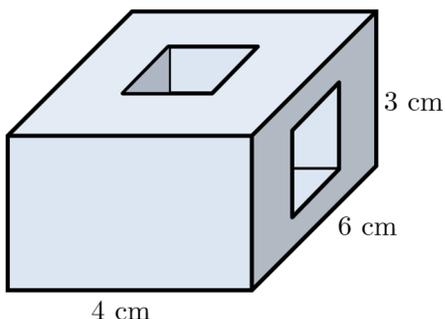
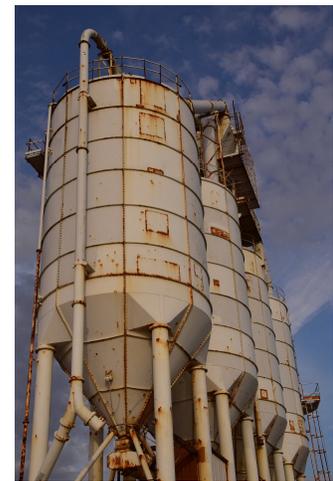
10) Ava has 120 m of fence to enclose an area for her pet ostrich.

- If Ava wants to give the ostrich the largest amount of space possible with a rectangular enclosure, what dimensions should she use? Find the largest area.
- Would the answer to part (a) change if the rectangular enclosure was built against the side of a barn and only required fencing on three sides? Explain.
- If instead of constructing a rectangular enclosure, Ava uses the 120 m of fence to build a circular enclosure, calculate the enclosed area and compare it to the areas from parts (a) and (b).
- Ava finally decided to construct a semicircular enclosure against the side of the barn (with the barn lying on the diameter of the semicircle). Calculate the enclosed area for this design and compare it to the areas from parts (a), (b) and (c).



11) A concrete mixing silo consists of cylindrical rings and a conical spout. Each cylindrical ring has a height of 122.5 cm and a diameter of 322.5 cm.

- How much volume, to the nearest tenth of a cubic metre, does each cylindrical ring add to the silo?
- Determine, to the nearest tenth of a cubic metre, the volume of the conical spout if its height is 230 cm.
- Determine the volume of a silo with 6 rings.
- Write an equation to model the volume,  $V$  (in cubic metres), of a silo that has  $n$  rings.
- If a silo must hold a volume of  $110 \text{ m}^3$ , how many rings are needed?



12) A solid rectangular prism has a hole cut through the centre of its top and an identical hole cut through the centre of its side, as shown on the left. These holes pass through to the opposite side of the box. If the face of each hole is a square with side length 2 cm, determine the volume of the solid.

## ANSWERS

- 1) perimeter = 41 in, area =  $91 \text{ in}^2$
- 2) area =  $59 \text{ m}^2$ , perimeter = 36 m
- 3) a)  $1345.5 \text{ ft}^2$    b) \$3360.00   c)  $1017.9 \text{ ft}^3$
- 4)  $56 \text{ cm}^3$
- 5)  $204 \text{ cm}^3$
- 6) a) perimeter  $\approx 38.1 \text{ m}$ , area  $\approx 90.6 \text{ m}^2$    b) perimeter  $\approx 43.9 \text{ cm}$ , area  $\approx 67.1 \text{ cm}^2$
- 7) a)  $48.3 \text{ cm}^2$    b)  $58.9 \text{ cm}^2$
- 8)  $1444 \text{ in}^2$
- 9) 68.8 cm
- 10) a)  $30 \text{ m} \times 30 \text{ m}$  (a square), which gives an area of  $900 \text{ m}^2$ .   b) Yes. In this case, a square does not give the greatest area. The greatest area occurs when the length of the rectangle is along the barn and is twice the width. Specifically, the greatest area is achieved when the length is 60 m (along the barn) and the width is 30 m. The resulting area is  $1800 \text{ m}^2$   
c)  $1145.9 \text{ m}^2$ . This area is greater than the maximum area possible when fencing all four sides of a rectangular enclosure, but less than the maximum area possible when using the barn as one side of a rectangular enclosure.   d)  $4583.7 \text{ m}^2$ . This design gives a greater area than each of the other three designs.
- 11) a)  $10 \text{ m}^3$    b)  $6.3 \text{ m}^3$    c)  $66.3 \text{ m}^3$    d)  $V = 10n + 6.3$    e) 11
- 12)  $52 \text{ cm}^3$