

# Measurement

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## Key Ideas:

### 1. Conversions within and between systems.

- Use your formula sheet for conversions between systems.
- Use your formula sheet for conversions within the imperial system.
- You **MUST KNOW** your conversions within the metric system. This is **NOT** on the formula sheet.
  - **1 cm = 10 mm**
  - **1 m = 100 cm**
  - **1 km = 1000 m**
- **Within Systems: Larger unit to Smaller unit (multiply)**
- **Within Systems: Smaller unit to Larger unit (divide)**

### 2. Surface Area

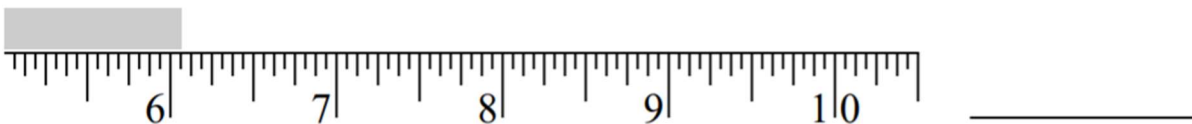
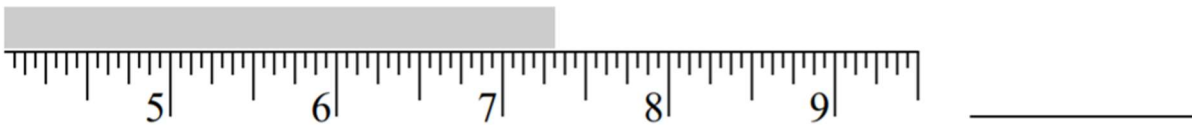
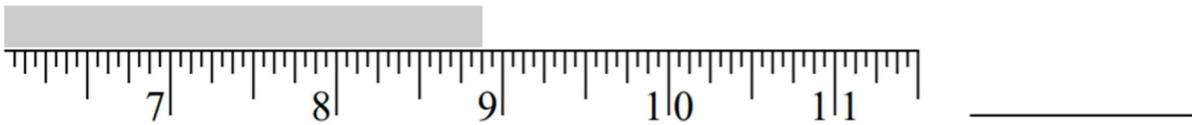
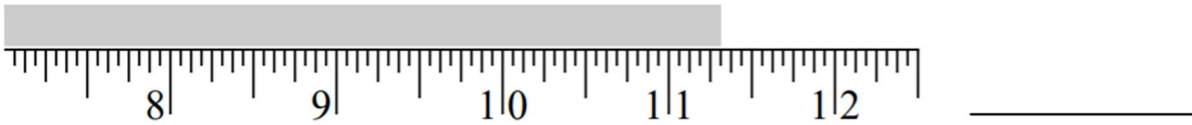
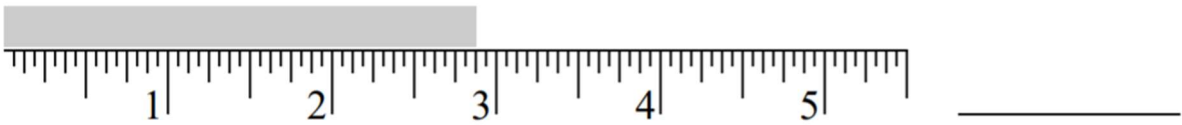
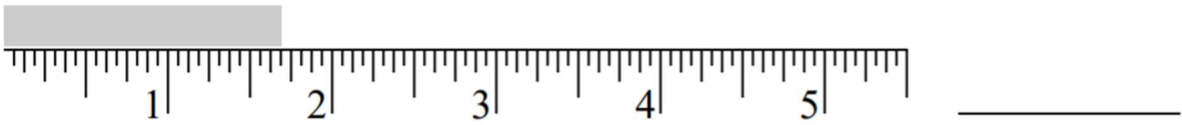
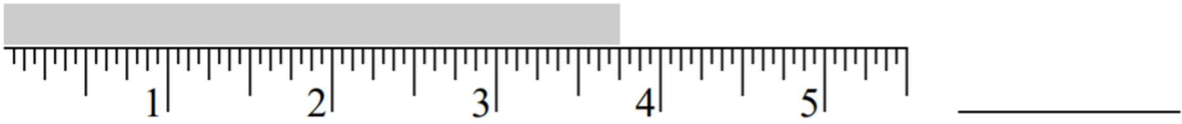
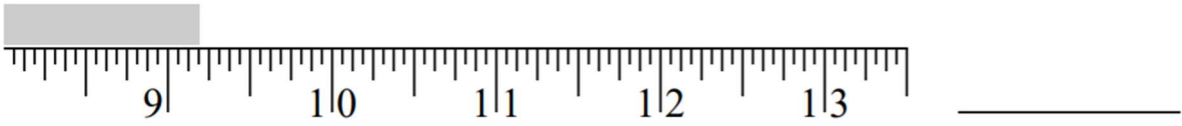
- Finding the area of the shape that you can "touch".
- May need to use Pythagorean Theorem for a cone or right pyramid to find the slant height before using the surface area formula.
- Think about what you can physically "touch"! You may only need the Lateral Area (area of the sides) for composite objects.
- For a hemisphere, remember to add the area of the circle on the bottom!!
- "B" represents Base Area, "P" represents Perimeter of the Base.

### 3. Volume

- Finding the space inside an object.
- May need to use Pythagorean Theorem for a cone or right pyramid to find the perpendicular height before using the volume formula.
- For composite objects, find the volume of each shape and then add together.

## Conversions Within and Between Systems

1. State the following measurements represented in the diagram.



2. Andrea is constructing a pen for her dog. The perimeter of the pen is  $70\text{ ft}$ .

a) Determine the perimeter of the pen, in yards and feet.

b) The fencing material is sold by the yard. It costs  $\$2.49/\text{yd}$ . Determine the cost of this material, before taxes.

3. Convert each measurement.

a) 45 cm to metres

b) 5 yds to inches

c) 120 m to kilometres

d) 6.5 miles to feet

4. Convert each measurement.

a) 9 *yd.* to the nearest metre

b) 11 000 *in.* to the nearest metre

c) 5 *km* to the nearest mile

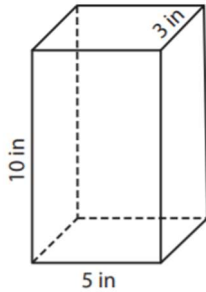
d) 160 *cm* inches

5. On the Alex Fraser Bridge in Delta, B.C., the maximum height of the road above the Fraser River is 154 *m*. On the Tacoma Narrows Bridge in Tacoma, Washington, the maximum height of the road above The Narrows is 510 *ft*. Which road is higher above the water? How much higher is it?

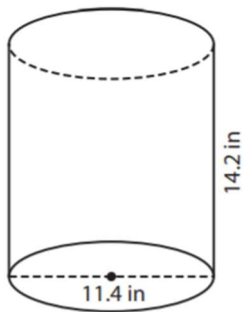
**Surface Area and Volume of 3D Objects**

6. Determine the surface area of each object below.

a)

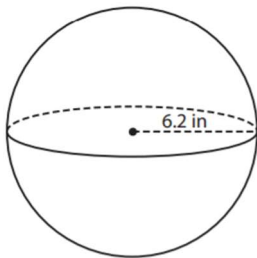


b)

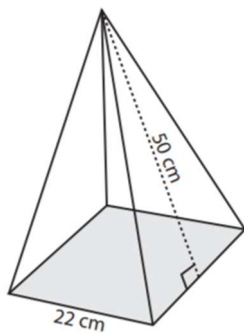


7. Determine the volume of each object below.

a)

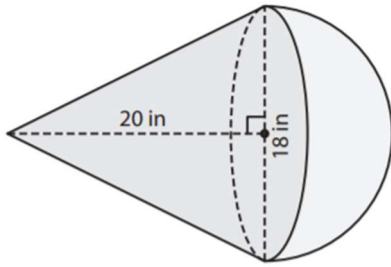


b)

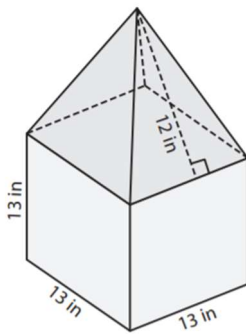


8. Determine the surface area of the following composite objects.

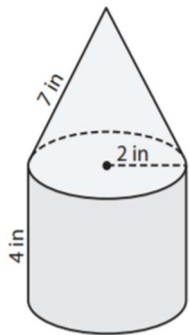
a)



b)



9. Determine the volume of the composite object below.



10. Determine the volume of a right cone with a diameter of  $7\text{ ft.}$  and a height of  $15\text{ ft.}$
11. The height of a right square pyramid is  $40\text{ in.}$ , and the side length of the base is  $48\text{ in.}$  Determine the lateral area of the pyramid to the nearest square inch.
12. The radius of a hemisphere is  $30.5\text{ mm.}$  Determine the surface area of the hemisphere to the nearest tenth of a millimetre.

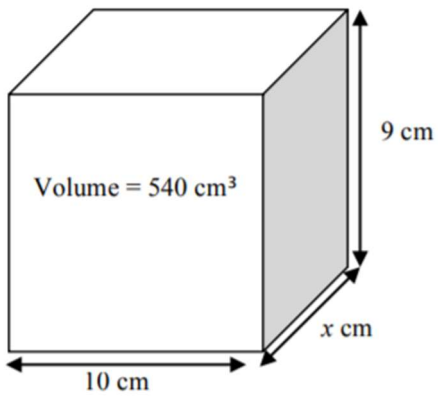
13. Determine the slant height of a cone whose surface area is 301.44 square inches and has a radius of 6 inches.

14. A box has a surface area of  $450 \text{ cm}^2$ . Its length and width are 8 and 6 cm respectively. Determine its height.

15. A cylinder has a surface area of  $1800 \text{ cm}^2$  and a radius of 12 cm. Determine its height.



16. Given that the volume of the rectangular prism below is  $540 \text{ cm}^3$ . Determine the length of side marked  $x$ .



17. The diameter of the base of a right cone is  $12 \text{ yd.}$  and the volume of the cone is 224 cubic yards. Determine the height of the cone, to the nearest yard.