

## Lesson Seven: Surface Area and Volume Applications

As with 2-dimensional areas – surface area and volume are concepts that are constantly used in the “real world”.

Surface area is used in applications where you need to find an amount of material (wrapping paper, paint, plastic) that will comprise the outer shell of the shape being manufactured.

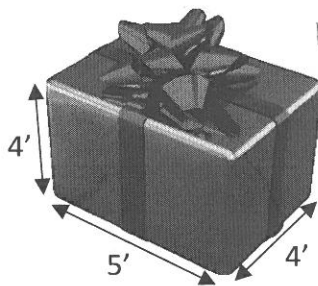
Volume is used when you need to determine the amount of material (dirt, water, air) that will be needed to completely fill the inside of the shape being manufactured.

These application questions will commonly require you to figure out which concept is needed: surface area, volume, or possibly both! There may also be a cost component to the question. Recall that when adding tax, the rate of PST is 7% and GST is 5%.

### Example 1

You have a large present you need to wrap in fancy wrapping paper. It is a snow blower in a box with measurements shown in the diagram below. You will need 10% extra wrapping paper to have enough to overlap and tape. You want to wrap the box in wrapping paper that costs \$5.99 (plus tax) per roll. Each roll covers 50 ft<sup>2</sup>.

Calculate the cost of the wrapping paper required to wrap the box.



$$1. \text{ Cost (wrapping paper)} = \# \text{ of rolls} \times \$5.99 \times 1.12$$

$$2. \text{ Rolls of wrapping paper} = (\text{Surface area} \times 1.10) \div 50$$

$$3. \text{ Surface Area} = 2lw + 2lh + 2wh$$

$$= (2 \times 5 \times 4) + (2 \times 5 \times 4) + (2 \times 4 \times 4)$$

$$= 40 \text{ ft}^2 + 40 \text{ ft}^2 + 32 \text{ ft}^2$$

$$= 112 \text{ ft}^2$$

$$4. \text{ Rolls of wrapping paper} = (112 \times 1.10) \div 50$$

$$= 123.2 \div 50$$

$$= 2.5 \rightarrow \text{Round up}$$

$$= 3 \text{ rolls}$$

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$$\text{Cost of wrapping paper} = 3 \text{ rolls} \times \$5.99 \times 1.12$$

$$= \underline{\underline{\$20.10}}$$