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Complex Conversions Quiz: Solutions

- A. In the UK, gasoline is about £1.19 per liter. Determine this cost in USD (\$) for 1 gallon of gasoline. $1 \text{ £} = 1.38424 \text{ €}$ and $1 \text{ €} = \$1.08$
- $$(\text{£}1.19 / \text{L}) \cdot (1.38424 \text{ €} / 1 \text{ £}) \cdot (\$1.08 / 1 \text{ €}) \cdot (3.78541 \text{ L} / \text{gal}) = \$6.73 / \text{gal}$$
- B. A homeowner determines 75% of the 2400 ft² home requires new carpeting. Berber carpet can be installed for \$32.50 / yd². Estimate how much money it will cost to get new carpeting.
- $$(0.75) \cdot (2400 \text{ ft}^2) \cdot (1 \text{ yd} / 3 \text{ ft})^2 \cdot (\$32.50 / \text{yd}^2) = \$6,500$$
- C. A popular road trip map connecting 48 states and 50 major US landmarks is approximately 14,000 miles. Estimate the fuel costs for the trip using a car that averages 30 mpg when an average price of gas is \$2.35 / gal. Estimate the trip using a motorhome with 12 mpg.
- $$(14000 \text{ miles}) \cdot (1 \text{ gal} / 30 \text{ miles}) \cdot (\$2.35 / \text{gal}) = \$1097$$
- $$(14000 \text{ miles}) \cdot (1 \text{ gal} / 12 \text{ miles}) \cdot (\$2.35 / \text{gal}) = \$2742$$
- D. A cylinder and a sphere have the same radius and volume, $36\pi \text{ cm}^3$. Determine the height of the cylinder.
- $$\text{Volume}_{\text{sphere}} = \frac{4\pi R^3}{3} = 36\pi \text{ cm}^3; R = 3 \text{ cm}$$
- $$\text{Volume}_{\text{cylinder}} = \pi R^2 H = \pi (3 \text{ cm})^2 H = 36\pi \text{ cm}^3; H = 4 \text{ cm}$$



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- E. Twelve inches of snow is equivalent to about 1 inch of rain. If 6 inches of snow were to fall on a 40 ft x 50 ft roof, estimate the weight of the snow on the roof in units of metric tons; 1 ft³ of rain water is about 62.5 pounds.

$$(6 \text{ in snow}) \cdot (1 \text{ in rain} / 12 \text{ in snow}) \cdot (1 \text{ ft} / 12 \text{ in}) \cdot (40 \text{ ft}) \cdot (50 \text{ ft}) \cdot (62.5 \text{ lbs} / 1 \text{ ft}^3) = 5208.3 \text{ lbs}$$

$$(5208.3 \text{ lbs}) \cdot (\text{kg} / 2.20462 \text{ lbs}) \cdot (1 \text{ metric ton} / 1000 \text{ kg}) = 2.36 \text{ metric tons}$$