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Conversions: Speed, Area, Volume
Quiz: Solutions

A. **A family drives 6 hours and 15 minutes to arrive at a vacation getaway located 625 km away from their home. Determine their average speed with units of mph.**

$\text{Time} = 6\text{ hr} + (15\text{ min})\cdot(1\text{ hr} / 60\text{ min}) = 6.25\text{ hr}$

$\text{Length} = (625\text{ km})\cdot(1000\text{ m} / 1\text{ km})\cdot(1\text{ mile} / 1609.34\text{ m}) = 388\text{ miles}$

$\text{Speed} = \text{Length} / \text{Time} = 388\text{ miles} / 6.25\text{ hr} = 62.1\text{ mph}$

B. **A company wants to sell small, medium, and large size pizzas that have a diameter of 10 in, 12 in, and 14 in, respectively. If the company determines a small pizza should cost $8.99, what price should be set for the medium and large pizzas?**

$A_{circle} = \pi R^2 = \pi(5\text{ in})^2 = 25\pi\text{ in}^2$ $\quad \$\text{ Ratio} = \$8.99 / 25\pi\text{ in}^2$

$A_{circle} = \pi R^2 = \pi(6\text{ in})^2 = 36\pi\text{ in}^2$ $\quad \$ = (36\pi\text{ in}^2)\cdot(\$8.99 / 25\pi\text{ in}^2) = \$12.95$

$A_{circle} = \pi R^2 = \pi(7\text{ in})^2 = 49\pi\text{ in}^2$ $\quad \$ = (49\pi\text{ in}^2)\cdot(\$8.99 / 25\pi\text{ in}^2) = \$17.62$

C. **A parent wishes to paint the walls of a bedroom. The dimensions of the bedroom are 12 ft x 14 ft with an 8 ft ceiling height. Estimate the area to be painted with units of m^2.**

$\text{Area} = 2\cdot(12\text{ ft})\cdot(8\text{ ft}) + 2\cdot(14\text{ ft})\cdot(8\text{ ft}) = 416\text{ ft}^2$

$\text{Area} = 416\text{ ft}^2\cdot(12\text{ in} / 1\text{ ft})^2\cdot(2.54\text{ cm} / 1\text{ in})^2\cdot(1\text{ m} / 100\text{ cm})^2 = 38.6\text{ m}^2$

D. **Determine the volume and surface area of three different size balls: R = 3 cm, R = 6 cm, R = 9 cm.**

$Area_{R = 3cm} = 4\pi R^2 = 4\pi(3\ cm)^2 = 36\pi\ cm^2$
$Volume_{R = 3cm} = 4\pi R^3 / 3 = 4\pi(3\ cm)^3 / 3 = 36\pi\ cm^3$

$Area_{R = 6cm} = 4\pi R^2 = 4\pi(6\ cm)^2 = 144\pi\ cm^2$
$Volume_{R = 6cm} = 4\pi R^3 / 3 = 4\pi(6\ cm)^3 / 3 = 288\pi\ cm^3$

$Area_{R = 9cm} = 4\pi R^2 = 4\pi(9\ cm)^2 = 324\pi\ cm^2$
$Volume_{R = 9cm} = 4\pi R^3 / 3 = 4\pi(9\ cm)^3 / 3 = 972\pi\ cm^3$

E. **Copper is ductile. Determine the length of 16 gauge (R = 0.0254 in) wire that can be made from a 3 in cube of copper. Express your answer in units of meters.**

$V = L^3 = (3\ in)^3 = 27\ in^3$
$V = 27\ in^3 = \pi R^2 H = \pi(0.0254\ in)^2 H$
$H = 1.3321 \times 10^4\ in$

$H = (1.3321 \times 10^4\ in) \cdot (2.54\ cm / 1\ in) \cdot (1\ m / 100\ cm) = 338\ m$