

Name: _____

1. George knows that there are 12 inches in a foot, so he thinks there should be 12 square inches in a square foot, explain why is incorrect.

A square foot is a square with length and width of 1 foot. Since 1 foot is the same thing as 12 inches one square foot is a 12 inch by 12 inch square, the area of a 12 in by 12 in square is 144 square inches, so 1 square foot must equal 144 square inches.

2. Convert 50 square feet into square yards

From data booklet: 1 yd = 3 ft

"When converting square units you square the conversion factor" thus

$$1 \text{ sq yd} = 3^2 \text{ sq ft}$$

$$1 \text{ sq yd} = 9 \text{ sq ft}$$

$$\frac{1 \text{ sq yd}}{9 \text{ sq ft}} = \frac{x}{50 \text{ sq ft}}$$

$$50 \times 1 \div 9 = 5.56 \text{ sq yds}$$

3. Convert 2256 square millimeters into square inches

From data booklet: 1 cm = 10 mm and 1 inch = 2.54 cm

The plan is to convert square mm \rightarrow square cm then convert those into square inches,

① Square the conversion factors $1 \text{ cm}^2 = 100 \text{ mm}^2$, $1 \text{ sq in} = 6.45 \text{ cm}^2$

② Do conversions

$$\frac{1 \text{ cm}^2}{100 \text{ mm}^2} = \frac{x \text{ cm}^2}{2256 \text{ mm}^2}$$

$$2256 \times 1 \div 100 = 22.56 \text{ cm}^2$$

$$\frac{1 \text{ sq in}}{6.45 \text{ cm}^2} = \frac{x \text{ sq in}}{22.56 \text{ cm}^2}$$

$$22.56 \times 1 \div 6.45 = 3.50 \text{ sq in}$$

4. Nic is putting tile in his bathroom, each tile is a 20cm square. How many of these tiles will fit in a 9 foot by 6 foot space. He can cut the tiles up if he needs to.

Area of each tile: $20\text{cm} \times 20\text{cm} = 400\text{cm}^2$

Area of room: $9\text{ft} \times 6\text{ft} = 54\text{sq ft}$

Area of room in square cm?

① Find linear conversion factor in data booklet
 $1\text{ft} = 30.48\text{cm}$

② Square conversion factor $1\text{sq ft} = 929.03\text{cm}^2$

③ Convert $\frac{1\text{sq ft}}{929.03\text{cm}^2} = \frac{54\text{sq ft}}{x\text{cm}^2}$ $54 \times 929.03 \div 1 = 50167.62\text{cm}^2$

of tiles needed: $\frac{50167.62}{400} = 125.42 \text{ tiles}$

5. The average person takes up about 2 square feet of ground space when standing straight up. How many square miles would be needed if all 7 billion people on Earth stood next to each other?

How much space would 7 billion people take up?

$2\text{sq ft} \times 7000000000$
 $= 14000000000\text{sq ft}$

What is this in square miles?

$1\text{mile} = 5280\text{ft}$ so $1\text{sq mile} = 27878400\text{sq ft}$

$\frac{1\text{sq mile}}{27878400\text{sq ft}} = \frac{x\text{sq miles}}{14000000000\text{sq ft}}$

$14000000000 \times 1 \div 27878400 = 502.18 \text{ square miles}$