

2.A THE PROBLEM SOLVING POWER OF UNITS

7. No. MILES MEASURE DISTANCE.
MILES/HOUR MEASURES SPEED.

8. Yes

9. No. sq ft MEASURES AREA.
cu ft (ft^3) MEASURES VOLUME.

10. No. ACRES MEASURE AREA.
sq ACRES MEASURES 4-DIMENSIONAL SPACE!

13. (a) $\frac{3}{4} \times \frac{1}{2} = \frac{3 \cdot 1}{4 \cdot 2} = \frac{3}{8}$

(b) $\frac{2}{3} \times \frac{1}{5} = \frac{2}{15}$

(c) $\frac{1}{2} + \frac{3}{2} = \frac{1+3}{2} = \frac{4}{2} = 2$

(d) $\frac{2}{3} + \frac{1}{6} = \frac{4}{6} + \frac{1}{6} = \frac{5}{6}$

(e) $\frac{2}{3} \times \frac{1}{4} = \frac{1}{6}$

(f) $\frac{1}{4} + \frac{3}{8} = \frac{2}{8} + \frac{3}{8} = \frac{5}{8}$

(g) $\frac{5}{8} - \frac{1}{4} = \frac{5}{8} - \frac{2}{8} = \frac{3}{8}$

(h) $\frac{3}{2} \times \frac{2}{3} = 1$

14. (a) $\frac{1}{3} + \frac{1}{5} = \frac{5}{15} + \frac{3}{15} = \frac{8}{15}$

(b) $\frac{10}{3} \times \frac{3}{7} = \frac{10}{7}$

(c) $\frac{3}{4} - \frac{1}{8} = \frac{6}{8} - \frac{1}{8} = \frac{5}{8}$

(d) $\frac{1}{2} + \frac{2}{3} + \frac{3}{4} = \frac{6}{12} + \frac{8}{12} + \frac{9}{12} = \frac{23}{12}$

$$(e) \frac{6}{5} + \frac{4}{15} = \frac{18}{15} + \frac{4}{15} = \frac{22}{15} \quad (f) \frac{3}{5} \times \frac{2}{7} = \frac{6}{35}$$

$$(g) \frac{1}{3} + \frac{13}{6} = \frac{2}{6} + \frac{13}{6} = \frac{15}{6} = \frac{5}{2}$$

$$(h) \frac{3}{8} \times \frac{10}{15} \times \frac{1}{2} = 3$$

$$\underline{27.} \quad 24 \cancel{\text{ft}} \cdot \frac{12 \text{ in}}{1 \cancel{\text{ft}}} = 24 \cdot 12 \text{ in} = 288 \text{ in}$$

$$\underline{29.} \quad 25 \cancel{\text{min}} \cdot \frac{60 \text{ sec}}{1 \cancel{\text{min}}} = 25 \cdot 60 \text{ sec} = 1500 \text{ sec}$$

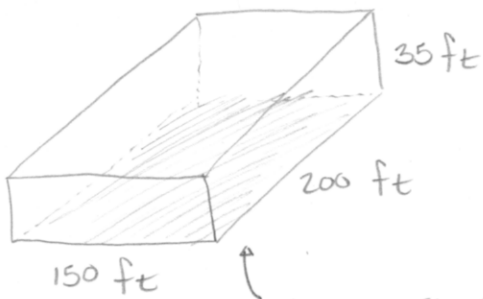
$$\underline{33.} \quad 140 \cancel{\text{week}} \cdot \frac{7 \text{ DAYS}}{1 \cancel{\text{week}}} = 140 \cdot 7 \text{ DAYS} = 980 \text{ DAYS}$$

$$\underline{34.} \quad \frac{60 \text{ mi}}{1 \cancel{\text{hr}}} \cdot \frac{1 \cancel{\text{hr}}}{60 \text{ min}} = \frac{60 \text{ mi}}{60 \text{ min}} = 1 \text{ mi/min}$$

$$\underline{35.} \quad 3 \cancel{\text{years}} \cdot \frac{365 \cancel{\text{DAYS}}}{1 \cancel{\text{year}}} \cdot \frac{24 \cancel{\text{HRS}}}{1 \cancel{\text{DAY}}} = 3 \cdot 365 \cdot 24 \text{ HRS} = 26280 \text{ HRS}$$

$$\underline{36.} \quad 1 \cancel{\text{TON}} \cdot \frac{2000 \cancel{\text{LBS}}}{1 \cancel{\text{TON}}} \cdot \frac{16 \text{ oz}}{1 \cancel{\text{LBS}}} = 1 \cdot 2000 \cdot 16 = 32000 \text{ oz}$$

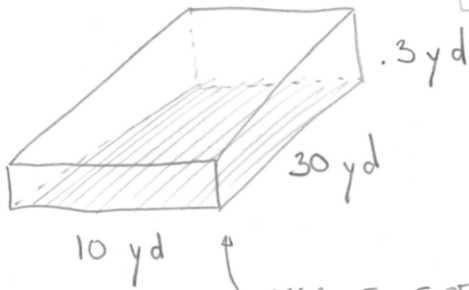
37. (c)



$$\begin{aligned} \text{AREA OF FLOOR} &= 150 \text{ ft} \times 200 \text{ ft} \\ &= \boxed{30,000 \text{ ft}^2} \end{aligned}$$

$$\begin{aligned} \text{VOLUME} &= 150 \text{ ft} \times 200 \text{ ft} \times 35 \text{ ft} \\ &= \boxed{1,050,000 \text{ ft}^3} \end{aligned}$$

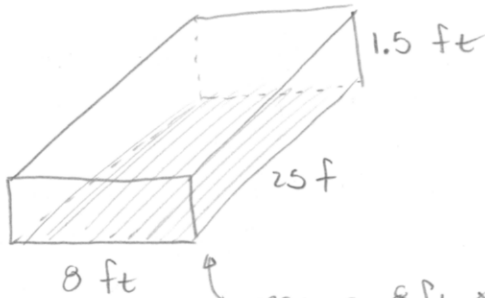
(b)



$$\text{AREA OF SURFACE} = 10 \text{ yd} \times 30 \text{ yd} = \boxed{300 \text{ yd}^2}$$

$$\text{VOLUME} = 10 \text{ yd} \times 30 \text{ yd} \times .3 \text{ yd} = \boxed{90 \text{ yd}^3}$$

(c)



$$\text{AREA} = 8 \text{ ft} \times 25 \text{ ft} = \boxed{200 \text{ ft}^2}$$

$$\text{VOLUME} = 8 \text{ ft} \times 25 \text{ ft} \times 1.5 \text{ ft} = \boxed{300 \text{ ft}^3}$$

39. $1 \text{ ft} = 12 \text{ m}$

$\Rightarrow 1 \text{ ft}^2 = 1 \text{ ft} \times 1 \text{ ft} = 12 \text{ m} \times 12 \text{ m} = 144 \text{ m}^2$

$\therefore 1 \text{ ft}^2 = 144 \text{ m}^2$, $\frac{1 \text{ ft}^2}{144 \text{ m}^2} = 1$, $\frac{144 \text{ m}^2}{1 \text{ ft}^2} = 1$

40. $1 \text{ ft}^3 = 1 \text{ ft} \times 1 \text{ ft} \times 1 \text{ ft} = 12 \text{ m} \times 12 \text{ m} \times 12 \text{ m} = 1728 \text{ m}^3$

$\therefore 1 \text{ ft}^3 = 1728 \text{ m}^3$, $\frac{1 \text{ ft}^3}{1728 \text{ m}^3} = 1$, $\frac{1728 \text{ m}^3}{1 \text{ ft}^3} = 1$

42. $1 \text{ yd}^2 = 1 \text{ yd} \times 1 \text{ yd} = 3 \text{ ft} \times 3 \text{ ft} = 9 \text{ ft}^2$

so $\frac{9 \text{ ft}^2}{1 \text{ yd}^2} = 1$.

AREA = $20 \text{ yd} \times 12 \text{ yd} = 240 \text{ yd}^2$

AND $240 \text{ yd}^2 \cdot \frac{9 \text{ ft}^2}{1 \text{ yd}^2} = \boxed{2160 \text{ ft}^2}$

47. $\$400 \cdot \frac{\pounds .7072}{\$1} = \boxed{\pounds 282.88}$

49. $\pounds 3000 \cdot \frac{\$1}{\pounds 15.19} = \boxed{\$197,50}$

$$55. \quad \frac{45 \text{ mi}}{5 \text{ min}} \cdot \frac{60 \text{ min}}{1 \text{ HR}} = \frac{45 \cdot 60}{5} \text{ mi/HR} = \boxed{540 \text{ mi/HR}}$$

$$57. \quad 300 \text{ g} \cdot \frac{1 \text{ min}}{3.2 \text{ g}} \cdot \frac{1 \text{ HR}}{60 \text{ min}} = \frac{300}{3.2 \cdot 60} \text{ HR} =$$

$$= \boxed{\frac{25}{16} \text{ HR} \text{ or } 1.5625 \text{ HR}}$$

$$58. \quad \frac{614 \text{ mi}}{1 \text{ HR}} \cdot \frac{1 \text{ HR}}{60 \text{ min}} \cdot \frac{1 \text{ min}}{60 \text{ SEC}} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}}$$

$$= \frac{614 \cdot 5280}{60 \cdot 60} \text{ ft/s} = \boxed{900.53 \text{ ft/s}}$$

$$68. \quad \frac{70 \text{ BEATS}}{1 \text{ min}} \cdot \frac{60 \text{ min}}{1 \text{ HR}} \cdot \frac{24 \text{ HR}}{1 \text{ DAY}} \cdot \frac{365 \text{ DAYS}}{1 \text{ yr}} \cdot \frac{80 \text{ yrs}}{1 \text{ LIFETIME}}$$

$$= \boxed{2,943,360,000 \text{ BEATS/LIFETIME}}$$

$$70. \quad \text{WRONG.} \quad \frac{5 \text{ mi}}{1 \text{ HR}} \div 3 \text{ HR} = \frac{5 \text{ mi}}{1 \text{ HR}} \cdot \frac{1}{3 \text{ HR}} = 5 \text{ mi/HR}^2$$

←
WHAT UNIT IS THIS?

$$\text{correct} \quad 3 \text{ HR} \times \frac{5 \text{ mi}}{1 \text{ HR}} = 15 \text{ mi} \quad \checkmark$$

71.

WRONG:

$$\frac{50 \text{ LBS}}{\$ 11} = 4.55 \text{ LBS/DOLLAR}$$

↙ CHECK THE UNIT

CORRECT:

$$\frac{\$ 11}{50 \text{ LBS}} = 0.22 \text{ DOLLARS/LB}$$

(CHEAPER THAN 0.39 DOLLARS/LB)