

21. Convert 2.05×10^5 seconds into years.

$$2.05 \times 10^5 \text{ s} \left(\frac{1 \text{ min}}{60 \text{ s}} \right) \left(\frac{1 \text{ hr}}{60 \text{ min}} \right) \left(\frac{1 \text{ day}}{24 \text{ hr}} \right) \left(\frac{1 \text{ yr}}{365 \text{ days}} \right) = 6.5 \times 10^{-3} \text{ yr}$$

(or $365 \frac{1}{4}$ (11))

22. Traveling at 65 miles/hour, how many minutes will it take to drive 125 miles to San Diego?

$$125 \text{ miles} \left(\frac{1 \text{ hr}}{65 \text{ miles}} \right) \left(\frac{60 \text{ min}}{1 \text{ hr}} \right) = 115 \text{ minutes}$$

$125 \div 65 \times 60 = 115 \text{ minutes}$

23. Convert 50 years into seconds.

$$50 \text{ yr} \left(\frac{365 \text{ d}}{1 \text{ yr}} \right) \left(\frac{24 \text{ hr}}{1 \text{ d}} \right) \left(\frac{60 \text{ min}}{1 \text{ hr}} \right) \left(\frac{60 \text{ s}}{1 \text{ min}} \right) = 1.58 \text{ billion seconds}$$

$50 \times 365 \times 24 \times 60 \times 60 = 1.58 \times 10^9 \text{ seconds}$

24. Traveling at 65 miles/hour, how many feet can you travel in 22 minutes? (1 mile = 5280 feet)

$$22 \text{ min} \left(\frac{1 \text{ hr}}{60 \text{ min}} \right) \left(\frac{65 \text{ mi}}{1 \text{ hr}} \right) \left(\frac{5280 \text{ ft}}{1 \text{ mi}} \right) = 125,840 \text{ ft}$$

$22 \div 60 \times 65 \times 5280 = 125,840$

25. Sally Leadfoot was pulled over on her way from Syracuse to Ithaca by an officer claiming she was speeding. The speed limit is 65 mi/hr and Sally had traveled 97 km in 102 minutes. How fast was Sally's average speed? Does she deserve a ticket? (Whoops - I forgot to give you... 1 km = .62 mi)

$$\frac{97 \text{ km}}{102 \text{ min}} \left(\frac{60 \text{ min}}{1 \text{ hr}} \right) = 57 \frac{\text{km}}{\text{h}}$$

Average speed

$$\frac{65 \text{ mi}}{\text{hr}} \left(\frac{1 \text{ km}}{.62 \text{ mi}} \right) = 105 \frac{\text{km}}{\text{h}}$$

Speed limit

Ticket? depends on instantaneous speed! (11)

26. Winnipeg is refilling the pool. How many gallons of water will it take if the pool is 50m by 25m by 1.5m? (1 gallon = 3.786 L)

Know from notes: $1 \text{ mL} = 1 \text{ cm}^3$, $1000 \text{ mL} = 1 \text{ L}$

$$V = L \cdot W \cdot h$$

$$5000 \text{ cm} \times 2500 \text{ cm} \times 150 \text{ cm} = 1,875,000 \text{ cm}^3$$

$$1,875,000 \text{ cm}^3 \left(\frac{1 \text{ mL}}{1 \text{ cm}^3} \right) \left(\frac{1 \text{ L}}{1000 \text{ mL}} \right) \left(\frac{1 \text{ gallon}}{3.786 \text{ L}} \right) = 495,246 \text{ gallons}$$

about 500K gallons!

27. Meredith found some lace at a price of 4.0 £/meter in Ireland that she liked but was afraid she was paying too much for it. The same lace in the Canada would sell for \$5.99/yd. Was she paying too much for it? (\$1 = 0.498 £) (1 yard = 3 ft)

Ireland: $4 \frac{\text{£}}{\text{m}} \left(\frac{1 \text{ $}}{.498 \text{ £}} \right) = \$8 \frac{\text{meter}}{\text{meter}}$

"The Canada" $5.99 \frac{\text{yd}}{\text{yard}} \left(\frac{1.09 \text{ meter}}{1 \text{ yard}} \right) = \$6.53 \frac{\text{meter}}{\text{meter}}$

Better Deal in The Canada

Argh! I forgot again! 1 meter = 1.09 yards

5.99 x 1.09 = 6.53

28. In Raiders of the Lost Ark, Indiana Jones tried to remove a gold idol from a booby-trapped pedestal. He replaces the idol with a bag of sand. If the idol has a mass of 2.00 kg, how many litres of sand must he place on the pedestal to keep the mass sensitive booby-trap from activating? (Density of sand is 3.00 g/cm³)

$$2 \text{ kg idol} \left(\frac{1000 \text{ g}}{1 \text{ kg}} \right) \left(\frac{1 \text{ cm}^3}{3 \text{ g}} \right) \left(\frac{1 \text{ mL}}{1 \text{ cm}^3} \right) \left(\frac{1 \text{ L}}{1000 \text{ mL}} \right)$$

hard step

1000 cancels, so $2 \div 3 = \frac{2}{3} \text{ Liter} \sim .67 \text{ L}$

23. Comer; 50 years into seconds.

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