

1. How many inches are there in a football field?

$$(100 \text{ yds}) \left(\frac{3 \text{ ft}}{\text{yd}} \right) \left(\frac{12 \text{ in}}{\text{ft}} \right) = 3600 \text{ inches}$$

2. How many feet are there in a mile? (5280 feet = mile)

3. How many yards are there in a mile?

$$\text{mile} = 5280 \text{ ft} \left(\frac{\text{yd}}{3 \text{ ft}} \right) = 1760 \text{ yards}$$

4. How many yards are there in a soccer field?

$$100 \text{m} \left(\frac{100 \text{ cm}}{\text{m}} \right) \left(\frac{1 \text{ in}}{2.54 \text{ cm}} \right) \left(\frac{\text{ft}}{12 \text{ in}} \right) \left(\frac{\text{yard}}{3 \text{ ft}} \right) = 109.36 \text{ yards}$$

5. How many feet are there in a furlong?

$$\frac{1}{8} \text{ mile} \left(\frac{5280 \text{ ft}}{\text{mile}} \right) = 660 \text{ ft}$$

6. How many paces make up a football field?

$$\frac{100 \text{ yds}}{1} \left(\frac{3 \text{ ft}}{\text{yd}} \right) \left(\frac{12 \text{ in}}{\text{ft}} \right) \left(\frac{\text{pace}}{31 \text{ in}} \right) = 116.1 \text{ paces}$$

7. How many paces make up a furlong?

$$\left(\frac{1 \text{ mile}}{8} \right) \left(\frac{5280 \text{ ft}}{\text{mile}} \right) \left(\frac{12 \text{ in}}{\text{ft}} \right) \left(\frac{\text{pace}}{31 \text{ in}} \right) = 255.5 \text{ paces}$$

8. How many fathoms is a 20 foot deep diving well?

$$20 \text{ ft} \left(\frac{\text{fathom}}{6 \text{ ft}} \right) = 3.33 \text{ fathoms}$$

9. Every 75 feet down a scuba diver goes makes him feel like he has had a martini. How many fathoms is this?

$$75 \text{ ft} \left(\frac{\text{fathom}}{6 \text{ ft}} \right) = 12.5 \text{ fathoms}$$

10. How many feet are between the first and second floor of a building (one story)?

$$\left(\frac{1 \text{ story}}{1} \right) \left(\frac{3 \text{ m}}{\text{story}} \right) \left(\frac{100 \text{ cm}}{\text{m}} \right) \left(\frac{2.54 \text{ in}}{\text{cm}} \right) \left(\frac{\text{ft}}{12 \text{ in}} \right) = 9.84 \text{ ft}$$

11. How many parsecs make up a light year?

$$9.4647 \times 10^{15} \text{ m} \left(\frac{100 \text{ cm}}{\text{m}} \right) \left(\frac{\text{in}}{2.54 \text{ cm}} \right) \left(\frac{\text{ft}}{12 \text{ in}} \right) \left(\frac{\text{mi}}{5280 \text{ ft}} \right) \left(\frac{\text{parsec}}{1.91738 \times 10^{13} \text{ mi}} \right) = 0.31 \text{ parsecs}$$

12. How many rods make up a mile?

$$1 \text{ mi} \left(\frac{5280 \text{ ft}}{\text{mi}} \right) \left(\frac{\text{yd}}{3 \text{ ft}} \right) \left(\frac{\text{Rod}}{5.5 \text{ d}} \right) = 320 \text{ rods}$$

13. How many centimeters are in a fathom?

$$6 \text{ ft} \left(\frac{12 \text{ in}}{\text{ft}} \right) \left(\frac{2.54 \text{ cm}}{\text{in}} \right) = 182.88 \text{ cm}$$

14. How many seconds are in a year?

$$(1 \text{ yr}) \left(\frac{365 \text{ days}}{\text{yr}} \right) \left(\frac{24 \text{ hrs}}{\text{day}} \right) \left(\frac{60 \text{ min}}{\text{hr}} \right) \left(\frac{60 \text{ sec}}{\text{hr}} \right) = 3.15 \times 10^7 \text{ sec}$$

15. How many hours are in a fortnight?

$$\text{fortnight} \left(\frac{14 \text{ days}}{\text{fortnight}} \right) \left(\frac{24 \text{ hrs}}{1 \text{ day}} \right) = 336.00 \text{ hrs}$$

16. The average life span a tortoise is 200 years. How many scores is this?

$$200 \text{ yrs} \left(\frac{\text{score}}{20 \text{ yrs}} \right) = 10 \text{ score}$$

17. A housefly's life span is 3 days. How many minutes is this?

$$3 \text{ days} \left(\frac{24 \text{ hrs}}{\text{day}} \right) \left(\frac{60 \text{ min}}{\text{hr}} \right) = 4,320.00 \text{ min}$$

18. If a person blinks their eyes once every 3 minutes on the average, then how many times do they blink their eye in a 12 hour day?

$$12 \text{ hrs} \left(\frac{60 \text{ min}}{\text{hr}} \right) \left(\frac{\text{blinks}}{3 \text{ min}} \right) = 240 \text{ blinks in a 12 hr day}$$

19. How many grams are in a pound?

$$1 \text{ lb} \left(\frac{\text{kg}}{2.05 \text{ lbs}} \right) \left(\frac{1000\text{g}}{\text{kg}} \right) = 487.80$$

20. How many poundals are in a pound?

$$1 \text{ lb} \left(\frac{\text{kg}}{2.05 \text{ lb}} \right) \left(\frac{100 \text{ g}}{\text{kg}} \right) \left(\frac{\text{poundal}}{14.09808\text{g}} \right) = 3.46 \text{ poundals}$$

21. How many pounds are in a metric ton?

$$\text{Tonne} = 1000 \text{ kg} \left(\frac{2.05 \text{ lbs}}{\text{kg}} \right) = 2050 \text{ lbs}$$

22. A typical locomotive weighs 40,000 tons. How many drams is this?

$$\frac{40,000 \text{ tons}}{1} \left(\frac{2000\text{lbs}}{\text{ton}} \right) \left(\frac{7000\text{grains}}{\text{lb}} \right) \left(\frac{\text{dram}}{27.34375 \text{ grains}} \right) = 2.048 \times 10^{10} \text{ drams}$$

* 23. A typical car manufactured in 1974 weighs 4000 pounds. How many McDonald's Quarter Pounder™ is this? If the Quarter Pounder™ costs \$0.65 in 1974 and the car costs \$6,000, then which is cheaper the car or the car's weight in Quarter Pounders™?

$$\left(\frac{4000 \text{ lbs}}{1974 \text{ car}} \right) \left(\frac{\text{Quarter Pounder}}{\frac{1}{4} \text{ lb}} \right) = 16,000 \text{ Quarter Pounders}$$

$$\left(\frac{4000 \text{ lbs}}{1974 \text{ car}} \right) \left(\frac{\text{Quarter Pounder}}{\frac{1}{4} \text{ lb}} \right) \left(\frac{\$0.65}{\text{Quarter Pounder}} \right) = \$10,400$$

*24. What is the speed of a car in feet/second that is traveling at 60 miles/hour?

$$\left(\frac{60 \text{ mi}}{\text{hr}} \right) \left(\frac{5280 \text{ ft}}{\text{mi}} \right) \left(\frac{\text{hr}}{3600 \text{ sec}} \right) = 88.00 \frac{\text{ft}}{\text{sec}}$$

*25. The space shuttle travels at 28,000 mph while orbiting the Earth. How far does the shuttle travel in feet in the blink of an eye?

$$\left(\frac{28,000 \text{ mi}}{\text{hr}}\right)\left(\frac{\text{hr}}{3600 \text{ sec}}\right)\left(\frac{1 \text{ sec}}{10 \text{ blink}}\right) = \frac{0.7 \text{ mi}}{\text{blink}}$$

* 26. How much time, in seconds, passes before a beam of light, traveling at 3.00×10^8 meters/second travels one foot?

$$\left(3.00 \times 10^8 \frac{\text{m}}{\text{sec}}\right)\left(\frac{100 \text{ cm}}{\text{m}}\right)\left(\frac{\text{in}}{2.54 \text{ cm}}\right)\left(\frac{\text{ft}}{12 \text{ in}}\right) = 9.84 \times 10^8 \frac{\text{ft}}{\text{sec}}$$

$$\frac{1}{9.84 \times 10^8 \frac{\text{ft}}{\text{sec}}} = 1.02 \times 10^{-9} \frac{\text{ft}}{\text{sec}}$$

*27. A stack of ten 3.5-inch diskettes is 34 millimeters high. How many diskettes does it take to make a stack 100 yards high?

$$\frac{34 \text{ mm}}{10 \text{ disks}} = \frac{3.4 \text{ mm}}{\text{disk}}$$

$$100 \text{ yd} \left(\frac{3 \text{ ft}}{\text{yd}}\right) \left(\frac{36 \text{ in}}{\text{ft}}\right) \left(\frac{2.54 \text{ cm}}{\text{in}}\right) \left(\frac{10 \text{ mm}}{\text{cm}}\right) \left(\frac{3.4 \text{ mm}}{\text{disk}}\right) = 80,682.35 \text{ diskettes}$$

*28. A PSSC physics book is 1.5 inches thick. How many books would it take to make a stack 2 stories high?

$$\frac{2 \text{ stories}}{1} \left(\frac{3 \text{ m}}{\text{story}}\right) \left(\frac{100 \text{ cm}}{\text{m}}\right) \left(\frac{\text{in}}{2.54 \text{ cm}}\right) \left(\frac{\text{book}}{1.5 \text{ in}}\right) = 157 \text{ books}$$

*29. If you earned one penny every 10 seconds of your life then how many dollars would you have after 65 years?

$$65 \text{ years} \left(\frac{365 \text{ days}}{\text{yr}}\right) \left(\frac{24 \text{ hr}}{\text{day}}\right) \left(\frac{3600 \text{ sec}}{\text{hr}}\right) \left(\frac{\$ 0.01}{10 \text{ sec}}\right) = \$2,926,278,000$$

**30. A 5.25 inch diskette spins around once every 0.200 seconds. The disk's diameter is 5.25 inches. If you were an insect sitting on the edge of the diskette, then how fast would travel in mph?

$$\text{Velocity} = \left(\frac{\text{distance}}{\text{time}}\right) = \left(\frac{16.49 \text{ in}}{0.2 \text{ sec}}\right) \left(\frac{\text{ft}}{12 \text{ in}}\right) \left(\frac{\text{mi}}{5280 \text{ ft}}\right) \left(\frac{3600 \text{ sec}}{\text{hr}}\right) = 4.69 \frac{\text{mi}}{\text{hr}}$$

31

$$\left(\frac{16 \text{ oz}}{1}\right) \left(\frac{2 \text{ liters}}{67.63 \text{ oz}}\right) \left(\frac{1000 \text{ ml}}{\text{liters}}\right) \left(\frac{\text{cm}^3}{\text{ml}}\right) \left(\frac{\text{in}^3}{2.54^3 \text{ cm}^3}\right) = 28.9 \text{ in}^3$$

Volume = $(\pi)r^2h$... The glass is ___ inches high

32

$$43,560 \text{ ft}^2 \left(\frac{12^2 \text{ in}^2}{\text{ft}^2}\right) \left(\frac{2.54^2 \text{ cm}^2}{\text{in}^2}\right) \left(\frac{\text{m}^2}{100^2 \text{ cm}^2}\right) = 4046.9 \text{ m}^2$$

63.61 meters on each side.

33

34
$$\left(\frac{88 \text{ ft}}{\text{s}}\right)\left(\frac{\text{mi}}{5280 \text{ ft}}\right)\left(\frac{60 \text{ s}}{\text{min}}\right)\left(\frac{60 \text{ min}}{\text{hr}}\right) = 60 \frac{\text{mi}}{\text{hr}}$$

35
$$\left(\frac{25 \text{ mi}}{\text{hr}}\right)\left(\frac{\text{hr}}{3600 \text{ s}}\right)\left(\frac{5280 \text{ ft}}{\text{mi}}\right)\left(\frac{12 \text{ in}}{\text{ft}}\right)\left(\frac{2.54 \text{ cm}}{\text{in}}\right)\left(\frac{\text{m}}{100 \text{ cm}}\right) = 11.18 \frac{\text{m}}{\text{s}}$$

36
$$\left(\frac{28,000 \text{ mi}}{\text{hr}}\right)\left(\frac{\text{hr}}{3600 \text{ s}}\right) = 7.78 \frac{\text{mi}}{\text{s}}$$

29.22 $\frac{\text{fathom}}{\text{s}}$

$$\left(\frac{0.125 \text{ furlongs}}{\text{s}}\right)\left(\frac{\left(\frac{1}{8}\right) \text{ mi}}{\text{furlong}}\right)\left(\frac{5280 \text{ ft}}{\text{mi}}\right)\left(\frac{\text{fathom}}{6 \text{ ft}}\right) = 13.75 \frac{\text{fathoms}}{\text{s}}$$

37
$$\left(\frac{82 \text{ mi}}{\text{hr}}\right)\left(\frac{\text{hr}}{3600 \text{ s}}\right)\left(\frac{5280 \text{ ft}}{\text{mi}}\right)\left(\frac{\text{fathom}}{6 \text{ ft}}\right) = 20.04 \frac{\text{fathom}}{\text{s}}$$

$$20,000 \text{ gal} \left(\frac{128 \text{ oz}}{\text{gal}}\right)\left(\frac{2 \text{ liter}}{67.63 \text{ oz}}\right) = 75,706 \text{ liters}$$

$$2,000,000 \text{ cm}^3 \left(\frac{\text{ml}}{\text{cm}^3}\right)\left(\frac{\text{liter}}{1000 \text{ ml}}\right) = 2000 \text{ liters}$$

12,000 liters

38
$$537,000 \frac{\text{furlong}}{\text{fortnight}} \left(\frac{\left(\frac{1}{8}\right) \text{ mi}}{\text{furlong}}\right)\left(\frac{5280 \text{ ft}}{\text{mi}}\right)\left(\frac{\text{fortnight}}{14 \text{ days}}\right)\left(\frac{\text{day}}{24 \text{ hr}}\right)\left(\frac{\text{hr}}{3600 \text{ s}}\right) = 293 \frac{\text{ft}}{\text{s}}$$

212 $\frac{\text{ft}}{\text{s}}$

$$\left(\frac{9,000,000 \text{ cm}}{\text{hr}}\right)\left(\frac{\text{in}}{2.54}\right)\left(\frac{\text{ft}}{12 \text{ in}}\right)\left(\frac{\text{hr}}{3600 \text{ s}}\right) = 82 \frac{\text{ft}}{\text{s}}$$

39
$$\left(\frac{\$0.99}{\text{liter}}\right)\left(\frac{2 \text{ liter}}{67.63 \text{ oz}}\right) = \frac{\$0.029}{\text{oz}}$$

$$\left(\frac{\$1.89}{\text{gal}}\right)\left(\frac{\text{gal}}{128 \text{ oz}}\right) = \frac{\$0.014}{\text{oz}}$$

$$\left(\frac{\$0.20}{12 \text{ oz}}\right) = \frac{\$0.017}{\text{oz}}$$

40

$$\frac{8 \text{ pints}}{1} \left(\frac{\text{quart}}{2 \text{ pint}} \right) \left(\frac{\text{gal}}{4 \text{ quart}} \right) = 1 \text{ gal}$$

$$2 \text{ liter} \left(\frac{67.63 \text{ oz}}{2 \text{ liter}} \right) \left(\frac{\text{gal}}{128 \text{ oz}} \right) = 0.528 \text{ gal}$$

$$\frac{320 \text{ in}^3}{1} \left(\frac{2.54^3 \text{ cm}^3}{\text{in}^3} \right) \left(\frac{\text{ml}}{\text{cm}^3} \right) \left(\frac{\text{liter}}{1000 \text{ ml}} \right) \left(\frac{57.64 \text{ oz}}{2 \text{ liter}} \right) = 143 \text{ gal}$$

41. A quart container's bottom has an area of 5.06 cm². How many square yards is this?

$$\frac{5.06 \text{ cm}^2}{1} \left(\frac{1^2 \text{ in}^2}{2.54^2 \text{ cm}^2} \right) \left(\frac{1^2 \text{ ft}^2}{12^2 \text{ in}^2} \right) \left(\frac{1^2 \text{ yd}^2}{3^2 \text{ ft}^2} \right) = 6.05 \times 10^{-4} \text{ yd}^2$$

42. A teaspoon of oil can cover the surface of a pond about 10,000 cubits² in size. How many square yards is this?

$$10,000 \text{ cubits}^2 \left(\frac{20^2 \text{ in}^2}{1^2 \text{ cubits}^2} \right) \left(\frac{1^2 \text{ ft}^2}{12^2 \text{ in}^2} \right) \left(\frac{1^2 \text{ yd}^2}{3^2 \text{ ft}^2} \right) = 3086 \text{ yd}^2$$

43. A fingerprint is about 1.25 in². How many cm² is this?

$$1.25 \text{ in}^2 \left(\frac{2.54^2 \text{ cm}^2}{1^2 \text{ in}^2} \right) = 8.06 \text{ cm}^2$$

44. The continental United States covers about 16,000,000 miles². How squared walking paces is this?

$$16,000,000 \text{ miles}^2 \left(\frac{5280^2 \text{ ft}^2}{1^2 \text{ mi}^2} \right) \left(\frac{1^2 \text{ in}^2}{1^2 \text{ ft}^2} \right) \left(\frac{1^2 \text{ pace}}{31^2 \text{ in}^2} \right) = 6.684 \times 10^{12} \text{ paces}^2$$

45. The walls of a room have a total area of 60 square meters. How many rolls of wallpaper will it take to cover all the walls is a single roll can cover 24 ft²?

$$60 \text{ m}^2 \left(\frac{100^2 \text{ cm}^2}{1^2 \text{ m}^2} \right) \left(\frac{1^2 \text{ in}^2}{2.54^2 \text{ cm}^2} \right) \left(\frac{1^2 \text{ ft}^2}{12^2 \text{ in}^2} \right) \left(\frac{\text{roll}}{24 \text{ ft}^2} \right) = 26.91 \text{ rolls}$$