Converting Units

Accelerated 7th Grade Math

Name: Key

Customary Units	Metric Units	Customary/Metric
1 ft = 12 in 1 yd = 3 ft 1 mi = 5,280 ft	1 m = 100 cm 1 km = 1,000 m	1 in = 2.54 cm 1 mi = 1.6093 km
1 cup = 8 fl oz 1 pt = 2 cup 1 qt = 2 pt 1 gal = 4 qt	1 liter = 1,000 mL	1 gal = 3.79 liters
1 lb = 16 oz 1 ton = 2,000 lb	1 kg = 1,000 grams	1 lb = 0.45 kg

Directions: Use the information above to convert each of the following measurements.

1. 48 in = _____ ft

$\frac{12}{1} = \frac{48}{x}$ (in / ft)

$12x = 48$

$x = 4$ ft

2. 12.3 km = _____ m

$\frac{1}{1000} = \frac{12.3}{x}$ (km / m)

$x = 12{,}300$ m

3. 30 cm = _____ in

$\frac{2.54}{1} = \frac{30}{x}$ (cm / in)

$2.54x = 30$

$x = 11.81$ in

4. 47 oz = _____ cups

$\frac{8}{1} = \frac{47}{x}$ (oz / c)

$8x = 47$

$x = 5.875$ c

5. 25 in = _____ cm

$\frac{1}{2.54} = \frac{25}{x}$ (in / cm)

$x = 63.5$ cm

6. 5.3 mi = _____ ft

$\frac{1}{5{,}280} = \frac{5.3}{x}$ (mi / ft)

$x = 27{,}984$ ft

7. 5,261 mL = _____ liters

$\frac{1{,}000}{1} = \frac{5{,}261}{x}$ (mL / L)

$1{,}000x = 5{,}261$

$x = 5.261$ L

8. 7,834 ft = _____ mi

$\frac{5{,}280}{1} = \frac{7{,}834}{x}$ (ft / mi)

$5{,}280x = 7{,}834$

$x = 1.48$ mi

9. 10 liters = ____ gal

$\frac{3.79}{1} = \frac{10}{x}$ (L / gal)

$3.79x = 10$

$x = 2.64$ gal

10. 90 lb = _____ kg

$\frac{1}{.45} = \frac{90}{x}$ (lb / kg)

$x = 40.5$ kg

11. 46 oz = _____ lb

$\frac{16}{1} = \frac{46}{x}$ (oz / lb)

$16x = 46$

$x = 2.875$ lbs

12. 80 km = _____ mi

$\frac{1.6093}{1} = \frac{80}{x}$ (km / mi)

$1.6093x = 80$

$x = 49.7$ mi

Tough Conversions!

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1. 7 qt = _____ cups

$\frac{qt}{pt}\ \frac{1}{2} = \frac{7}{x}\ \frac{qt}{pts}$, $x = 14$ pts

$\frac{pts}{c}\ \frac{1}{2} = \frac{14}{y}\ \frac{pts}{c}$, $y = 28$ c

2. 10 liters = _____ qts

$\frac{L}{gal}\ \frac{3.79}{1} = \frac{10}{x}\ \frac{L}{gal}$, $3.79x = 10$, $x = 2.64$ gal

$\frac{gal}{qts}\ \frac{1}{4} = \frac{2.64}{y}\ \frac{gal}{qts}$, $y = 10.55$ qts

3. 4 days = _____ seconds

$\frac{day}{hrs}\ \frac{1}{24} = \frac{4}{x}\ \frac{days}{hrs}$, $x = 96$ hrs

$\frac{hr}{min}\ \frac{1}{60} = \frac{96}{y}\ \frac{hrs}{min}$, $y = 5{,}760$ min

$\frac{min}{sec}\ \frac{1}{60} = \frac{5{,}760}{z}\ \frac{min}{sec}$, $z = 345{,}600$ sec

4. 4 tons = _____ kg

$\frac{tn}{lb}\ \frac{1}{2{,}000} = \frac{4}{x}\ \frac{tn}{lbs}$, $x = 8{,}000$ lbs

$\frac{lb}{kg}\ \frac{1}{.45} = \frac{8{,}000}{x}\ \frac{lb}{kg}$, $x = 3{,}600$ kg

5. 1.2 mi = _____ cm

$\frac{mi}{ft}\ \frac{1}{5{,}280} = \frac{1.2}{x}\ \frac{mi}{ft}$, $x = 6{,}336$ ft

$\frac{ft}{in}\ \frac{1}{12} = \frac{6{,}336}{y}\ \frac{ft}{in}$, $y = 76{,}032$ in

$\frac{in}{cm}\ \frac{1}{2.54} = \frac{76{,}032}{z}\ \frac{in}{cm}$, $z = 193{,}121.28$ cm

6. 17 gal = _____ oz

$\frac{gal}{qts}\ \frac{1}{4} = \frac{17}{x}\ \frac{gal}{qts}$, $x = 68$ qts

$\frac{qt}{pt}\ \frac{1}{2} = \frac{68}{y}\ \frac{qts}{pt}$, $y = 136$ pts

$\frac{pt}{c}\ \frac{1}{2} = \frac{136}{z}\ \frac{pts}{c}$, $z = 272$ c

$\frac{c}{oz}\ \frac{1}{8} = \frac{272}{w}\ \frac{c}{oz}$, $w = 2{,}176$ oz

7. 32 in = _____ m

$\frac{in}{cm}\ \frac{1}{2.54} = \frac{32}{x}\ \frac{in}{cm}$, $x = 81.28$ cm

$\frac{cm}{m}\ \frac{100}{1} = \frac{81.28}{y}\ \frac{cm}{m}$, $100y = 81.28$, $y = .8128$ m

8. 420 oz = _____ pts

$\frac{oz}{c}\ \frac{8}{1} = \frac{420}{x}\ \frac{oz}{c}$, $8x = 420$, $x = 52.5$ c

$\frac{c}{pt}\ \frac{2}{1} = \frac{52.5}{y}\ \frac{c}{pts}$, $2y = 52.5$, $y = 26.25$ pts

9. 3.2 km/hr = _____cm/min

$\frac{km}{m}\ \frac{1}{1{,}000} = \frac{3.2\ km}{x\ m}$ $\quad x = 3{,}200\ m$

$\frac{m}{cm}\ \frac{1}{100} = \frac{3{,}200\ m}{y\ cm}$ $\quad y = 320{,}000\ cm$

$\frac{hr}{min}\ \frac{1}{60} = \frac{1\ hr}{z\ min}$ $\quad z = 60\ min$

$\frac{320{,}000\ cm}{60\ min}$ reduce $= 5{,}333.\bar{3}\ \frac{cm}{min}$

10. 10 ft/sec =_____mi/hr

$\frac{ft}{mi}\ \frac{5{,}280}{1} = \frac{10\ ft}{x\ mi}$ $\quad 5{,}280x = 10$ $\quad x = .0018939\overline{\ }\ mi$

$\frac{sec}{min}\ \frac{60}{1} = \frac{1\ sec}{y\ min}$ $\quad 60y = 1$ $\quad y = \frac{1}{60}\ min$

$\frac{min}{hr}\ \frac{60}{1} = \frac{\frac{1}{60}\ min}{z\ hr}$ $\quad 60z = \frac{1}{60}$ $\quad z = \frac{1}{3{,}600}\ hr$

$\frac{.0018939\ mi}{\frac{1}{3600}\ hr} = \frac{6.81\ mi}{hr}$

11. Find your mass in grams (start with your weight in pounds).

$\frac{lb}{.45\ kg}\ \frac{1}{} = \frac{200}{x}\ \frac{-165}{kg}$ $\quad x = 90\ kg$

$\frac{kg}{g}\ \frac{1}{1{,}000} = \frac{90\ kg}{y\ g}$ $\quad y = 90{,}000\ g$

12. How many cups of water are there in 6 gallons?

$\frac{gal}{qts}\ \frac{1}{4} = \frac{6\ gal}{x\ qts}$ $\quad x = 24\ qts$

$\frac{qts}{pts}\ \frac{1}{2} = \frac{24\ qts}{y\ pts}$ $\quad y = 48\ pts$

$\frac{pt}{c}\ \frac{1}{2} = \frac{48\ pts}{z\ c}$ $\quad z = 96\ c$

13. A typical human weighs 150 pounds and takes in 3,000 calories per day. A typical whale weighs 50 tons and needs 395,000 calories per day. A whale may spend 15 hours a day feeding during the summer season.

a. How many pounds (lbs) does a typical whale weigh? (look at your conversions on the front)

$\frac{ton}{lbs}\ \frac{1}{2{,}000} = \frac{50\ ton}{x\ lbs}$ $\quad x = 100{,}000\ lbs$

b. Here is a "rate" problem (from last homework):

How many calories / hour does a typical whale take in?

$\frac{395{,}000\ cal}{1\ day} \rightarrow \frac{395{,}000\ cal}{24\ hr} = \frac{16{,}458.\bar{3}\ cal}{hr}$

c. Use your above rate and your knowledge of conversions to determine how many calories / second a whale takes in.

$\frac{16{,}458.\bar{3}\ cal}{hr} \rightarrow \frac{16{,}458.\bar{3}\ cal}{60\ min} \rightarrow \frac{274.30\bar{5}\ cal}{min}$

$\rightarrow \frac{274.30\bar{5}\ cal}{60\ sec} = \frac{4.57\ cal}{sec}$