

3 Non-Linear & Metric Conversions

September 11, 2018 4:09 PM

FMPC10

Updated June 2018

Conversions with Non-linear Measurements.



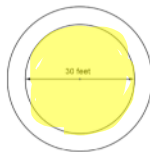
③ $\times 12in^2 = 12^2$ OR

② $9ft^2 \times \frac{12in}{1ft} \times \frac{12in}{1ft} = 1296in^2$

54. To convert the area of a figure from square feet to square inches, what calculations must you perform?

56. To convert the area of a figure from square miles to square feet, what calculations must you perform?

57. A pizza has an area of $1.5 ft^2$. If the pizza is to be sliced into six equal slices, how many square inches is each slice?



50. How do you calculate the area of a square?

Area = $l \cdot w$ Square units for Area
51. What is the area of the square to the left in square-feet?
 $A = 3ft \cdot 3ft = 9ft^2$

52. What is the side length of the square in inches?

$\frac{3ft}{1ft} \times \frac{12in}{1ft} = 36in$

53. What is the area in square inches?

$A = 36in \cdot 36in = 1296in^2$

55. A rectangular plot of land has dimensions of 0.5 miles by 0.4 miles. What is the area in ft^2 ?

0.5mi
0.4mi
 $A = 0.5mi \times 0.4mi$
 $A = 0.2mi^2$

Longer
0.5mi \rightarrow ft
0.4mi \rightarrow ft
A = ?

OR
 $\frac{0.2mi^2}{1mi} \times \frac{5280ft}{1mi} \times \frac{5280ft}{1mi} = 5575680ft^2$
OR
 $0.2mi^2 \times (5280ft)^2 = 5575680ft^2$

58. A circular carpet has an area of $100\pi ft^2$ (approximately $314 ft^2$). What is the length of the radius in inches?

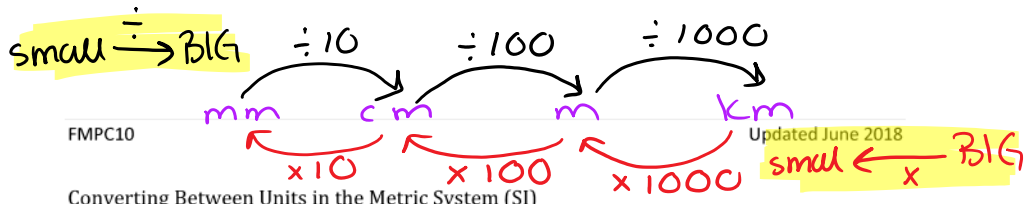
$A = \pi r^2$

60. The pipe in the previous question has concrete walls that are 5 feet thick. Calculate the cross-sectional area of concrete to the nearest in^2 .

The International System of Units (SI)

↪ Metric

UNIT	QUANTITY MEASURED	REPRESENTATIVE EXAMPLE	3 EXAMPLES OF OBJECTS YOU WOULD MEASURE USING THIS UNIT
Milligram	MASS? VOLUME? DISTANCE?	ONE GRAIN OF SALT	1. medicine (pills) 2. sand / sugar / chemistry 3.
Gram	MASS? VOLUME? DISTANCE?	ONE PAPER CLIP	1. bag of chips 2. bulk candy / food 3. postage
Kilogram	MASS? VOLUME? DISTANCE?	ONE PINEAPPLE	1. delivery box 2. luggage 3. person
Millilitre	MASS? VOLUME? DISTANCE?		1. can of pop 2. baking (other) 3. milk (dairy)
Litre	MASS? VOLUME? DISTANCE?		1. Milk 2. sparkling water 3. shampoo
Millimetre	MASS? VOLUME? DISTANCE?		1. rainfall 2. mechanical pencil 3. thickness of paper
Centimetre	MASS? VOLUME? DISTANCE?		1. Bugs 2. Height 3. donate hair (C4C)
Metre	MASS? VOLUME? DISTANCE?		1. walking 2. Athletics 3. pool
Kilometre	MASS? VOLUME? DISTANCE?		1. running 2. driving 3. long distances.



Converting Between Units in the Metric System (SI)

Conversion Factor: Multiplying or dividing by this number allows us to convert from one unit to another.

Eg. Convert 230 mm to cm.

$$230 \text{ mm} \times \frac{1 \text{ cm}}{10 \text{ mm}} = 23 \text{ cm}$$

set up to cancel units

Use the numbers in the table on page 5.

$$\frac{1 \text{ cm}}{10 \text{ mm}}$$

The unit on top is the one you are converting to!

Metric conversions can be made by moving the decimal left or right. Imperial conversions cannot

multiple of 10

One Unit Conversions

Convert the following. Answer to the nearest tenth when necessary.

61. 1250 mm = _____ cm

$$1250 \text{ mm} \times \frac{1 \text{ cm}}{10 \text{ mm}} = 125 \text{ cm}$$

Or...simply move the decimal one place to the left.

64. 138 m = _____ mm

62. 37.25 m = 3725 cm

37.25 m \times 100 cm = 3725 cm

1 m (want to cancel)

63. 0.8 cm = _____ mm.

conversion factor.

1 decimal place

67. A circle has a radius of 10 cm. Find the circumference of the circle in millimetres.

68. A farmer builds a fence around a rectangular sheep pen. The pen is 5 metres long and 7 metres wide. What is the perimeter of the pen in centimetres?

69. Find the height of a triangle with a base of 12 cm and an area of 75 cm². Answer in millimetres.

Two (or three) Unit Conversions

Use two conversion factors to make necessary conversions. Round to the nearest tenth of a unit if necessary.

70. Convert 3.45 m to mm.

71. Convert 12.357 km to m.

72. Convert 176 mm to m.

73. Convert 1.365 km to mm.

74. Convert $17\frac{1}{5}$ m to mm.75. Convert $\frac{3}{4}$ km to cm.76. The poliovirus is about 30 **nanometers** in diameter. That is 0.000 000 030 m. How many millimetres in diameter is the virus.

77. The Great Wall of Ming Dynasty in China has been measured to be 8851.8 km long. Approximately how many centimetres is this?

78. A standard volleyball court is 18 m long and 9 m wide. Find the area in square millimetres.

79. $2\text{ m} + 30\text{ cm} + 4\text{ mm}$

= _____ mm

80. $1.35\text{ km} + 125\text{ m} + 40\text{ cm}$

= _____ m

81. $1.35\text{ km} + 125\text{ m} + 120\text{ mm}$

= _____ cm

Imperial \longleftrightarrow Metric

Unit Conversion **between** Systems

One-Step Conversions:

conversion factor

$$\boxed{2.2 \text{ lbs} = 1 \text{ kg}}$$

$$1 \text{ lbs} = 0.454 \text{ kg}$$

Use the table on page 5. Write the conversion factors as a ratio (watch the units!)

Convert each of the following. Round to the nearest tenth.

82. 50 mi = _____ km

Use: $\frac{1.609 \text{ km}}{1 \text{ mi}}$ (from reference page)

$$50 \text{ mi} \times \frac{1.609 \text{ km}}{1 \text{ mi}} = 80.45 \text{ km}$$

$$\approx 80.5 \text{ km}$$

83. 185 lb = _____ kg

$$\begin{array}{r} 185 \text{ lb} \mid 1 \text{ kg} \\ \hline 2.2 \text{ lb} \\ \hline \end{array}$$

or

$$\begin{array}{r} 185 \text{ lb} \mid 0.454 \text{ kg} \\ \hline 1 \text{ lb} \\ \hline \end{array}$$

$$185 \div 2.2 = 84.1 \text{ kg}$$

$$185 \times 0.454 = 83.99 = 84.0 \text{ kg}$$

84. 150 m = _____ yd

85. 72 in = _____ cm

86. 42 oz = _____ g

87. 1245 km = _____ mi

Two-Step or Three-Step Conversions:

Convert each of the following. Round to the nearest tenth.

88. 42 km = _____ ft

89. 54 m = _____ in

90. 1250 g = _____ lb

- ① Convert from km \rightarrow mi
- ② Convert from mi \rightarrow ft

$$42 \text{ km} \times \frac{1 \text{ mi}}{1.609 \text{ km}} \times \frac{5280 \text{ ft}}{1 \text{ mi}}$$

$$\approx 137824.7 \text{ ft}$$

91. Answer the question above using a different conversion strategy.

92. 4.25 km = _____ in

93. 1.3 tons = _____ kg

Convert the following. Exact answers or round to the nearest hundredth when necessary.

<p>94. $12 \text{ lbs } 3 \text{ oz} = \underline{\hspace{2cm}} \text{ kg}$</p> <p>① Convert 3 oz to lbs. $3 \text{ oz} \times \frac{1 \text{ lb}}{16 \text{ oz}} = 0.1875 \text{ lb}$</p> <p>② Add: $12 + 0.1875 = 12.1875 \text{ lb}$</p> <p>③ $12.1875 \text{ lb} \times \frac{0.454 \text{ kg}}{1 \text{ lb}} = 5.53 \text{ kg}$</p>	<p>95. $2 \text{ lbs } 14 \text{ oz} = \underline{\hspace{2cm}} \text{ kg}$</p>	<p>96. $7 \text{ lbs } 8 \text{ oz} = \underline{\hspace{2cm}} \text{ g}$</p>
<p>97. $12'6'' = \underline{\hspace{2cm}} \text{ m}$</p>	<p>98. $8 \text{ yd } 3' = \underline{\hspace{2cm}} \text{ m}$</p>	<p>99. $14 \text{ m } 28 \text{ cm} = \underline{\hspace{2cm}} \text{ yd}$</p>
<p>100. Answer the question above using a different conversion strategy.</p>	<p>101. Answer the question above using a different conversion strategy.</p>	<p>102. Answer the question above using a different conversion strategy.</p>
<p>103. A pizza has a circumference of 5 feet 3 inches. Find the diameter in centimetres.</p>	<p>104. A volleyball has a diameter of 2 feet 2 inches. Find the circumference of the ball at its widest point. Answer to the nearest inch.</p>	<p>105. Mr. J needs 2m, 41 cm and 3 mm of edge grain fir to make each of his cabinet doors. How many linear feet does he need to make his 8 doors?</p>

up to #105

Homework: complete all questions p. 16 - 21