The Imperial System of Units

UNIT	QUANTITY MEASURED (circle one)	REPRESENTATIVE EXAMPLE or REFERENT (a comparison you could use)	3 EXAMPLES OF OBJECTS YOU WOULD MEASURE USING THIS UNIT
INCH	MASS? VOLUME? (DISTANCE?)	She grew 5 inches over the summer	1. Height 2. Food/Sandwiches 3. Wood to build house
FOOT	MASS? VOLUME? (DISTANCE?)	The boy is 6ft tall.	1. Height 2. Houses 3. Length of pool
YARD	MASS? VOLUME? (DISTANCE?)	He ran 10 yards in the football game.	1. Football 2. Farming 3. Soccer?
MILE	MASS? VOLUME? (DISTANCE?)	You drive 10 miles	1. Driving 2. Running 3. Travelling
GALLON	MASS? (VOLUME?) DISTANCE?	The large plastic jug of milk at the grocery store.	1. Gas 2. Drinks (e.g. milk) 3. Pool

Converting Between Units Within the Imperial System

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

Eg. Convert 57 inches to feet.

$$57 \text{ inches} \times \frac{1 \text{ foot}}{12 \text{ inches}} = \frac{57}{12} \text{ feet}$$

$4\frac{9}{12} = 4\frac{3}{4}$ feet

Use the numbers in the table on page 5.

$$\frac{1 \text{ foot}}{12 \text{ inches}}$$

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

One Unit Conversions

Convert the following. Answer in exact form (fraction or non-rounded decimal).

1. 3 yd. = 9 feet.
   $3 \text{ yd} \times \frac{3 \text{ ft}}{1 \text{ yd}} = 9 \text{ ft}$
2. 15 yd. = 45 feet.
   $\frac{15 \text{ yd}}{1} \times \frac{3 \text{ ft}}{1 \text{ yd}} = 45 \text{ ft}$
3. 12.5 yd. = 37.5 feet.
4. 12 ft. = 4 yards.
5. 2.25 ft. = 27 inches.
   $2.25 \text{ ft.} \times \frac{12 \text{ in}}{1 \text{ ft}} = 27 \text{ in}$
6. 136 ft. = $\frac{136}{3}$ yards.
7. 8 ft. = 96 inches.
   $\frac{8 \text{ ft}}{1} \times \frac{12 \text{ in}}{1 \text{ ft}}$:
8. 2.75 ft. = 33 inches.
   $\frac{2.75 \text{ ft}}{1} \times \frac{12 \text{ in}}{1 \text{ ft}}$:
9. 4.8 ft = 57.6 inches.
10. 36 in. = 3 feet.
    $\frac{36 \text{ in}}{1} \times \frac{1 \text{ ft}}{12 \text{ in}} = 3$
11. 140 in. = $\frac{35}{3}$ feet.
    $\frac{140}{12} = \frac{70}{6} = \frac{35}{3}$
12. 2016 in = 168 feet.
13. 2 mi. = 3520 yards.
    $2 \times 1760 = 3520$
14. 4.2 mi. = 22176 feet.
    $4.2 \times 5280 = 22176$
15. 1500 yd. = $\frac{75}{88}$ miles.
    $\frac{1500}{1760} \div \frac{150}{176} = \frac{75}{88}$
16. 5250 yd. = 189000 inches.
    $5250 \times 36 = 189000$
17. 160 oz. = 10 pounds.
    $160 \div 16 = 10$
18. 220oz. = 13.75 pounds.
    $\frac{220}{16} = \frac{55}{4} = 13.75$
19. 4 lb. = 64 ounces.
    $4 \times 16 = 64$
20. 2.25 lb. = 36 ounces.
    $2.25 \times 16 = 36$
21. 6000 lb. = 3 tons.
    $\frac{6000}{2000} = 3$
22. Mr.S placed 32 yard sticks end to end across his front yard. Find the width of his yard in feet.
    $\frac{32 \text{ yrds}}{1} \frac{3 \text{ ft}}{1 \text{ yrd}} = 96 \text{ ft}$
23. Maisy can fit 8 blocks of butter in her backpack. Butter is sold in 1 pound blocks. How many ounces does Maisy carry?
    $\frac{8 \text{ lbs}}{1} \cdot \frac{16 \text{ oz}}{1 \text{ lb}} = 128 \text{ oz}$

24. Auntie Dee is making a frame for a photograph. The outer dimensions are 3 ft. by 5 ft. How many inches of frame must she purchase?

3ft + 5ft + 3ft + 5ft = 16 ft

$\frac{16\text{ft}}{1} \times \frac{12\text{ in}}{1\text{ft}} =$ **192 in.**

25. Mr. J wants to update his living room with crown moulding. The room is rectangular and measures 180 in. by 260 in. Moulding is sold by the foot and costs $2.19 per linear foot. What is the cost of moulding required (not including any taxes)?

880 ft = $73\frac{1}{3}$ ft → 74 ft × $2.19 = **$162.06**

Convert each of the following measurements to the indicated units.

26. 140 feet to yards and feet.

Recall: 3 yd = 1 ft

$140\text{ ft} \times \frac{1\text{ yd}}{3\text{ ft}}$

$= \frac{140}{3}\text{ yd}$

$= 46\frac{2}{3}\text{ yd}$

140 ft = 46yd and 2 ft.

27. 256 feet to yards and feet.

$\frac{256\text{ ft}}{1} \times \frac{1\text{ yd}}{3\text{ ft}}$

$= 85\frac{1}{3}\text{ yd}$

$\frac{1}{3} \times \frac{3}{1} = 1\text{ ft}$

256 ft = 85yd and 1ft

28. 356 inches to yards, feet and inches

$\frac{356\text{ in}}{1} \quad \frac{1\text{ yd}}{36\text{ in}} = \frac{356}{36}\text{ in} = 9\frac{32}{36} = 9\frac{8}{9}\text{ yd}$

$\frac{8\text{ yd}}{9} \times \frac{3\text{ ft}}{1\text{ yd}} = \frac{8}{3}\text{ ft} = 2\frac{2}{3}\text{ ft}$

$\frac{2\text{ ft}}{3} \times \frac{12\text{ in}}{1\text{ ft}} = 8\text{ in}$

9yd, 2ft, 8in

29. 142 inches to feet and inches.

$\frac{142\text{ in}}{1} \times \frac{1\text{ ft}}{12\text{ in}} = \frac{71}{6}\text{ ft} = 11\frac{5}{6}\text{ ft}$

$\frac{5\text{ ft}}{6} \times \frac{12\text{ in}}{1\text{ ft}} = 10\text{ in}$

11 ft, 10 in.

30. 204 inches to yards and feet.

$\frac{204\text{ in}}{1} \times \frac{1\text{ yd}}{36\text{ in}} = \frac{17}{3}\text{ yd} = 5\frac{2}{3}\text{ yd}$

$\frac{2\text{ yd}}{3} \times \frac{3\text{ ft}}{1\text{ yd}} = 2\text{ ft}$

5 yd, 2ft

31. 84260 ounces to tons, pounds and ounces.

$\frac{84260\text{ oz}}{1} \times \frac{1\text{ lb}}{16\text{ oz}} = 5266\frac{1}{4}\text{ lb}$

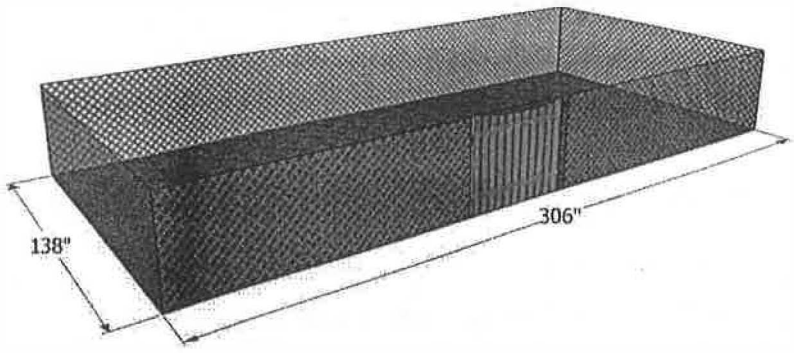
$\frac{21065\text{ lb}}{4} \times \frac{1\text{ ton}}{2000\text{ lb}} = 2\frac{1013}{1600}\text{ ton}$

$\frac{1013\text{ ton}}{1600} \times \frac{2000\text{ lb}}{1\text{ ton}} = 1266\frac{1}{4}\text{ lb}$

$\frac{1}{4}\text{ lb} \times \frac{16\text{ oz}}{1\text{ lb}} = 4\text{ oz}$

2 ton, 1266 lb, 4oz

32. Shelby the French Bull Dog needs an outdoor area to run. Ben plans on building her the pen below. The fencing material is sold by the linear foot but his measuring tape only shows inches. How many feet will he need to purchase?



888 inches

$\frac{888\text{ in}}{1} \times \frac{1\text{ ft}}{12\text{ in}}$

74ft

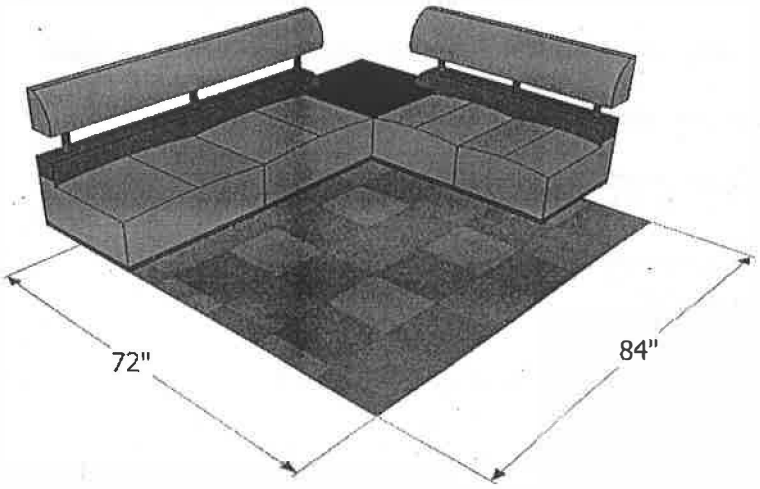
33. Convert your answer above to yards, feet and inches.

$\frac{74\text{ ft}}{1} \times \frac{1\text{ yd}}{3\text{ ft}} = 24\frac{2}{3}\text{ yd}$

$\frac{2}{3}\text{ yd} \times \frac{3\text{ ft}}{1\text{ yd}} = 2\text{ ft}$

24 yd and 2 ft

34. What are the dimensions of the rectangular carpet below in feet?



$\frac{72\text{ in}}{1} \times \frac{1\text{ ft}}{12\text{ in}} = 6\text{ ft}$

$\frac{84\text{ in}}{1} \times \frac{1\text{ ft}}{12\text{ in}} = 7\text{ ft}$

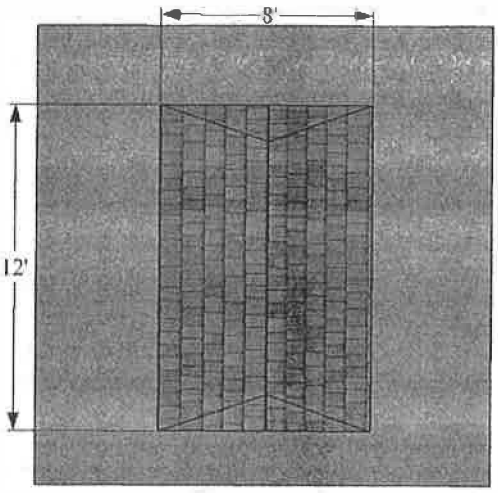
6' x 7'

35. If the carpet is sold for $4.25 per square foot, what is the cost of carpet required? Include 12% tax.

6' x 7' = 42' x $4.25 = $178.50

$178.50 x 0.12 = $21.42 → $178.50 + $21.42 = **$199.92**

36. What is the perimeter of the garden shed in yards and feet?



8' + 12' + 8' + 12' = 40'

$\frac{40\text{ ft}}{1} \times \frac{1\text{ yd}}{3\text{ ft}} = 13\frac{1}{3}\text{ yd}$

$\frac{1\text{ yd}}{1} \times \frac{3\text{ ft}}{1\text{ yd}} = 1\text{ ft}$

13 yd and 1 ft

÷ 1/3 ÷ 1/3

$\frac{1}{3} \times \text{total} = 96\text{ sq. ft}$

total = 288 sq. ft

37. The shed covers one-third of the area of the yard. How many square feet of sod (grass) are shown in the yard above?

12' x 8' = 96 sq ft → $96^{\text{sq ft}} \div (\frac{1}{3}) = 288^{\text{sq ft}} - 96^{\text{sq ft}} =$ **192 sq ft**

$\frac{1}{3} = \frac{\text{Shed}}{\text{yard}}$

$\frac{2}{3} = \frac{\text{grass}}{\text{yard}}$

38. Sod-Warehouse sells sod by the roll. Each roll is 1 foot wide and 4 feet long. Each roll sells for $2.75. what is the cost (including 12% tax) to buy sod for the yard?

192 sq ft ÷ 4 sq ft = 48 x $2.75 = $132 x 0.12 = $15.84

$132 + $15.84 = **$147.84**

Two Unit Conversions {Be comfortable working in fraction form and always reduce.}

You will need to use TWO conversion factors. Simply follow the steps for one unit conversions, then repeat.

Eg. Convert 58 inches to yards.

① $58\ inches \times \frac{1\ foot}{12\ inches} = \frac{58}{12}\ feet$

② $\frac{58}{12}\ feet \times \frac{1\ yard}{3\ feet} = \frac{58}{36} yards$

$= 1\frac{22}{36}\ yards = 1\frac{11}{18}\ yards$

Conversion Factors:

Step ① $\frac{1\ foot}{12\ inches}$ Step ② $\frac{1\ yard}{3\ feet}$

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

39. 6025 feet = $1\frac{745}{1056}$ miles

~~6025 feet~~ $\times \frac{1\ yard}{3\ feet} = \frac{6025}{3}$ yards

$\frac{6025}{3}$ yards $\times \frac{1\ mile}{1760\ yards} = \frac{6025}{5280}$ miles

$1\frac{745}{5280} = 1\frac{149}{1056}$ miles

40. 123450 feet = 23.38 miles

$\frac{123450\ ft}{1} \times \frac{1\ yd}{3\ ft} \times \frac{1\ mi}{1760\ yd}$

$= 23.38 miles$

41. $2\frac{1}{2}$ miles = 158400 inches.

$\frac{2.5\ mi}{1} \times \frac{1760\ yd}{1\ mi} \times \frac{3\ ft}{1\ yd} \times \frac{12\ in}{1\ ft}$

$= 158400 inches$

42. 3.25 yards = 117 inches

$\frac{3.25\ yd}{1} \times \frac{36\ in}{1\ yd}$

$= 117\ in$

43. $15\frac{2}{3}$ yards = 564 inches

$\frac{47}{3}\ yd \times \frac{3\ ft}{1\ yd} \times \frac{12\ in}{1\ ft} = \frac{(47)(3)(12)}{3}$ inches

$= 564$ inches

Note: I combined both steps into one equation here.

44. $24\frac{1}{3}$ yards = 876 inches

$\frac{73\ yd}{3} \times \frac{36\ in}{1\ yd} = 876\ in.$

45. A cabinet maker is using 1"x3" edge grain fir to make some cabinet doors. He purchased $42\frac{2}{3}$ yards on Craig's list. How many inches did he buy?

Convert $42\frac{2}{3}$ yd to in.

$\frac{128\ yd}{3} \times \frac{3\ ft}{1\ yd} \times \frac{12\ in}{1\ ft}$

$= 1536\ in.$

46. Gary is building picture frames to sell in a market. He has 75 yards of material and will make square frames with side lengths of 14 inches. How many frames can he make?

$\frac{75\ yd}{1} \times \frac{36\ in}{1\ yd} = 2700\ in \div 56 = 48$ frames

$14 \times 4 = 56$

Mr.J's measuring wheel clicks once for every yard it travels. On a walk to school, the wheel clicks 35200 times.

47. How many inches does he walk?

$35200 \times 36 = 1\,267\,200\ in$

48. How many miles?

$\frac{35200\ yd}{1} \times \frac{1\ mile}{1760\ yd} = 20$ miles

49. **A piece of paper is folded in half repeatedly. The paper has a thickness of $\frac{1}{250}$". How many yards thick will the paper be after 20 folds?

$\frac{1}{250} \times 2^{20} = 4194.304\ in \times \frac{1\ ft}{12\ in} \times \frac{1\ yd}{3\ ft}$

$= 116.\ yd$

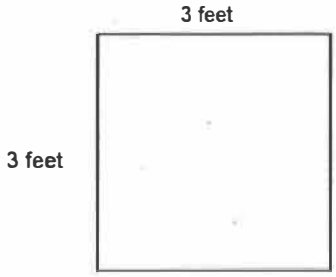
① $\frac{1}{250} \times 2 \quad 2 = 2^1$

② $\frac{1}{250} \times 4 \quad 4 = 2^2 \quad \frac{1}{250}" \times 2^{20}$

③ $\frac{1}{250} \times 8 \quad 8 = 2^3$

Conversions with Non-linear Measurements.

$\frac{144 in^2}{1 ft^2}$



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

L x W

51. What is the area of the square to the left in square-feet?

3 ft x 3 ft = 9 ft²

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

3 ft x 12 = 36 in

53. What is the area in square inches?

36 in x 36 in = 1296 sq in.

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

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

★ Multiply by $(12)^2$ ★

55. A rectangular plot of land has dimensions of 0.5 miles by 0.4 miles. What is the area in ft²?

0.5 x 0.4 miles = 0.2 miles²

$\frac{1 miles^2}{5} \times \frac{5280 ft}{1 Mile} \times \frac{5280 ft}{1 mile}$

= 5575680 ft²

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

★ Multiply by $(5280)^2$ ★

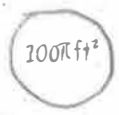
57. A pizza has an area of 1.5 ft². If the pizza is to be sliced into six equal slices, how many square inches is each slice?

$\frac{3 ft^2}{2} \times \frac{12 in}{1 ft} \times \frac{12 in}{1 ft} = \frac{216 in^2}{6}$

= 36 in²

58. A circular carpet has an area of 100π ft² (approximately 314 ft²). What is the length of the radius in inches?

$A = \pi r^2$

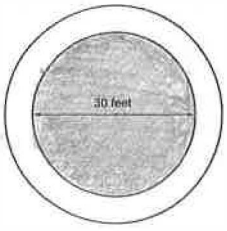


$\frac{100\pi}{\pi} = \frac{\pi r^2}{\pi}$

$100 ft^2 = r^2$; $r = 10$ ft

$\frac{10 ft}{1} \times \frac{12 in}{1 ft} = 120 in$

59. The cross-section of a concrete ~~underground~~ pipe is shown below. Calculate the area of the inner (open) part of the pipe to the nearest in².



$A = \pi r^2$

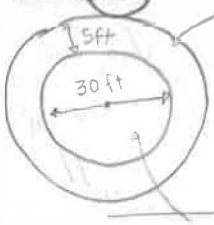
$A = \pi (15)^2$

$A = 225\pi = 706.858347$

$\times (12)^2$

= 101788 in²

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 in².



r = 20 ft

$A = \pi r^2$

$A = \pi (20)^2$

$A = 1256.637061 ft^2$

$A = \pi r^2$

$A = \pi (15)^2$

$A = 706.858347 ft^2$

$A_T - A_i = 549.8 ft^2$ ✓

$\frac{549.7787 ft^2}{1} \times \frac{144 in^2}{1 ft^2}$

= 79168 in²

The International System of Units (SI)

UNIT	QUANTITY MEASURED	REPRESENTATIVE EXAMPLE	3 EXAMPLES OF OBJECTS YOU WOULD MEASURE USING THIS UNIT
Milligram	(MASS?) VOLUME? DISTANCE?	ONE GRAIN OF SALT	1. grain of sugar 2. grain of sand 3. medication
Gram	(MASS?) VOLUME? DISTANCE?	ONE PAPER CLIP	1. mushroom 2. letter 3. piece of cheese
Kilogram	(MASS?) VOLUME? DISTANCE?	ONE PINEAPPLE	1. big delivery box 2. cement 3. luggage
Millilitre	MASS? (VOLUME?) DISTANCE?	$\approx \frac{1}{3}$ or $\frac{1}{2}$ TSP.	1. drop of water 2. eye drop 3. drop of food dye
Litre	MASS? (VOLUME?) DISTANCE?	ONE BOTTLE OF POP	1. carton of milk 2. pitcher of juice 3. shampoo
Millimetre	MASS? (VOLUME?) DISTANCE?	LENGTH OF FINGERNAIL	1. thickness of paper clip 2. thickness of iphone 5® 3. width of Twizzler®
Centimetre	MASS? VOLUME? (DISTANCE?)	LENGTH OF FINGER	1. length of pencil 2. length of hair 3. thickness of arm
Metre	MASS? VOLUME? (DISTANCE?)	TRACK RACES	1. distance from desk to board 2. height of giraffe 3. length of car
Kilometre	(DISTANCE?)	FROM HOUSE TO SCHOOL	1. from Victoria to L.A. 2. from house to mall 3. airplane ride (distance travelled)

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.

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

Use the numbers in the table on page 5.

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

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

One Unit Conversions

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

61. 1250 mm = 125 cm

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

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

62. 37.25 m = 0.4 cm

63. 0.8 cm = 8 mm.

64. 138 m = 138 000 mm

65. 1508 cm = 15.1 m

66. 3.28 cm = 32.8 mm

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

$C = 2\pi r$

$C = 2\pi(10)$

$C = 62.83185\,cm$

$\times 10$

$= 628.3\,mm$

not squared??

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?

$5 + 7 + 5 + 7 = 24\,m$

$24m \times 100 = 2400\,cm$

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

$A\Delta = \frac{bh}{2}$ $\quad 2\left(\frac{12cm\,h}{2}\right) = (75cm^2)2$

$\frac{12cm\,h}{12cm} = \frac{150cm^2}{12cm}$

$h = 12.5cm \times 10$

125 mm

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.

3450 mm

71. Convert 12.357 km to m.

12357 m

72. Convert 176 mm to m.

0.176 m

0.2 m

73. Convert 1.365 km to mm.

1 365 000 mm

74. Convert $17\frac{1}{5}$ m to mm.

17.2 × 100 × 10

= 17200 mm

75. Convert $\frac{3}{4}$ km to cm.

0.75 × 1000 × 100

75 000 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.

0.00003 mm

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

885 180 000 cm

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

18 m = 18000 mm

9 m = 9000 mm

18000 mm × 9000 mm

= 162 000 000 mm^2

79. 2 m + 30 cm + 4 mm

2000 mm + 300 mm + 4 mm

= 2304 mm

80. 1.35 km + 125 m + 40 cm

1350 m + 125 m + 0.4 m

= 1475.4 m

81. 1.35 km + 125 m + 120 mm

135 000 cm + 12 500 m + 12 cm

= 147512 cm

Unit Conversion **between** Systems

One-Step Conversions:

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= 80.5 km

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

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

$$\cong 80.5\ km$$

83. 185 lb = 84.1 kg

$\frac{185 lb}{1} \times \frac{1 kg}{2.2 lb} = 84.1$

84.0?

84. 150 m= 163.9 yd

$\frac{150 m}{1} \times \frac{1 yd}{0.915 m} = 163.9\ yd$

85. 72 in= 182.9 cm

$\frac{72 in}{1} \times \frac{2.54 cm}{1 in}$

182.88 cm

86. 42 oz = 1190.7 g

$\frac{42 oz}{1} \times \frac{28.35 g}{1 oz}$

1190.7g

87. 1245 km= 778.1 mi

$\frac{1245 km}{1} \times \frac{1 mile}{1.6 km}$

778.125 miles

??

Two-Step or Three-Step Conversions:

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

88. 42km= 137824.7 ft

① Convert from km→mi
② Convert from mi → ft

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

$$\cong 137824.7 ft$$

89. 54m = 2126.0 in

$54m \times 100 = 5400 cm$

$\frac{5400 cm}{1} \times \frac{1 in}{2.54 cm}$

2125.98 in

2126.0 in

90. 1250 g= 2.8 lb

$1250 g \div 1000 = 1.25 kg$

$\frac{1.25 kg}{1} \times \frac{2.2 lb}{1 kg} = 2.75 lb$

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

$42 \times 1000 = 42000\ m$

$\frac{42000 m}{1} \times \frac{1 ft}{0.3048 m}$

137795.3 ft

92. 4.25km = 167322.8 in

$4.25 km = 425000 cm$

$\frac{425000 cm}{1} \times \frac{1 in}{2.54 cm}$

167322.8in

93. 1.3 tons = 1181.8 kg

$1.3 \times 2000 = 2600 lbs$

$\frac{2600 lb}{1} \times \frac{1 kg}{2.2 lb}$

1181.8 kg

✓

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

94. *12 lbs 3 oz* = 5.53 *kg*

① Convert 3 oz to lbs.

$3\ oz \times \frac{1\ lb}{16\ oz} = 0.1875\ lb$

②Add: $12 + 0.1875 = 12.1875\ lb$

③ $12.1875\ lb \times \frac{0.454\ kg}{1\ lb} = 5.53\ kg$

95. *2 lbs 14 oz* = _____ *kg*

$\frac{2 lbs}{1} \times \frac{16 oz}{1 lb} = 32oz + 14oz = 46oz$

$\frac{46oz}{1} \times \frac{28.35g}{1oz} \times \frac{1kg}{1000g}$

1.30 kg

96. *7 lbs 8 oz* = _____ *g*

$\frac{7 lbs}{1} \times \frac{16oz}{1lb} = 112oz + 8oz = 120oz$

$\frac{120oz}{1} \times \frac{28.35g}{1oz}$

3402 g

97. 12'6" = _____ m

(' = feet, " = inches)

$\frac{12 ft}{1} \times \frac{12in}{1ft} = 144in$

$144in + 6in = 150in$

$\frac{150in}{1} \times \frac{2.54cm}{1in} = 381cm$

$\frac{381cm}{1} \times \frac{1m}{100cm} = 3.81m$

98. 8 yd 3' = 8.23 m

$1ft = 0.3048m$

$\frac{8yd}{1} \times \frac{3ft}{1yd} = 24ft + 3ft = 27ft$

$\frac{27ft}{1} \times \frac{0.3048m}{1ft} = 8.23m$

99. 14m 28 cm= _____ yd

$\frac{14m}{1} \times \frac{100cm}{1m} = 1400cm + 28cm$

$\frac{1428cm}{1} \times \frac{1ft}{30.48cm}$

$= \frac{46.85039371ft}{1} \times \frac{1yd}{3ft}$

$= 15.62\ yd$

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

n/a

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

n/a

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

n/a

103. A pizza has a circumference of 5 feet 3 inches. Find the diameter in centimetres.

$\frac{5ft}{1} \times \frac{12in}{1ft} = 60in + 3in = 63in$

$\frac{2\pi r}{\pi} = \frac{63}{\pi}$

$2r = d$

$d = 20.05352283in \times 2.54$

d = 50.9 cm

★don't use 3.14, use π★

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.

$2ft \times 12 = 24in + 2 = 26in$

$26in \div 2 = 13in$

$C = 2\pi r \rightarrow C = 2\pi(13)$

C = 82 in

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?

$2m = 200cm$

$41cm = 41cm$

$3mm = 0.3cm$

$200 + 41 + 0.3 = 241.3\ cm$

$241.3cm \times 8 = 1930.4cm$

$\frac{1930.4cm}{1} \times \frac{1ft}{30.48cm}$

63.33 ft

★don't round until end★

Geometry of 3-D figures.

Familiarize yourself with the shapes, names and formulas at the beginning of this booklet.

Using the **reference page** at the beginning of this unit.

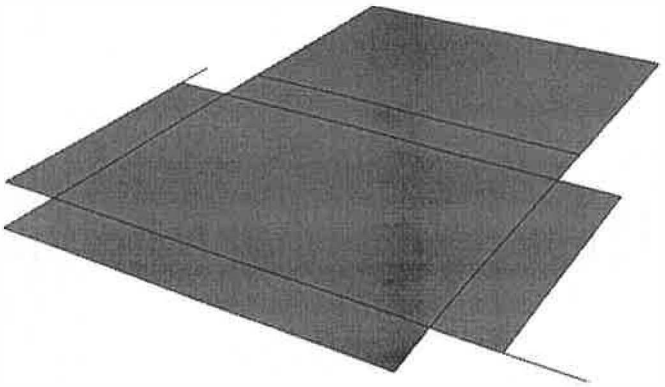
- Choose the right formula.
- Fill in all known values into the formula.
- Calculate (remember BEDMAS).

Surface Area

Area is the **two-dimensional** size of a surface. Consider the area that this booklet is covering on the surface below it (unless you are on a computer of course).

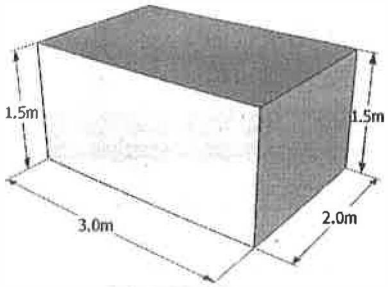
The **surface area** of a solid is the total area of its exposed surfaces.

Consider a common cereal box. If you unfolded the sides, top, bottom, front and back...how much area on your desk would it cover? That would be the surface area of the box.



127. Refer to page 5 to answer the following question.

Find the surface area of the rectangular prism below to the nearest square metre.



$2 \times$ [3m] $1.5m = 9m^2$

$2 \times$ [2m] $1.5m = 6m^2$

$9 + 6 + 12 = 27m^2$

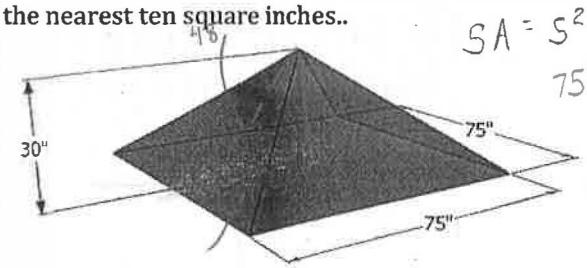
128. Refer to page 5 to answer the following question.

Find the surface area of the square pyramid below to the nearest ten square inches..

$SA = s^2 + 4\frac{bh}{2}$

$75^2 + 4\frac{(75)(48)}{2}$

$= 12825 in^2$



37.5 ($\frac{1}{2}$ of 75")

$a^2 + b^2 = c^2$

$37.5^2 + 30^2 = c^2$

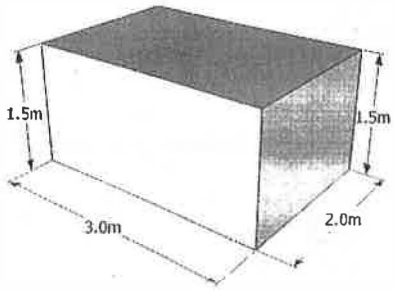
$2306.25 = c^2$

$c = 48.02343178$

$12825 in^2 \times \frac{1 ft}{12 in} \times \frac{1 ft}{12 in}$

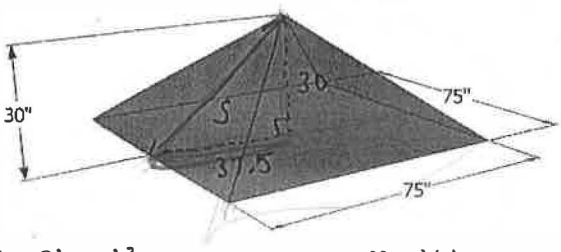
$89.0625 ft^2$

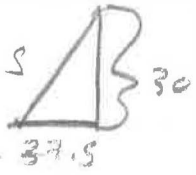
Find the surface area of the rectangular prism below to the nearest square metre.



$SA = 2(hl + lw + hw)$
$SA = 2[(1.5 \times 3) + (3 \times 2) + (1.5 \times 2)]$
$SA = 2[4.5 + 6 + 3]$
$SA = 27\ m^2$

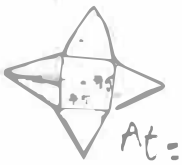
Find the surface area of the square pyramid below to the nearest ten square inches..





$A = 2bs + b^2$
$A = 2(75)(s) + (75)^2$

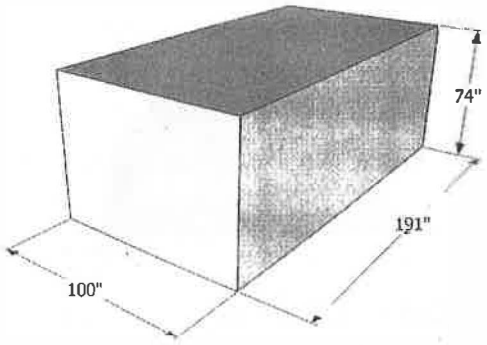
Need 's'
Use $a^2 + b^2 = c^2$
$37.5^2 + 30^2 = s^2$
$s = 48.0$



$A = 2(75)(48.0) + (75)^2$
$A \cong 12830$ sq in

Calculate the surface area of the following figures. Answers should be given as indicated.

129. Nearest square inch.



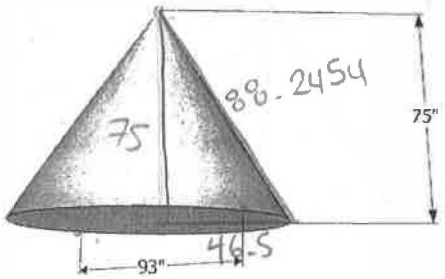
2 × 100 × 74 = 14800 in²

2 × 191 × 74 = 28268 in²

2 × 191 × 200 = 38200 in²

= 81268 in²

130. Nearest square inch.



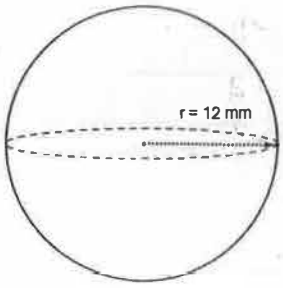
$A = \pi r^2 + \pi rs$

$A = \pi(46.5)^2 + \pi(46.5)(88.24539648)$

$A = 19\,684$ sq in

Calculate the surface area of the following figures. Answers should be given as indicated.

131. Nearest square millimetre.



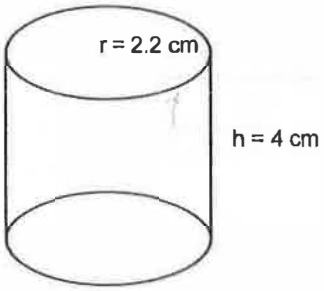
$SA = 4\pi r^2$

$SA = 4\pi(12)^2$

$SA = 1809.557368$ sq mm

SA: 1810 sq mm

132. Nearest square centimetre.



$SA = 2\pi r^2 + 2\pi rh$

$SA = 2\pi(2.2)^2 + 2\pi(2.2)(4)$

$SA = 85.70264759$ sq cm

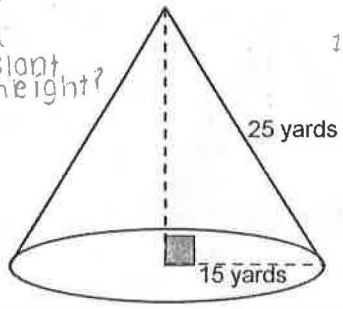
SA: 86 sq cm

133. Nearest square foot.

(circle) (cone wrapper)

$SA = \pi r^2 + \pi rS$

(S = slant height?)



1 yd = 3 ft

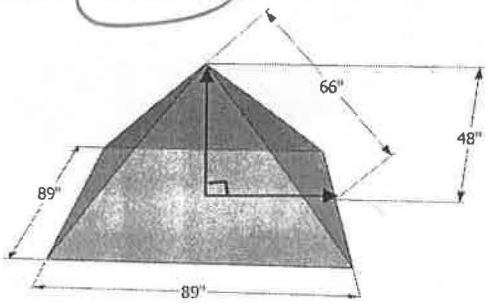
$1\text{yd}^2 = 9\text{ft}^2$

$SA = \pi(15)^2 + \pi(15)(25)$

$SA = 1884.955592$ sq yd × 9

$SA = 16964.6$ sq ft → 16965 sq ft

134. Nearest square foot.



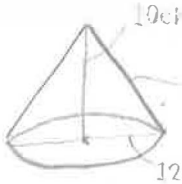
$SA = 2bs + b^2$

$SA = 2(89)(66) + 89^2$

$= 19669$ sq in ÷ 144

$= 136.5902778 =$ 137 sq ft

135. Calculate the surface area of a cone with a height of 10 cm and a base diameter of 12 cm. Answer to the nearest square centimetre.



$SA = \pi r^2 + \pi rS$

$S = a^2 + b^2 = c^2$

$10^2 + 6^2 = c^2$

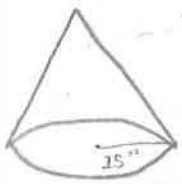
$136 = c^2 \rightarrow c = 11.66190379$ cm

$SA = \pi(6)^2 + \pi(6)(11.66190379)$

SA: 333 cm²

136. A cone has a base radius of 15 inches and a surface area of 1650 square inches. Find the slant height of the cone to the nearest inch.

$SA = 1650$ in²



$SA = \pi r^2 + \pi rS$

$1650\text{in}^2 = \pi(15\text{in})^2 + \pi(15\text{in})S$

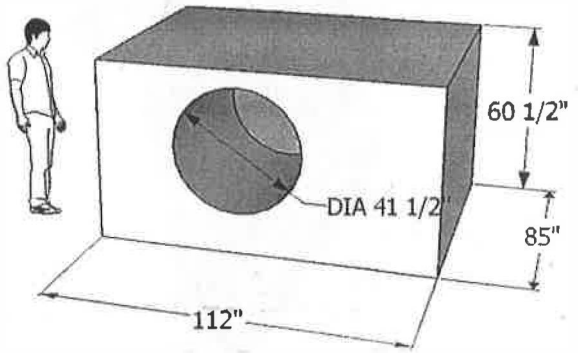
$1650\text{in}^2 = \pi 225\text{in}^2 + \pi(15)S$

$1650\text{in}^2 = 706.8583471\text{in}^2 + \pi(15)S$

$\frac{943\text{in}^2}{\pi(15\text{in})} = \frac{\pi(15)S}{\pi(15)}$

20 in = S

137. Frank needs to find the surface area of the playground equipment below so he can estimate how much paint to buy. Explain the process he should use (he will not paint the bottom).



Explain 2 ends = 2(60.5)(85) =

1 top = 112(85) =

front + back = 2(112)(60.5) − 2π (20.75)² =

cylinder wrapper = 2π(20.75)(85) =

138. Find the surface area of the figure to the left to the nearest square inch.

2 ends = 10285 in²

1 top = 9520 in²

f + b = 10846.69603 in²

cw = 11081.96809

total = 41733.65839 in²

41734 sq in

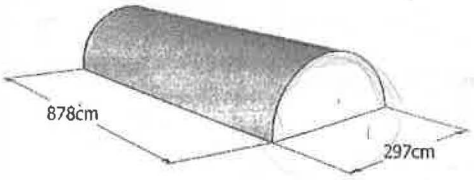
139. One quart of paint (a small can) covers 87.5 sq ft. How many quarts will Frank need to buy?

41734 sq in ÷ 144

= 289.8194444 ÷ 87.5

= 3.312 → 4 quarts

140. Find the surface area of the concrete curb below (all surfaces). Answer to the nearest square centimetre.



bottom (878)(297) = 260766 cm²

circle: πr² → π(148.5)² = 69279.1866 cm²

C = 2πr = 2π(148.5) = 933.0530181 ÷ 2

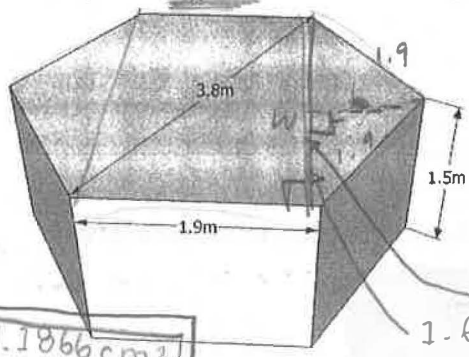
= 466.5265091

466.5265091 × 878 = 409610.275

SA = 739655.4616 sq cm

SA = 739655 sq cm

141. Calculate the surface area of the hexagonal prism (regular) to the nearest square metre.



c² − b² = a²

3.8² − 1.9² = a²

√10.83 = √a²

3.290896534 = a

1.645448267

6× 2.5m = 17.1m²
1.9m

2× 3.290896534 = 12.50540683
1.9m

c² − b² = a² → 1.9² − 1.645448267² = a²

a² = 0.9025 → a = 0.95

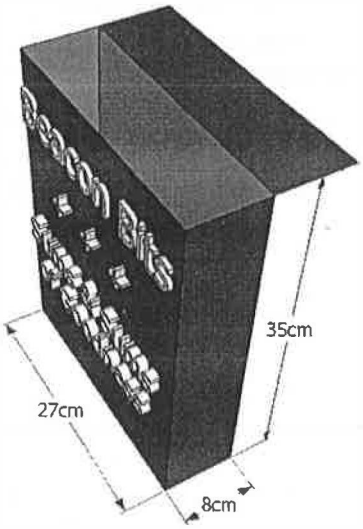
3× 0.95m × 1.645448267m = 6.252703415m

SA = 36m²

Volume

Volume is the amount of 3-dimensional space that a figure occupies or contains.

Consider the cereal box. The "amount" of Beacon Bits that fit inside the box is its volume. This is often refered to as the **capacity** of a container.

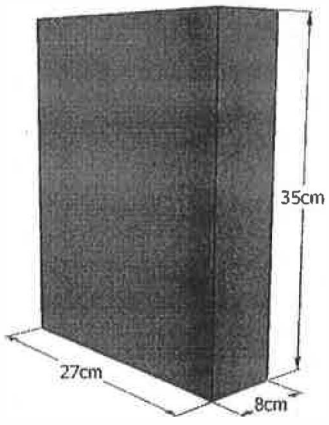


142. **Challenge**:
If each Beacon Bit is a cube 1 cm by 1 cm by 1cm, how many Bits would fit in the box?
Start by finding out how many would fit in the bottom layer.

$V = 35 \times 27 \times 8 = 7560\,cm^3$ (box)
$V = 1 \times 1 \times 1 = 1\,cm^3$ (Beacon Bit)
$7560\,cm^3 \div 1\,cm^3 =$ 7560 Beacon Bits

143. Refer to page 5 to answer the following question. $l \times w \times h$

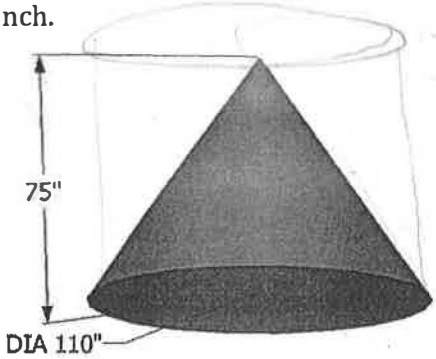
Find the volume of the box to the nearest cm^3.



$V = 27 \times 35 \times 8$
$V =$ $7560\,cm^3$

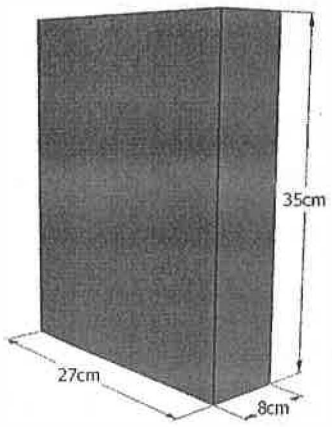
144. Refer to page 5 to answer the following question. $\frac{\pi r^2 h}{3}$

Find the volume of the cone to the nearest cubic inch.



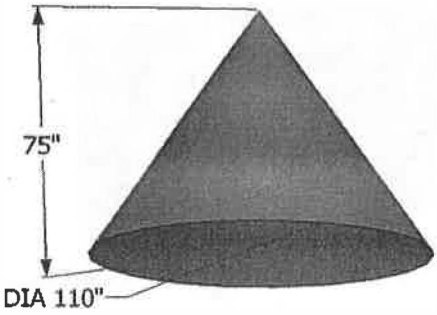
$V = \frac{\pi r^2 h}{3}$
$V = \frac{\pi (55)^2 (75)}{3}$
$V =$ $237583\,in^3$

Find the volume of the box to the nearest cm^3.



$V = lwh$
$V = (27)(8)(35)$
$V = 7560\ cm^3$

Find the volume of the cone to the nearest cubic inch.



$$V = \frac{1}{3}(\pi r^2)h$$
$$V = \frac{\pi(55)^2(75)}{3}$$
$$V = \frac{226875\pi}{3} = 75625\pi \cong 237583\ sq\ in$$

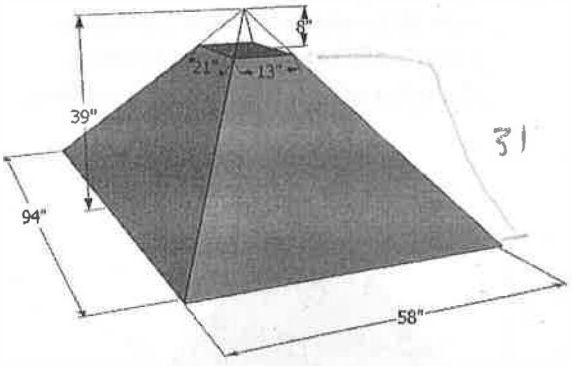
145. Using the formula for the volume of a rectangular prism, $V = lwh$, explain why the units for volume are "cubed".

B/c it is units (L) x units (w) x unit (h), and units x units x units makes units^3

146. Refer to page 5. Compare the formulas to calculate volume of right prisms, right cylinders, and triangular prisms. What do they all have in common?

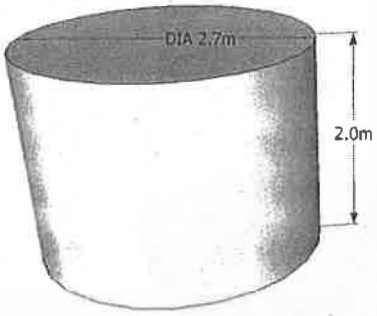
They are all base area x height
[V = (Base area)h]

147. Timothy is building a garden water fountain in the shape of a "truncated" square pyramid. Describe **how** you would find the volume of concrete required to build this fountain.



Find volume of big square based pyramid ($V = \frac{1}{3}(94 \times 58)(39)$) then subtract cut out square-based pyramid ($V = \frac{1}{3}(21 \times 13)(8)$).

148. Find the volume to the nearest tenth of metre.

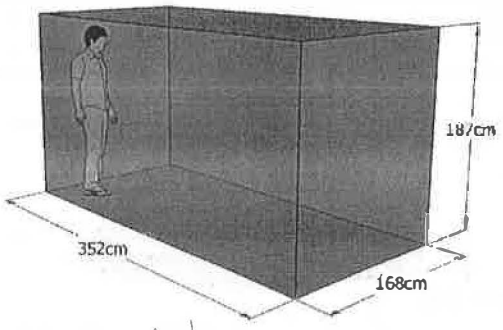


★not $2\pi r^2$ b/c not SA★

V = (Base Area)h
$V = (\pi r^2)(h)$
$V = \pi(1.35)^2(2)$
$V = 11.45110522\ m^3$
$V = \boxed{11.5\ m^3}$

Calculate the volume of the following figures. Answers should be given as indicated.

149. Cubic centimetres.

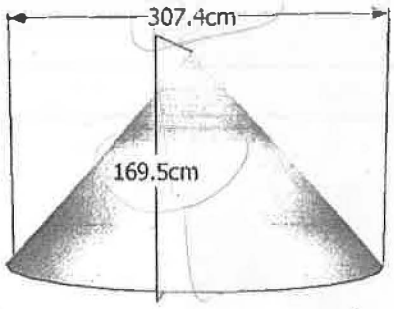


$V = l \times w \times h$

$V = 352 \times 168 \times 187$

$V = \boxed{11\,058\,432\ cm^3}$

150. Cubic centimetres.

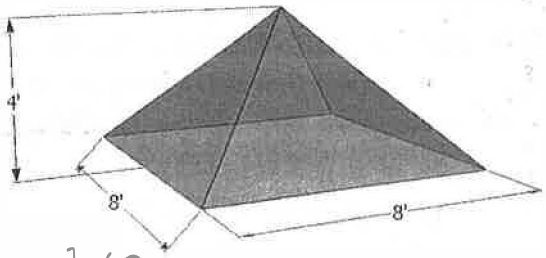


$V = \frac{1}{3}(\pi r^2)h$

$V = \frac{1}{3}(\pi \times 153.7^2)(169.5)$

$V = \boxed{4193205 cm^3}$

151. Cubic feet.

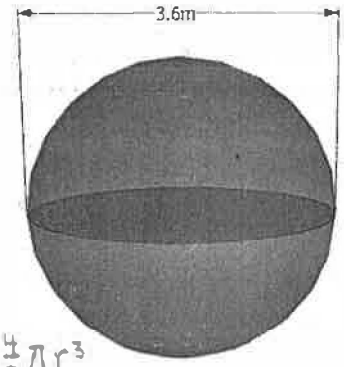


$V = \frac{1}{3}(\text{Base Area})\,h$

$V = \frac{1}{3}(8 \times 8)(4)$

$V = \boxed{85\ ft^3}$

152. Cubic metres.

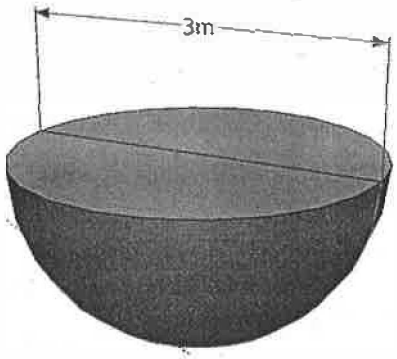


$V = \frac{4}{3}\pi r^3$

$V = \frac{4}{3}\pi(1.8)^3 \rightarrow V = \boxed{24\ m^3}$

★Answer says $24.4\ m^3$★

153. Nearest tenth of a cubic metre.

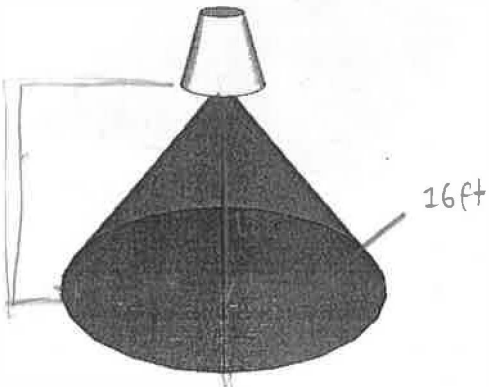


$V = \frac{2}{3}\pi r^3$

$V = \frac{2}{3}\pi(1.5)^3$

$V = \boxed{7.1\ m^3}$

154. A spray nozzle produces a cone-shaped spray pattern. Find the volume of the cone if the nozzle is 12 feet above the ground and produces a circle with a diameter of 16 feet. (Nearest cubic foot)



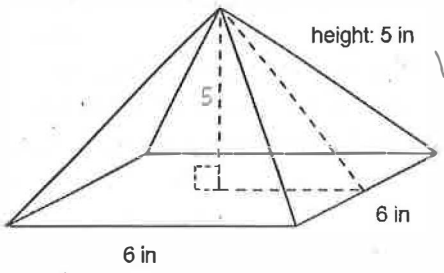
$V = \frac{1}{3}(\pi r^2)h$

$V = \frac{1}{3}(\pi \times 8^2)(12)$

$V = \boxed{804\ ft^3}$

volume original → shape increased by factor of 3 → volume enlarged
$2 \rightarrow 2^3$

155. Find the volume to the nearest cubic inch.



$V = \frac{1}{3}(\text{Base Area})h$
$V = \frac{1}{3}(6 \times 6)(5)$
$V = 60\ in^3$

156. If the pyramid to the left is enlarged by a factor of 2, what will the new volume be?

$V = \frac{1}{3}(\text{Base Area})h$
$V = \frac{1}{3}(12 \times 12)(10)$
$V = 480\ in^3$

Can you make a rule (formula) for this?

Multiply final answer by 8 if enlarged by 2. ★ 2^3 ★

157. A square-based pyramid has a volume of 250 cubic yards and a height of 30 feet. Find the side length of the square base to the nearest foot.

$\frac{250\ yd^3}{1} \times \frac{3\ ft}{1\ yd} \times \frac{3ft}{1\ yd} \times \frac{3ft}{1\ yd} = 6750\ ft^3$

$V = \frac{1}{3} \times s^2 \times h$

$\frac{6750\ ft^3}{30ft} = \frac{1}{3} \times s^2 \times \frac{30\ ft}{30ft}$

$\frac{3}{1} \times (225\ ft^2) = \left(\frac{1}{3} \times s^2\right)\frac{3}{1}$

$\sqrt{675\ ft^2} = \sqrt{s^2} \rightarrow s = 26\ ft$

158. A sphere has a volume of 3000 m³. Find the radius of the sphere to the nearest metre.

$V = \frac{4}{3}\pi r^3$

$\frac{3}{4}(3000\ m^3) = \left(\frac{4}{3} \times \pi \times r^3\right)\frac{3}{4}$

$\frac{2250\ m^3}{\pi} = \frac{\pi \times r^3}{\pi}$

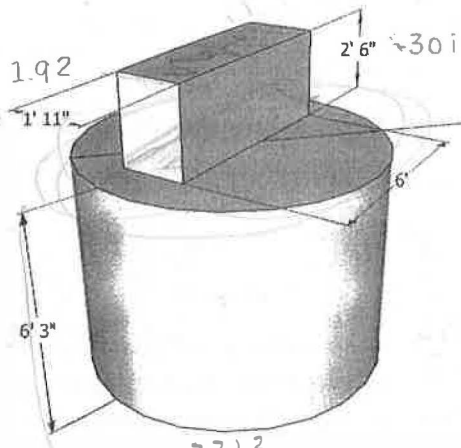
$\sqrt[3]{716.1972439\ m^3} = \sqrt[3]{r^3}$

$r = 8.947002289$

$r = 9\ m$

159. Charlie needs to paint the composite shape below. Before he purchases paint he needs to calculate the surface area to the nearest square foot. The bottom does not need to be painted. How many square feet does he need to paint?

$SA = 2\pi r^2 + 2\pi rh$

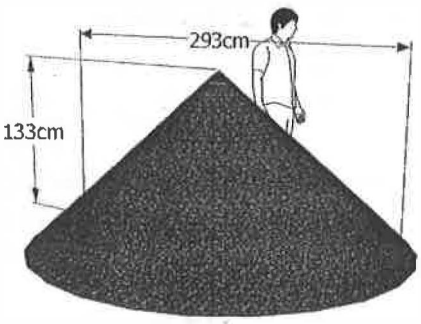


$d = 8\frac{8}{12} = 8.67$
$r = 4.33$
$h = 6\frac{3}{12} = 6.25$

circle $\pi r^2 = \pi(4.33)^2$
wrap $2\pi rh = 2\pi(4.33)(6.25)$
2 ends $2(2.5)(1.92)$
2 sides $2(2.5)(6)$

$= 268.54$
$= 269\ ft^2$

160. Find the volume of gravel in the pile to the nearest cubic yard.



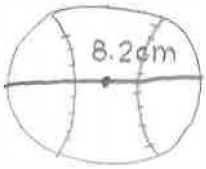
$V = \frac{1}{3}(\pi r^2)h$
$V = \frac{1}{3}(\pi \times 146.5^2)(133)$
$V = 2989203.681\ cm^3$

$\frac{2989203.681\ cm^3}{1} \times \frac{1ft}{30.48\ cm} \times \frac{1ft}{30.48cm} \times \frac{1ft}{30.48cm}$

$\frac{105.5627317\ ft^3}{1} \times \frac{1yd}{3ft} \times \frac{1yd}{3ft} \times \frac{1yd}{3ft}$

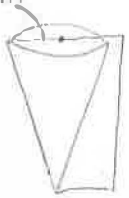
$V = 3.909730805\ yd^3$ ✓
$V = 4\ yd^3$

161. Find a spherical object and measure the diameter. Calculate the surface area of your object. Draw a neat and detailed diagram showing your object and measurement. Record all measurements to the nearest tenth of a centimetre. Round your answer to the nearest square centimetre.



$SA = 4\pi r^2$
$SA = 4\pi(4.1)^2$
$SA = 211\ cm^2$

162. Find a conical object. Make appropriate measurements to the nearest tenth of a centimetre. Draw a neat and detailed diagram showing your object and measurements. Calculate the volume of the cone to the nearest cubic centimetre.



$V = \frac{1}{3}(\pi r^2)h$
$V = \frac{1}{3}(\pi(5.6^2)(11.4)$
$V = 374\ cm^3$

$36.81553891\ in^3 - 24.54369261\ in^3 =$
$12.3\ in^3$

163. One gallon of paint covers approximately 350 sq-ft. How many decorative balls can you paint with a 5-gallon bucket of paint if each ball has a radius of 12 cm.

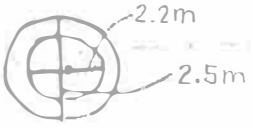
Why 897?2

$SA = 4\pi r^2 \rightarrow SA = 4\pi(12)^2$
$SA = 1809.557368\ cm^2 \times \frac{1\ ft}{30.48\ cm} \times \frac{1\ ft}{30.48\ cm}$
$SA = 1.947792341\ ft^2$
$350 \times 5 = 1750\ ft^2$
$1750\ ft^2 \div 1.947792341\ ft^2 = 898.4535269$
898 balls X → 897 balls ★

164. A cylindrical can holds 3 tennis balls. The diameter of a tennis ball is 2 ½ inches. Calculate the volume of air in the can surrounding the 3 balls. The can is designed to hold exactly three tennis balls in terms of height and diameter. (Nearest tenth of a cubic inch).

CAN: $V = (Base\ Area)h \rightarrow V = \pi(1.25)^2(7.5)$
$V = 36.81553891\ in^3$
BALLS: $V = \frac{4}{3}\pi r^3 \rightarrow V = \frac{4}{3}\pi(1.25)^3$
$V = (8.181230869\ in^3)3$
$V = 24.54369261\ in^3$

165. A section of concrete pipe has an inside diameter of 2.2 m and an outside diameter of 2.5 m. Find the cross-sectional area of exposed concrete for one end of the pipe.



$A_o = \pi r^2 \rightarrow A_o = \pi(1.25)^2 \rightarrow A_o = 4.908738521\ m^2$
$A_i = \pi r^2 \rightarrow A_i = \pi(1.1)^2 \rightarrow A_i = 3.801327111\ m^2$
$A_o - A_i = 1.107411411\ m^2$

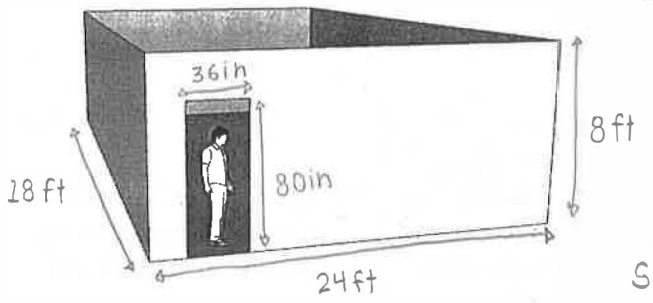
166. A sphere has a surface area of 260π square feet. Find the exact radius of the sphere.

$SA = 4\pi r^2 \rightarrow \frac{260\pi}{4\pi} = \frac{4\pi r^2}{4\pi} = \frac{65\pi}{\pi} = \frac{\pi r^2}{\pi}$
$\sqrt{65} = \sqrt{r^2} \rightarrow r = \sqrt{65}\ ft$ ✗

167. A sphere has a surface area of 289π square inches. Find the radius of the sphere to the nearest tenth of an inch.

$SA = 4\pi r^2 \rightarrow \frac{289\pi\ in^2}{4\pi} = \frac{4\pi r^2}{4\pi}$
$\sqrt{72.25\ in^2} = \sqrt{r^2}$
$r = 8.5\ in$ ✗

168. Below is a model of a standard room at a storage facility. The interior walls are to be painted. The room measures 18' by 24' and the wall height is 8'. The door is standard height and width (36" by 80"). Find the interior surface area of the walls.



$2 \times$ [24 × 8] $= 384\,ft^2$

$2 \times$ [18 × 8] $= 288\,ft^2$

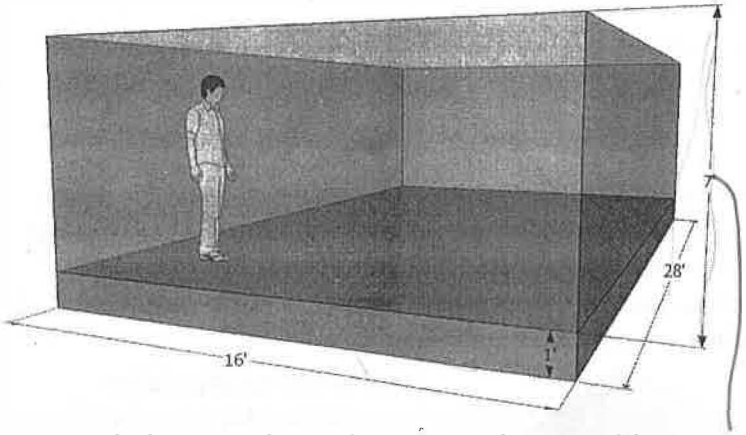
Subtractions:

$1 \times$ [36in × 80in] $= \frac{2880\,in^2}{1} \times \frac{1\,ft}{12\,in} \times \frac{1\,ft}{12\,in}$

$= 20\,ft^2$

$SA = 384\,ft^2 + 288\,ft^2 - 20\,ft^2 = \boxed{652\,ft^2}$

Check out the huge aquarium! Mr. J wants to swim the fishes so he is building this aquarium in his home.



169. Calculate the volume of concrete in the floor of the aquarium in cubic feet.

$V = l \times w \times h$

$V = 16ft \times 28ft \times 1ft$

$V = \boxed{448\,ft^3}$

7 starts at top of concrete!

170. Calculate the mass of the floor if concrete has a mass of 2400 kg per cubic metre.

$\frac{448\,ft^3}{1} \times \frac{0.3048m}{1\,ft} \times \frac{0.3048m}{1\,ft} \times \frac{0.3048m}{1\,ft}$

$12.68594727\,m^3 \times 2400\,kg$

$\boxed{30446.27346\,kg}$ ✓

171. Calculate the area of acrylic (aquarium wall) required to build this structure.

$2 \times$ [16 × 7] $= 224\,ft^2$

$2 \times$ [28 × 7] $= 392\,ft^2$

$A = \boxed{616\,ft^2}$

172. Sheets of acrylic sell for $45 /sq ft. If he could actually find sheets this size, what would be the cost (before taxes)?

$616 \times 45 = \boxed{\$\,27\,720}$

173. How many litres of water does the tank hold? How many gallons?

Note: *1 cm³ = 1 ml, 1000 ml = 1 litre, 1 gallon = 3.785 litres*

$V = l \times w \times h = V = 16 \times 28 \times 7 = \frac{3136\,ft^3}{1} \times \frac{30.48\,cm}{1\,ft} \times \frac{30.48cm}{1ft} \times \frac{30.48cm}{1ft}$

$V = 88801630.91\,cm^3 = \frac{88801630.91\,ml}{1} \times \frac{1\,L}{1000\,ml} \times \frac{1\,gallon}{3.785\,L}$

$V = \boxed{88801.663091\,L}$ ★ ?? 01? ★ ✓

$V = \boxed{23461.46127\,gallons}$

★ Why round? ★

★ 01 on L? ★

★ $s = \sqrt{9 \times 10} \rightarrow \boxed{3\sqrt{10}\text{m}}$ ★

174. A sphere has a volume of $\frac{256\pi}{3}$ cm³. Find the exact radius of the sphere.

$V = \frac{4}{3}\pi r^3$

$\frac{3}{4}\left(\frac{256\pi}{3}\right) = \left(\frac{4}{3}\pi r^3\right)\frac{3}{4}$

$\frac{64\pi}{\pi} = \frac{\pi r^3}{\pi}$

$\sqrt[3]{64} = \sqrt[3]{r^3} \rightarrow \boxed{r = 4\text{cm}}$

175. A square-based pyramid with a height of 10 metres has a volume of 300m³. Find the exact side length of the base.

$V = \frac{1}{3} \times s^2 \times h$

$\frac{3}{1}(300\text{m}^3) = \left(\frac{1}{3} \times s^2 \times 10\text{m}\right)\frac{3}{1}$

$\frac{900\text{m}^3}{10\text{m}} = \frac{s^2 \times 10\text{m}}{10\text{m}}$

$\sqrt{90\text{m}^2} = \sqrt{s^2}$

$s = \boxed{\sqrt{90}\text{m}}$

176. Find the height of a cylinder if it has a volume of 1200 cm³ and a radius of 12 cm. Answer to the nearest tenth of a centimetre.

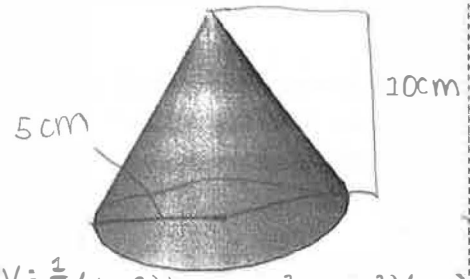
$V = \pi r^2 \times h$

$1200\text{cm}^3 = \pi \times 12^2 \times h$

$\frac{1200\text{cm}^3}{144} = \frac{\pi \times 144 \times h}{144}$

$\frac{8.333}{\pi} = \frac{\pi \times h}{\pi} \rightarrow h = \boxed{2.7\text{cm}}$

177. Find the exact volume of the right cone below. It has a height of 10 cm and a radius of 5 cm.



$V = \frac{1}{3}(\pi r^2)h \rightarrow V = \frac{1}{3}(\pi \times 5^2)(10) \rightarrow \frac{1}{3} \times \frac{\pi \times 25 \times 10}{1} = \boxed{\frac{250\pi}{3}\text{cm}^3}$

178. Find the exact volume of a cylinder with the same height and radius as the cone in the previous question.

$V = \pi r^2 \times h$

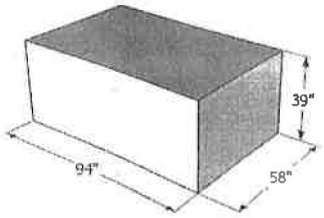
$V = \pi(5)^2 \times 10$

$V = \boxed{250\pi\text{cm}^3}$

179. What is the ratio of volumes for the two figures in the previous two questions?

$\boxed{1:3}$

180. Find the volume of the right prism below. Answer to the nearest cubic inch.

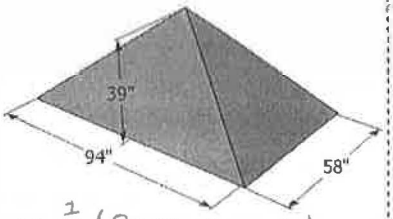


$V = l \times w \times h$

$V = 94'' \times 58'' \times 39''$

$V = \boxed{212628\text{in}^3}$

181. Below is a right pyramid with the same base and height as the prism in the previous question. Find the volume to the nearest cubic inch.



$V = \frac{1}{3}(\text{Base Area})h$

$V = \frac{1}{3}(94 \times 58)(39)$

$V = \boxed{70876\text{in}^3}$

182. What is the ratio of volumes for the two previous figures?

$\boxed{3:1}$ why 1:3??

183. In general, what is the relationship between the volumes of right pyramids and right prisms with the same dimensions?

Right pyramids will have $\frac{1}{3}$ the volume of right prisms w the same dimensions. ✓

Answers:

1. 9 ft
2. 45 ft
3. $37\frac{1}{2}$ or 37.5 ft
4. 4 yd
5. 27 inches
6. $45\frac{1}{3}$ yd
7. $96\ in$
8. 33 in
9. 57.6in
10. 3 ft
11. $11\frac{2}{3}\ ft$
12. 168 ft
13. 3520 yd
14. 22176 ft
15. $\frac{75}{88}$ miles
16. 189000 in
17. 10lbs
18. $13\frac{3}{4}$ or 13.75 lbs
19. 64 oz
20. 36 oz
21. 3 tons
22. 96'
23. 128 oz
24. 192"
25. $162.06 for 74'
26. 46 yd , 2 ft
27. 85yd, 1 ft
28. 9 yd, 2 ft, 8 in
29. 11' 10 "
30. 5 yd, 2 ft
31. 2 tons, 1266 lbs and 4 oz
32. 74 ft
33. 24 yd, 2 ft
34. 6' x 7'
35. $199.92
36. 13 yd, 1 ft
37. 192 sq ft
38. $147.84 for 48 rolls
39. $1\frac{149}{1056}\ miles$ (about 1.141 miles)
40. $23\frac{67}{176} \cong 23.4\ miles$
41. 158400"
42. 117"
43. 564"
44. 876"
45. 1536"
46. 48 frames
47. 1267200"
48. 20 miles
49. 116.5 yd
50. $A = lw$
51. 9 sq ft
52. 36 in
53. 1296 sq in
54. Multiply by the conversion factor (12) twice. That is, multiply by 12^2
55. 5 575 680 sq ft
56. Multiply by $(5280)^2$
57. 36 sq in
58. 120"
59. 101788 sq in
60. 79168 sq in
61. 125 cm
62. 3725 cm
63. 8 mm
64. 138 000 mm
65. 15.1 m
66. 32.8 mm
67. 628 mm
68. 2400 cm
69. 125 mm
70. 3450 mm
71. 12357 m
72. 0.2 m
73. 1 365 000 mm
74. 17200 mm
75. 75 000 cm
76. 0.000 03 mm
77. 885 180 000 cm
78. 162 000 000 mm^2
79. 2304 mm
80. 1475.4 m
81. 147512 cm
82. 80.5 km
83. 84.0 kg
84. 164.0 yd
85. 182.9 cm
86. 1190.7 g
87. 773.8 miles
88. 137824.7 ft
89. 2126.0 in
90. 2.8 lbs
91. 137795.3 ft
92. 167322.8 in
93. 1180.4 kg
94. 5.53 kg
95. 1.31 kg
96. 3402 g
97. 3.81 m
98. 8.23 m
99. 15.62 yd
100. 3.81 m
101. Try yards →feet→metres
102. Try m→ cm →inches→yards
103. 50.94 cm
104. 82"
105. $66\frac{1}{3}$ = 66.33 linear ft.
106. Your answers here.
107. Your answers here.
108. Your answers here.
109. Your answers here.
110. Trundle wheel.
111. Vernier calipers.
112. Micrometer.
113. Inches, cm, mm.
114. Eg. Measuring tape. Cm, inches (and fractions thereof)
115. Eg. Measuring cup. Cups, ounces, ml, l
116. Eg. Volumetric cylinder. ml
117. Eg. 2-pan balance scale. g, kg
118. Eg. Electronic scale. μg, mg, g
119. Diameter, distance.
120. Volume. ml
121. Diameter, distance.
122. One set of claws is for measuring inside diameters such as inside a tube. The other is for measuring outside diameter.
123. 1.97 mm
124. 3.15 cm
125. 3.68 cm
126. 0.40 mm
127. 27 m^2
128. 12 830 sq in
129. 81 268 sq in
130. 19 684 sq in
131. 1810 mm^2
132. 86 cm^2
133. 16 965 sq ft
134. 137 sq ft
135. 333 cm^2
136. 20"
137. Find the surface area of the rectangular prism, add the area of the curved cylindrical surface, subtract the bottom of the prism and the two circles.
138. 41 734 sq in
139. Frank should buy 4 quarts.
140. 739 655 cm^2 (with bottom) 478889 cm^2 (without bottom)
141. $36m^2$
142. 7560 Beacon Bits

143. 7560 cm^3
144. 237 583 cubic inches
145. The three dimensions have units such as centimetres. If we multiply $cm \times cm \times cm$ we get cm^3.
146. Bottom (base area) multiplied by the height.
147. Find the volume of the large pyramid and subtract the volume of the small (removed) pyramid.
148. 11.5 m^3
149. 11 058 432 cm^3
150. 4 193 205 cm^3
151. 85 cubic feet
152. 24.4 m^3
153. 7.1 m^3
154. 804 cubic feet
155. 60 cubic inches
156. 480 cubic inches
157. 26 ft
158. 9 m
159. 269 sq ft
160. 4 yd^3
161. Your answer here.
162. Your answer here.
163. 897 balls
164. 12.3 cubic inches
165. 1.1 m^2
166. Radius is $\sqrt{65}$ ft
167. 8.5 in
168. 652 sq ft
169. 448 cubic feet or 12.69 m^3
170. 30 446 kg
171. 616 sq ft
172. $27720
173. 88 800 l, 23 461 gal
174. 4 cm
175. $3\sqrt{10}$ m (approx 9.49 m)
176. 2.7 cm
177. $\frac{250}{3}\pi$ cm^3
178. 250π cm^3
179. 1: 3 or $\frac{1}{3}$
180. 212628 cubic inches
181. 70876 cubic inches
182. 1: 3 or $\frac{1}{3}$
183. Pyramids and cones will have volumes equal to one-third of their corresponding prism.