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Workforce Development:

Module 6

1.1 Lessons Abbreviation Key Table

C = Calculator Lesson
P = Pre-algebra Lesson
A = Algebra Lesson
G = Geometry Lesson
S = Special Topics

The number following the letter is the Lesson Number.

E = Exercises with Answers: Answers are in brackets [ ].
EA = Exercises Answers: (only used when answers are not on the same page as the exercises.)
ES = Exercises Supplemental: Complete if you feel you need additional problems to work.

1.2 Exercises Introduction

Why do the Exercises?

Mathematics is like a "game." The more you practice and play the game the better you will understand and play it.

The Foundation's Exercises, which accompany each lesson, are designed to reinforce the ideas presented to you in that lesson's video.

It is unlikely you will learn math very well by simply reading about it or listening to Dr. Del, or anyone else, or watching someone else doing it.

You WILL learn math by "doing math."

It is like learning to play a musical instrument, or write a book, or play a sport, or play chess, or cooking.

You will learn by practice.

Repetition is the key to mastery.

You will make mistakes. You will sometimes struggle to master a concept or technique. You may feel frustration sometimes "**WE ALL DO**."

But, as you learn and do math, you will begin to find pleasure and enjoyment in it as you would in any worthwhile endeavor. Treat it like a sport or game.

These exercises are the KEY to your SUCCESS!

ENJOY!

S1 LESSON: UNITS CONVERSION

Suppose you have two Units of Measurement

U_1 and U_2 and you wish to convert from one unit to the other, for example, cm and inches.

For example, you want to convert 23.4 cm to inches.

First, you must determine the conversion number.

You may look this up in some type of unit conversion table, or you can go to www.wolframalpha.com and get the answer or find the conversion number.

WA1 **Convert 1 cm to inches**

Answer: 1 cm = 0.3937 inches

Now, you have 23.4 cm = X inches and you want X.

Multiply both sides by 23.4 and get:

23.4 cm = 23.4x0.3937 inches = 9.2 inches

Of course, we could have gotten this directly from www.wolframalpha.com

WA2 **Convert 23.4 cm to inches**

Answer: 9.213

Suppose you wanted to convert 15.7 inches to cm?

1 cm = 0.3937 inches same as 1/0.3937 cm = 1 inch

Or, 1 inch = 2.54 cm since 1/0.3937 = 2.54
Then, 15.7 inches = 15.7x2.54 cm = 39.88 cm

Of course,

WA3 **convert 1 inch to cm**

Answer: 2.54

WA4 **convert 15.7 inches to cm**

Answer: 39.88

This type of process applies to any type of conversion of units. Of course, the units must be measuring the same thing like length or weight.

Example 1: convert 18.3 grams to ounces

First you must find a conversion factor for grams to ounces:

1 gm = .0353 oz you find somewhere.

Then, 18.3 gm = .0353x18.3 oz = .646 oz

WA5 **1 gram to ounce**

Answer: .03527

WA6 **18.3 gram to ounce**

Answer: .6455

The same process applies to any type of unit conversion.

For example, square feet to square meters:

1 sq meter = 10.76 square feet

Thus, 1 square foot = 1/10.76 sq m = .093m^2

Example 2: 4.7 sq m are how many sq ft?

Answer: 4.7x10.76 ft^2 = 50.57 ft^2

WA7 **4.7 sq m to sq ft**

Answer: 50.6

To get more accuracy:

WA8 **4.70 sq m to sq ft**

Answer: 50.59

WA9 **1 square meter to square feet**

Answer: 10.76

Example 3: 12.3 Kilograms is how many pounds?

WA10 **12.3 kilograms to pounds**

Answer: 27.12 lb = 27 lb 1.9 oz

Example 4: 3.4 cubic meters is how many cubic yards

1 m = 1.094 yd

1 m^3 = 1.0943^3 yd^3 = 1.309 yd

So 3.4 cu m = 3.4x1.309 cu yd = 4.45 cu yd

WA11 **3.4 cubic meter to cubic yard**

Answer: 3.45 cu yd

In general, if you have two units which measure the same quantity, U_1 and U_2, and you wish to convert from one unit to the other, then:

If you have access to www.WolframAlpha.com, you simply enter the command:

convert N U_1 to U_2

where N is the amount of the quantity you have expressed in U_1 and you will get the amount expressed in U_2.

If you don't have access to Wolfram Alpha, then you must find the conversion factor, C, where:

$1\ U_1 = CU_2$

Multiply both sides by N to obtain the answer:

$N\ U_1 = CxN\ U_2$

Example: you know 1 mile = 1.609 kilometers

60 miles = 1.609x60 km = 96.54 km

So, you can see for example that:

100 km/hr is about 60 m/hr.

S1E

Units Conversion

1. Given the conversion factor 1 ft = 12 in, how many inches are in 1.5 ft?

2. Given the conversion factor 1 ft = 12 in, how many feet are in 14 in?

3. Given the conversion factor 1 m = 39.37 in, how many inches are in 2.8 m?

4. Given the conversion factor 1 m = 39.37 in, how many meters are in 76 in?

5. Given the conversion factor 1 in^2 = 6.452 cm^2, how many cm^2 are on an 8 ½ in x 11 in sheet of paper?

6. Given the conversion factor 1 in^2 = 6.452 cm^2, how many in^2 are in 100 cm^2?

7. Given the conversion factor 1 gal = 3.785 L, how many liters are in 19 gal?

8. Given the conversion factor 1 km^2 = 0.3861 mi^2, how many mi2 are in 15 km2?

9. Given the conversion factor 1 gal = 3.785 L, how many gallons are in 2 L?

10. If I want to pour a concrete house slab that is 52 feet long by 28 feet wide by 4 inches deep, how would I determine how many cubic yards of concrete would be needed?

S1EA

UNITS CONVERSION

1. Given the conversion factor 1 ft = 12 in, how many inches are in 1.5 ft?

   1 ft = 12 in (You will also see this written as 12 in/ft.)

   1.5 ft = X in

   (12 in/ft)*(1.5 ft) = 18 in

   or

   WA **convert 1.5 ft to in**

   18 in

2. Given the conversion factor 1 ft = 12 in, how many feet are in 14 in?

   1 ft = 12 in

   1/12 ft = 12/12 in

   0.0833 ft = 1 in (You will also see this written as 0.0833 ft/in.)

   14 in = X feet

   (0.0833 ft/in)*(14 in) = 1.167 ft

   or

   WA **convert 14 in to ft**

   1.167 ft

3. Given the conversion factor 1 m = 39.37 in, how many inches are in 2.8 m?

   2.8 m = X in

   (39.37 in/m)*(2.8 m) = 110.24 in

4. Given the conversion factor 1 m = 39.37 in, how many meters are in 76 in?

   1 m = 39.37 in

   1/39.37 m = 39.37/39.37 in

   0.0254 m = 1 in (You will also see this written as 0.0254 m/in.)

   76 in = X m

   (0.0254 m/in)*(76 in) = 1.930 m

   or

   WA **convert 76 in to m**

   1.93 m

5. Given the conversion factor 1 in^2 = 6.452 cm^2, how many cm^2 are on an 8 ½ in x 11 in sheet of paper?

   (8 ½ in)*(11 in) = 93.5 in^2

   (6.452 cm^2/in^2)*(93.5 in^2) = 603.262 cm^2

   or

   WA **convert 93.5 inches^2 to cm^2**

   603.2 cm^2

   or

   WA **convert (8.5 inches)*(11 in) to cm^2**

   603 cm^2

   Note: The answers are actually the same. The slight differences occur during rounding.

6. Given the conversion factor 1 in^2 = 6.452 cm^2, how many in^2 are in 100 cm^2?

   1 in^2 = 6.452 cm

   1/6.452 in^2 = 6.452/6.452 cm^2

   0.155 in^2 = 1 cm^2 (You will also see this written as 0.155 in^2/ cm^2.)

   100 cm^2 = X in^2

   (0.155 in^2/ cm2)*(100 cm^2) = 15.5 in^2

   or

   WA **convert 100 cm^2 to in^2**

   15.5 in^2

7. Given the conversion factor 1 gal = 3.785 L, how many liters are in 19 gal?

   19 gal = X L

   (3.785 L/gal)*(19 gal) = 71.915 L

   or

   WA **convert 19 gal to L**

   71.92 L

8. Given the conversion factor 1 km^2 = 0.3861 mi^2, how many mi^2 are in 15 km^2?

   15 km^2 = X mi^2

   (0.3861 mi^2/km^2)(15 km^2) = 5.7915 mi^2

   or

   WA **convert 15 km^2 to mi^2**

   5.792 mi^2

9. Given the conversion factor 1 gal = 3.785 L, how many gallons are in 2 l?

   1 gal = 3.785 L

   1/3.785 gal = 3.785/3.785 L

   0.2642 gal = 1 L (You will also see this written as 0.2642 gal/L.)

   2 L = X gal

   (0.2642 gal/L)*(2 L) = 0.5284 L

   or

   WA **convert 2 L to gal**

   0.5283 L

10. If I want to pour a concrete house slab that is 52 feet long by 28 feet wide by 4 inches deep, how would I determine how many cubic yards of concrete would be needed?

    $27\ ft^3 = 1\ yd^3$

    $27/27\ ft^3 = 1/27\ yd^3$

    $1\ ft^3 = 0.0370\ yd^3$

    1 ft = 12 in

    1 in = 0.0833 ft. (See A1 for math conversion.)

    First, convert in to ft.

    4 in = X ft

    (0.0833 ft/in)(4 in) = 0.3332 ft

    Next, calculate number of ft^3.

    $(52\ ft)(28\ ft)(0.3332\ ft) = 485.1392\ ft^3$

    Finally, convert ft^3 to yd^3

    $485.1392\ ft^3 = X\ yd^3$

    $(0.0370\ yd^3/ft^3)(485.1392\ ft^3) = 17.968\ yd^3$

S2 LESSON: DMS Degrees – Minutes - Seconds

There are 360°, or Degrees, in one revolution or circle.

In the DD (decimal degrees) system we express degrees with decimal notation. 37.45 degrees means 37 and 45/100 degrees.

In the DMS system, 1 degree = 60 minutes, or 1° = 60′

And 1 minute = 60 seconds, or 1′ = 60″

So, 1′ = (1/60)° and 1″ = (1/60)′ = (1/3600)°

We can express degrees in either DD or DMS format and convert degrees from DD to DMS and DMS to DD using the TI30Xa calculator.

DMS → DD is 2^{nd} +

DD → DMS is 2^{nd} =

Example:

6.5° = 6°30′ 00″00

6.55° = 6°33′ 00″00

6.57° = 6°34′ 12″00

6.573° = 6°34′ 22″80 (this means 22.80″)

127.875° = 127°52′ 30″

57.382° = 57°22′ 55″2 (this means 55.2″)

To apply the DMS → DD conversion you must enter the angle in the following format:

6°34′ 22″80 is entered: 6.342280 2nd +

Answer: 6.573°

26°4′ 2″50 is entered: 26.040250 2nd +

Answer: 26.06736

Now enter 26.06736° and get 26°04′ 02″5

It is possible to do these conversions manually with formulas, but it is best to do it with a calculator.

S2E

DMS Degrees – Minutes - Seconds

Convert the following decimal degree (DD) numbers to degrees-minutes-seconds (DMS).

Q1. 87.625

Q2. 137.6489

Q3. 65.475698

Q4. 19.01325

Q5. 45.4557

Convert the following degrees-minutes-seconds (DMS) to decimal degree (DD) numbers.

Q6. 66°18′12″0

Q7. 78°45′06″4

Q8. 180°04′07″

Q9. 97°09′45″7

Q10. 54°57′27″4

S2EA

THE NUMBER LINE, NEGATIVE NUMBERS

Answers: [ ]'s

Convert the following decimal degree (DD) numbers to degrees-minutes-seconds (DMS).

Q1. 87.625

[87°37′30″00]

Q2. 137.6489

[137°38′56″]

Q3. 65.475698

[65°28′32″5]

Q4. 19.01325

[19°00′47″7]

Q5. 45.4557

[45°27′20″5]

Convert the following degrees-minutes-seconds (DMS) to decimal degree (DD) numbers.

Q6. 66°18′12″0

[66.30333333]

Q7. 78°45′06″4

[78.75177778]

Note: If you get an answer of 78.75167778, what you did is enter into your calculator "78.450604" instead of "78.45064" before you hit the DMS → DD key. Anything after the " symbol, in this case 06″4, should be treated as 6.4 seconds, therefore, entering a 0 before the 4 would be incorrect.

Q8. 180°04′07″

[180.0686111]

Q9. 97°09′45″7

[97.162269444]

Note: If you get an answer of 97.16251944, what you did is enter into your calculator "97.094507" instead of "97.09457" before you hit the DMS → DD key.

Q10. 54°57′27″4

[54.95761111]

Note: If you get an answer of 54.95751111, what you did is enter into your calculator "54.572704" instead of "54.57274" before you hit the DMS → DD key.

S3 LESSON: y^x EXPONENTS

y^x means y times itself x times

y is called the base,

x is called the exponent

Examples:

$2^3 = 8$; $3^2 = 9$; $5^4 = 625$; $10^5 = 100{,}000$

The y^x key is the east way to calculate this.

Clear the calculator

Enter 2 and press the y^x

Enter 3 and press the = key

Answer: 8

Do all of the above.

y can be any positive number

x can be any number

$\sqrt[x]{y}$ means the x^{th} root of y

same as $y^{(1/x)}$ $[\sqrt[x]{y}]^x = y = \sqrt[x]{(y^x)}$

$\sqrt[3]{8} = 2 = 8^{1/3}$

$1.7^{2.7} = 4.19$

$2^{10} = 1024$ Kilo $\sqrt[10]{1024} = 2 = 1024^{1/10}$

Metric		Digital
$10^3 = 1000$	Kilo	$2^{10} = 1024$
$10^6 = 1{,}000{,}000$	Mega	$2^{20} = 1{,}048{,}576$
$10^9 = 1{,}000{,}000{,}000$	Giga	$2^{30} = 1{,}073{,}741{,}824$
$10^{12} = 1{,}000{,}000{,}000{,}000$	Tera	$2^{40} = 1{,}099{,}511{,}627{,}776$

Compound interest at 5% for 40 years:

$1.05^{40} = 7.04$

$1.06^{40} = 10.3$

$1.25^{25} = 265$ Kmart growth rate 25%/yr

$1.56^{25} = 67{,}315$ Walmart growth rate 56%/yr

$(1 + 1/1{,}000{,}000)^{1{,}000{,}000} = 2.718 = e$

Negative exponents

$y^{-x} = 1/y^x$

$9^{-2} = 1/9^2 = 1/81 = .012345679$

$9^{-1/2} = 1/3 = 1/9^{1/2}$

$5.7^{-1.3} = .104$

$.58^{-3.2} = 5.715$

$-3^{.5}$ = Error

Exponents are very common in many situations. The calculator makes it very easy to deal with them. Just follow the rules.

Of course, Wolfram Alpha also will deal with them very easily.

S3E

y^x EXPONENTS

Use your calculator to solve the following exercises.

1. 4^7 =

2. 10^9 =

3. $4.2^{3.6}$ =

4. 8 $\sqrt{256}$ =

5. 6 $\sqrt{1{,}000{,}000}$ =

6. $\sqrt[3.2]{8.3}$ =

7. 7^{-2} =

8. $56^{-2.4}$ =

9. $0.47^{-3.1}$ =

10. If production increases at a rate of 6.5%/year, what is your production after 15 years?

11. If production increases at a rate of 7.5%/year, what is your production after 15 years?

12. For the following exponents, match them with their name:

1. 10^3 = 1,000	a. Giga (Digital)
2. 10^6 = 1,000,000	b. Tera (Digital)
3. 10^9 = 1,000,000,000	c. Giga (Metric)
4. 10^{12} = 1,000,000,000,000	d. Tera (Metric)
5. 2^{10} = 1,024	e. Mega (Metric)
6. 2^{20} = 1,048,576	f. Kilo (Metric)
7. 2^{30} = 1,073,741,824	g. Mega (Digital)
8. 2^{40} = 1,099,511,627,776	h. Kilo (Digital)

S3EA

y^x EXPONENTS Answers: [ ]'s

Use your calculator to solve the following exercises.

1. 4^7 = [**16,384**]

2. 10^9 = [**1,000,000,000**]

3. $4.2^{3.6}$ = [**175.266**]

4. 8 $\sqrt{256}$ = [**2**]

5. 6 $\sqrt{1{,}000{,}000}$ = [**10**]

6. $\sqrt[3.2]{8.3}$ = [**1.937**]

7. 7^{-2} = [**0.020**]

8. $56^{-2.4}$ = [**0.0000637**]

9. $0.47^{-3.1}$ = [**10.387**]

10. If production increases at a rate of 6.5%/year, what is your production after 15 years?
    [**$1.065^{15} = 2.572$**]

11. If production increases at a rate of 7.5%/year, what is your production after 15 years?
    [**$1.075^{15} = 2.959$**]

12. For the following exponents, match them with their name:
    [**1f, 2e, 3c, 4d, 5h, 6g, 7a, 8b**]

S4 LESSON: Density = Weight/Volume

How much does 55 gallons of water weigh (in lbs)?

How much does 55 gallons of gasoline weigh?

How much does 55 gallons of cement weigh?

How much does 55 gallons of mulch weigh?

Weight is measured in units such as:
Grams (gm), pound (lb), ounce (oz),
kilograms (kg), stone (st), etc

Volume is measured in such units as:
gallons(gal), quarts (qt), fluid ounces (fl oz),
liters (ltr), cubic inches (cu in or in^3),
cubic feet (cu ft or ft^3), or in general cubic U (cu U or U^3) where U is a linear length, etc.

Suppose 1 gallon of water weighs 8.345 lbs

Then, 55 gallons would weigh 55x8.345 = 459 lbs

How do you find out what 1 gallon of water weighs?

Well, you could weigh a quart of water and multiply by 4, since 4 quarts equals one gallon.

Or, you could weigh 1 oz of water and multiply by 128 since one gallon is 128 oz.

Or, you could weigh a container full of water whose volume is 12 oz and then multiply by 128/12

Of course, you must subtract the weight of the empty container!

The Density of water is what you are computing.

Density = Mass/Volume = Weight/Volume

D = W/V or W = DV or V = W/D

So, if you know any two of these, then you always can calculate the third.

The units must always match up.

If W is lb and V is ft^3, the D must be lb/ft^3

D could be lb/gal, or oz/quart, or gm/liter, etc.

Above we determined a W and V in an experiment and calculated D, and then used this D to calculate the W when we were given the V.

What you always want to do first is learn the D for a substance.

For example, D for gasoline is 6.06 lb/gal

So, 55 gallons of gasoline would weigh:

55x6.06 = 333 lbs VxD = W galx(lb/gal) = lb

BUT, how do we know D for gasoline?

1. We could look it up in some table of densities.
2. We could find out on the Internet. My favorite is www.wolframalpha.com
3. We could do the experiment by weighing a known volume, usually pretty small.

WA1 density of gasoline in lb/gal

Answer: 6.06 lb/gal

But, suppose you did the experiment and found that 24.7 cu in of gasoline weighed 10.4 oz?

$10.4/24.7 = .42$ oz/in^3

WA2 convert .42 oz/in^3 to lb/gal

convert this to lb/gal

Answer: 6.06 lb/gal as it should be.

Note: Do you think I actually did this experiment?

Of course not, I just used WA backwards

WA3 convert 6.06 lb/gal to oz/in^3

Answer: .42 oz/in

But, in many cases, you won't be able to find the Density of a substance in any handbook, or even on Wolfram Alpha. So then, you simply must do the experiment with a convenient container.

1. Compute its volume.
2. Fill it up with the substance.
3. Calculate the Density of this substance.

Then you can find either V or W if you know the other one.

For example, how many cubic yards will one ton of insulation material fill up?

Suppose we do the experiment and find that the density of some insulation material is 2.5 lbs/gal. (I have no idea what it really would be.)

Then, WA tells us the density would be:

WA4 **convert 2.5 lbs/gal to lbs/yd^3**

Answer: 505 lbs/cu yd

So, V = W/D yields 2000/505 = 4 yd^3 as the answer.

How much does 55 gallons of cement weigh?

WA5 **density of cement in lb/gal**

Answer: 16.8 lb/gal

So 55 gallons weighs 55x16.8 = 924 lbs

If in doubt, actually do the experiment and weigh a small amount and then do the calculations.

How much does 55 gallons of mulch weigh?

WA6 **density of mulch in lb/gal**

WA doesn't know. You will probably just have to do the experiment and calculate the density.

So now, you can do a bunch of problems.

Sometimes, WA will give you the density.

Sometimes you will have to find it by experiment.

Use some handy container whose volume you know or can compute. And, fill it up and weight it. Subtract the empty container weight. Then, use WA to convert it to the Units you want.

S4E

Density = Weight/Volume

Use your calculator to solve the following exercises.

1. 1 quart of seawater (salt water) weighs 2.138 lb. What is the density of seawater (lb/gal)?

2. The density of propane is 0.0156843 lb/gal. A residential tank holds 250 gal. of propane. What is the weight (lb) of the propane in that tank?

3. The density of gold is 11.2 oz/ in^3. What is the volume (in^3) of 16 oz. (or 1 lb) of gold?

4. A quart of whole milk weighs 2.3 lb. What is the density (gal) of whole milk in lb/gal?

5. An adult is recommended to limit their salt intake to no more than 2300 mg per day. If the density of salt is 10,600 mg/tsp (teaspoons), what is the volume of salt (tsp) an adult should not exceed per day?

6. A grass catcher for a mower holds 4.4 ft^3 of grass. If the density of grass is 17.4 lb/ ft^3, what is the weight (lb) of the grass in the catcher?

7. You buy a pool which is 24 ft in diameter and fills with water to 4 ft deep. The density of water is 8.345 lb/gal. How much does the water in your pool weigh (lb)? Useful information: 1 ft^3 = 7.481 gal.

8. A ream (500 sheets) of 8.5 in x 11 in standard office paper is 2 in thick, and weighs 5 lb. What is the density of the paper (oz/in^3)? Useful information: 1 lb = 16 oz.

9. If 1 lb of feathers has a density of 0.0025 g/cm^3, what is the volume of those feathers (cm^3 and ft^3)? Useful information: 1 lb = 453.6 g; 1ft^3 = 28,317 cm^3

10. A bag of concrete mix weighs 80 lb. and has a dry volume of 0.53 ft^3. If 4 liters (L) of water are added to the mix, what is the final weight (lbs.) of the concrete? Also, what is the final volume (ft^3) that the bag will fill once mixed with water? Use these numbers to calculate the density (lb/ft^3). Useful information: Density of water: 1000 g/L (grams/liter); 1 lb = 453.6 g; 1 L = 0.03531 ft^3

S4EA

Density = Weight/Volume Answers: [ ]'s

1. D = W/V

   D = 2.138 lb/1 quart

   D = (2.138 lb/quart)x(4 gal/quart)

   D = 8.552 lb/gal

2. W = VD

   W = (250 gal)x(0.0156843 lb/gal)

   W = 3.92 lb

3. V = W/D

   V = (16 oz)/(11.2 oz/in^3)

   V = 1.43 in^3

4. D = W/V

   D = 2.3 lb/1 quart

   D = (2.3 lb/quart)x(4 gal/quart)

   D = 9.2 lb/gal

5. V = W/D

   V = (2300 mg)/(10,600 mg/tsp)

   V = 0.217 tsp

6. W = VD

   W = (4.4 ft^3)x(17.4 lb/ ft^3)

   W = 76.6 lb

7. $W = VD$

$V = \text{Height} \times \text{Area}$

$V = \text{Height} \times \pi\text{Radius}^2 \text{ or Height} \times \pi \times (1/2 \text{ Diameter})^2$

$V = (4 \text{ ft}) \times (\pi \times (1/2 \times 24 \text{ ft})^2)$

$V = 1809.557 \text{ ft}^3$

$V = (1809.557 \text{ ft}^3) \times (7.481 \text{ gal/ft}^3)$

$V = 13{,}537.299 \text{ gal}$

$W = (13537.299 \text{ gal}) \times (8.354 \text{ lb/gal})$

$W = 113{,}091 \text{ lb}$

8. $D = W/V$

$V = (8.5 \text{ in}) \times (11 \text{ in}) \times (2 \text{ in})$

$V = 187 \text{ in}^3$

$W = (5 \text{ lb}) \times (16 \text{ oz/lb})$

$W = 80 \text{ oz}$

$D = (80 \text{ oz})/(187 \text{ in}^3)$

$D = 0.4 \text{ oz/in}^3$

9. $V = W/D$

$V = (453.6 \text{ g})/0.0025 \text{ g/cm}^3)$

$V = 181{,}440 \text{ cm}^3$

$V = (181{,}440 \text{ cm}^3)(1/28{,}317 \text{ ft}^3/\text{cm}^3)$

$V = 6.4 \text{ ft}^3)$

10. Weight:

Concrete mix: 80 lb (given)

Water:

(4 L) x (1000 g/L) x (1/453.6 lb/g) = 8.82 lb

Total:

80 lb + 8.82 lb = 88.82 lb

Volume:

Concrete mix: 0.53 ft^3 (given)

Water:

(4 L) x (0.03531 ft3/L) = 0.14 ft^3

Total:

0.53 ft^3 + 0.14 ft^3 = 0.67 ft^3

Density:

D = W/V

D = 88.82 lb/0.67 ft^3

D = 132.57 lb/ft^3