

# KeyTrain Competencies – Level 6

## Reduce Fractions

$$\begin{array}{l} \underline{20} \div 5 = \underline{4} \quad \underline{24} \div 2 = \underline{12} \div 2 = \underline{6} \div 2 = \underline{3} \\ 25 \div 5 = 5 \quad 40 \div 2 = \underline{20} \div 2 = \underline{10} \div 2 = 5 \end{array}$$

OR

$$\begin{array}{l} \underline{24} \div 4 = \underline{6} \div 2 = \underline{3} \\ \underline{40} \div 4 = \underline{10} \div 2 = 5 \end{array}$$

To reduce fractions, you must divide the top number of the fraction **and** the bottom number of the fraction by the same number. Remember: If both numbers are even, you can always divide by 2 until you cannot divide anymore. If you have an even number and an odd number, you must divide by an odd number. Not all fractions can be reduced.

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## Fraction to Decimal

$$7/8 = 7 \div 8 = .875$$

$$5 \frac{4}{5} \quad 4 \div 5 = 0.8 \quad \mathbf{5.8}$$

To change a fraction to a decimal, just divide the bottom number of the fraction by the top number of the fraction. Using a calculator, this means that you must enter the top number of the fraction first. If you have a mixed number, the whole number will always stay the same.

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## Mixed to Improper

$$1 \frac{2}{3} \quad 1 \times 3 = 3 + 2 = \mathbf{5/3}$$

To change a mixed number to an improper fraction, multiply the whole number by the bottom of the fraction and then add the top number of the fraction. That answer will be the top number of the improper fraction. The original bottom number of the fraction will stay the same.

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## Improper to Mixed

$$5/4 \quad 5 \div 4 = 1 \text{ R}1 = \mathbf{1 \frac{1}{4}}$$

To change an improper fraction to a mixed number, divide the top number of the fraction by the bottom number of the fraction. If you have a remainder, put it as the top of a fraction with the number you divided by as the bottom of the fraction.

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## Fraction to a Decimal

$$4/5 = 4 \div 5 = .8$$

To change a fraction to a decimal, just divide the top number by the bottom number. If you are using a calculator, punch in the top number first, the  $\div$  sign, and then the bottom number and the equal sign.

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## Fraction to a Percent

$$4/5 = 4 \div 5 = .8 = \mathbf{80\%}$$

To change a fraction to a decimal, first you have to make the fraction a decimal, and then you have to move the decimal point to the **right** two places.

## Percents

Percent means part of one hundred. If you know how to cross multiply and divide, you can figure any percent problem. Using the box method to solve percents means that you just have to fill in the blanks and cross multiply and divide. Look at the box:

part	percent
whole	100

Here is an example:

What percent is 25 of 200?

25	?
200	100

To find the answer, you will multiply  $25 \times 100 = 2500$  and divide by  $200 = 12.5$

Here is another example: Kim knows that 6% of her spot welds are bad. On a day when she makes 325 welds, how many welds are bad? 325 is the whole number, or all the welds she made. If you have a percent, it always goes over the 100.  $325 \times 6 = 1950 \div 100 = 19.5$ . **19.5** of her welds are bad.

	6
325	100

## Percent to Decimal

$$45.6\% = .465 \quad \text{and} \quad 57\% = .57$$

To change a percent to a decimal, just move the decimal point in the percent two places to the **left**.

## Percent to a Fraction

$$24\% = .24 = 24/100 = 6/25$$

To turn a percent to a fraction, first you must turn it into a decimal by moving the decimal point two places to the **left**. Say the number you have written and write it in fraction form. You may have to reduce.

## Facts You Should Know

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

$$4 \text{ qts.} = 1 \text{ gallon}$$

$$3 \text{ feet} = 1 \text{ yard}$$

$$\frac{1}{2} = 0.5$$

$$16 \text{ ounces} = 1 \text{ pound}$$

$$\frac{1}{4} = 0.25$$

$$60 \text{ minutes} = 1 \text{ hour}$$

$$\frac{1}{3} = 0.3333$$

$$9 \text{ sq. feet} = 1 \text{ sq. yard}$$

$$\frac{3}{4} = 0.75$$

$$27 \text{ cubic feet} = 1 \text{ cubic yard}$$

To change inches to feet,  $\div$  the inches by 12.

$$8 \text{ ft. } 9 \text{ inches} = (9 \div 12 = .75) \text{ } 8.75 \text{ feet}$$

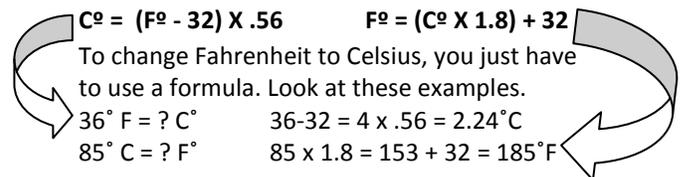
## Fahrenheit Celsius Conversions

$C^{\circ} = (F^{\circ} - 32) \times .56$        $F^{\circ} = (C^{\circ} \times 1.8) + 32$

To change Fahrenheit to Celsius, you just have to use a formula. Look at these examples.

$36^{\circ} F = ? C^{\circ}$        $36 - 32 = 4 \times .56 = 2.24^{\circ} C$

$85^{\circ} C = ? F^{\circ}$        $85 \times 1.8 = 153 + 32 = 185^{\circ} F$



## Metric English Conversions

<u>1 inch</u>	<u>? Inch</u>
2.54 inches	5.2 cm

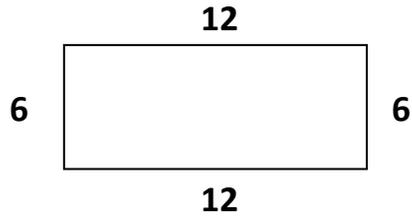
$$5.2 \times 1 = 5.2 \div 2.54 = 2.05$$

To change metric units to English units, or English units to metric units, you should use the ratio method. Here is an example:

$$5.2 \text{ cm} = \underline{\quad} \text{ inches}$$

First, you must find the fact about centimeters and inches and write it down as the first part of your proportion. Next, put the information you have into the proportion. Finally, cross multiply and divide to find the answer.

## Perimeter of Rectangle

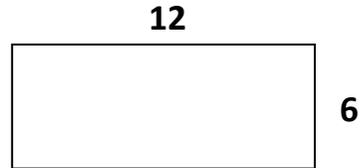


$$12+6+12+6 = 36$$

Perimeter of a rectangle simply means the total length of all the outside edges of that rectangle. Think **peRIMeter**

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## Area of Rectangle



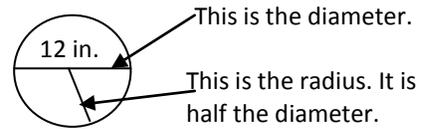
$$12 \times 6 = 72 \text{ ft}^2$$

To find the area of a rectangle, all you have to do is multiply the length by the width of the rectangle. Remember that your answer is a squared number.

This is the formula: **Area of a rectangle = LXW**

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## Area of Circle



$$\text{Area of Circle} = r^2 \times \pi$$

$$12 \div 2 = 6$$

$$6^2 = 36 \times \pi =$$

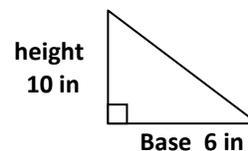
$$\mathbf{113.04 \text{ in}^2}$$

To find the area of a circle, you must square the radius and then multiply it by pi (3.14). Remember: The radius is  $\frac{1}{2}$  of the diameter.

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## Area of Triangle

The area of a right triangle is  $\frac{1}{2}$  of the base of the triangle multiplied by the height of the triangle, or  $\frac{1}{2} bh$

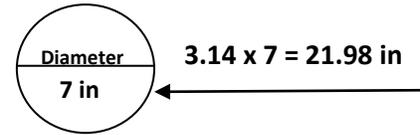


$$10 \times 6 = 60 \div 2 = 30$$

$$\text{Answer: } 30^2 \text{ in}$$

## Circumference (Perimeter) Of Circle

The perimeter of a circle just means the distance around the edge of the circle. The formula for this is  $\pi$  times the diameter, or  $C = \pi D$   
Look at the example.



## Inches to Feet

Just remember that there are 12 inches in a foot.

$$74 \text{ in.} = 6 \text{ ft. } 2 \text{ in.}$$

$$12 \times 6 = 72 + 2 = 74$$

$$10 \text{ ft. } 7 \text{ in.} = \underline{\hspace{2cm}} \text{ in.}$$

$$10 \times 12 = 120 + 7 = 127 \text{ inches}$$

## Adding Measurement

$$\begin{array}{r} 3 \text{ yds. } 2 \text{ ft. } 8 \text{ in} \\ + 2 \text{ yds. } 2 \text{ ft. } 5 \text{ in} \\ \hline 5 \text{ yds. } 4 \text{ ft. } 13 \text{ in} \end{array}$$

Answer: **(6 yds. 2 ft. 1 in)**

$$13 \text{ in} = 1 \text{ ft. } 1 \text{ in}$$

$$4 \text{ ft.} + 1 \text{ ft.} = 5 \text{ ft.}$$

$$5 \text{ ft.} = 1 \text{ yd.} + 2 \text{ ft.}$$

## Subtracting Measurement

$$15 \text{ ft. } 15 \text{ in} \quad (12 \text{ in} + 3 \text{ in} = 15)$$

$$\begin{array}{r} 16 \text{ ft. } 3 \text{ in} \\ - 2 \text{ ft. } 8 \text{ in} \\ \hline 13 \text{ ft. } 7 \text{ in} \end{array}$$

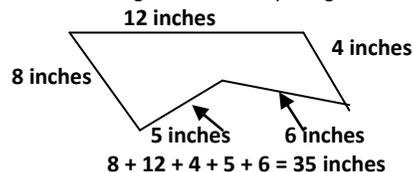
$$16 \text{ ft. } 3 \text{ in}$$

$$- 2 \text{ ft. } 8 \text{ in}$$

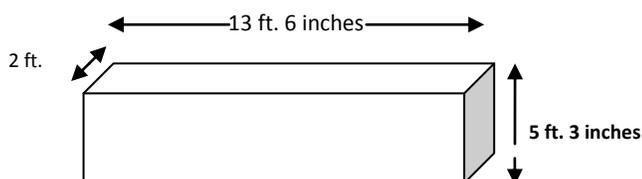
$$13 \text{ ft. } 7 \text{ in}$$

## Perimeter of an Irregular Polygon

The perimeter of an irregular polygon just means the distance around the edge of an odd shaped figure. Look at the figure below.



## Volume of a Rectangular Solid



The volume of something is what fills it up. When you are finding the volume of something, your answer will be cubed. We write cubic measurements like this  $14 \text{ ft.}^3$ . The formula for finding the volume of a rectangular solid is length X width X height, or LWH.

To find the volume of this solid, multiply: Say your answer as "141.75 CUBIC Feet"

$$13.5 \times 2 \times 5.25 = 141.75 \text{ ft.}^3$$

# Metric Measurement

Weight – Gram (Gm, g) Length – Meter (m)  Volume – Liter (L)	<b>Types</b>
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Micro = millionth Milli = thousandths Centi = hundredths  Deci = tenth Deca = ten Hecto = hundred Kilo = thousand	<b>Prefixes</b>
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Changing from one metric unit to another may seem difficult, but this system of measurement is really much easier to use than the household system you are familiar with because all measurements are figured in 10 and its multiples. This means that to convert from one unit to another, all you have to do is move the decimal point. Memorize the following verse to help you remember the order of the prefixes. The first letter of each word in the rhyme represents the first letter of a prefix in the metric system.

<b>K</b> angaroos (kilo)	<b>H</b> op (hecto)	<b>D</b> own (deca)	<b>M</b> ountains (Meter) (Liter) (Gram)	<b>D</b> rinking (deci)	<b>C</b> hocolate (centi)	<b>M</b> ilk (milli)	<b>Y</b> um -	<b>Y</b> um -	<b>M</b> ustache! (micro)
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Try this: How many meters are in 4.3 centimeters? You have centimeters, so that is your starting point. Move from the **RIGHT** of the centimeter letter to the **RIGHT** of the meter letter. Therefore, to change centimeters to meters, just move the decimal in the number 4.3 two places to the left, making it 0.043. The answer is 0.043 meters.

$$0.4.3 = .043$$

**\*\*Remember: Stay to the RIGHT of the letter of the prefix, no matter if you are moving right or left! For instance, if you are changing meters to kilometers, you would start at the right of the meter letter, and move to the right of the kilo letter, and move the decimal point three spaces to the left.**

Here's one more: How many microliters are in 12 liters? Liters is your starting point. Microliters is six places to the right of liters. Therefore, to change liters to microliters, move the decimal point in the number 12 six places to the right. Remember when you cannot see the decimal point, it is at the end of the number.

$$12.000000 = 12,000,000$$

Look at problems below and see if you can come up with the same answers.

$$3.2 \text{ Meters} = \boxed{320} \text{ Centimeters}$$

$$8 \text{ Kilometers} = \boxed{8000} \text{ Meters}$$

$$15 \text{ Centimeters} = \boxed{.15} \text{ Meters}$$

$$3.5 \text{ Meters} = \boxed{.0035} \text{ Kilometers}$$

$$99\text{CM} = \boxed{990} \text{ Millimeters}$$

$$7.783 \text{ M} = \boxed{778.3} \text{ Centimeters}$$

## Best Deals

The easiest way to find the best deal is to use the ratio method, just like in metric English conversions. Look at the two examples that follow.

1.) If one store will sell 12 pens for \$9.00 and another sells 10 pens for \$7.80, which is the better deal?

$$\frac{12 \text{ pens}}{\$9.00} \quad \frac{1 \text{ pen}}{\$ ?}$$

If you cross multiply and divide, you get this  $1 \times 9 = 9 \div 12 = .75$   
This means that each pen costs 75¢. (This is the best deal!)

$$\frac{10 \text{ pens}}{\$7.80} \quad \frac{1 \text{ pen}}{\$ ?}$$

If you cross multiply and divide, you get this:  $7.80 \times 1 = 7.8 \div 10 = .78$   
This means that one pen costs 78¢.

2.) Which is cheaper, 2 cases of paper for \$25.50, or 8 cases of paper for \$141.20?

$$\frac{2 \text{ cases}}{\$25.50} \quad \frac{1 \text{ case}}{\$ ?}$$

If you cross multiply and divide, you get this:  $25.50 \times 1 = 25.50 \div 2 = 12.75$   
This means that one case costs \$12.75. (This is cheaper!)

$$\frac{8 \text{ cases}}{\$141.20} \quad \frac{1 \text{ case}}{\$ ?}$$

If you cross multiply and divide, you get this:  $141.2 \times 1 = 141.2 \div 8 = 17.65$   
This means that one case costs \$17.65.

## Production Rates

Production rates are another case in which you can use the ratio method to find the correct answer. Look at the example that follows.

1. A department store sells 92 pairs of jeans in 2 months. How many pairs of jeans would you order to sell in the next three months?

Wow! You have to do a little thinking to solve this problem, but it is not too difficult. The easiest thing to do would be to find out how many jeans you sell in one month, and multiply that number by 3 to find how many you need for three months.

$$\frac{92 \text{ pairs}}{2 \text{ months}} \quad \frac{? \text{ pairs}}{1 \text{ month}}$$

$92 \times 1 = 92 \div 2 = 46$      $46 \times 3 = 138$   
You would need to order 138 pairs of jeans for the next three months.

## Finding Percents

There are several kinds of problems on the test that deal with percentages. You may use the box method to solve these problems, or just multiply for the simple percent problems.

Look at the examples that follow.

1. **A salesman makes a commission of 4% on all the big ticket items he sells. For the month of July, he sold \$31,500 worth of big ticket items. What will his commission be?**

You must remember that to turn a percent into a decimal, you have to **MOVE THE DECIMAL TWO PLACES TO THE LEFT!** Look at 4% - where is the decimal? Remember, when you can't see a decimal, it is at the end. If you move the decimal two places to the left, you get 0.04. This is the decimal of 4%. You should also remember that when you want to find a percent **OF** a number, that that means multiply. If you use the box, it would look like this:

$$31,500 \times 0.04 = 1,260$$

The commission on the big ticket items sold is \$1,260.

?	4
31,500	100

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2. **Sue goes to the store and finds a comforter that she like that costs \$129.95. If she has a coupon for 25% off, what will she pay for the comforter?**

The cost of the comforter is \$129.95. If you want to find 25% of that price, you must multiply by 0.25.  **$129.95 \times 0.25 = 32.4875$** . That long number, 32.4875 is the amount of the discount. Since the problem is talking about money, you should round that answer to the nearest hundredth, or the nearest penny, which would be 32.49. This means that with the coupon, Sue will save \$32.49 off the original price of the comforter. So,  **$\$129.95 - \$32.49 = \$97.46$** . That is the new price of the comforter.

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