BEGINNING CONSTRUCTION TRADES COMPETENCIES

Visit www.khanacademy.org/math and review 6th, 7th, and 8th grade math to get started.

Or visit www.constructionknowledge.net

HINT

SKILL *(These are SOME of the skills one should possess in order to be able to pass apprentice tests and succeed in the field.)*	REAL WORLD EXAMPLES
Addition, subtraction, multiplication division, simplification and conversion.	

d) If the tile for the stairs costs $14 per square foot, how much does the tile for this job cost?

) The one I-beam that is W18 × 50 is 50 lbs/ft × 14' = 700 lbs.
The other three I-beams each weigh 76 lbs/ft.
Each of these I-beams weighs 76 lbs/ft × 14' = 1064 lbs.
There are three of these, so their total weight is 1064 lbs × 3 = 3192 lbs.
If we add up these weights, we get 3900 lbs + 700 lbs + 3192 lbs = 7792 lbs.
The total weight for all ten I-beams is 7792 lbs.

You need to use math in most construction tasks. For example:

- The concrete company only wants the order in yards (cubic yards).
- Roofing material is purchased by the square (100 square feet).
- Finished flooring is sold by the square yard.
  Land is purchased in acres (or fractions of an acre).
- Your measuring tape reads in feet, inches, and fractions of an inch.
- All materials and labor cost dollars and cents.

```
   5 yd  2 ft   6 in.
           x  3
  ---------------------
  15 yd  6 ft  18 in.
```

Simplifying, this is

17 yd 1 ft 6 in.

```
      3
  38/1862
     114
     ---
      72
```

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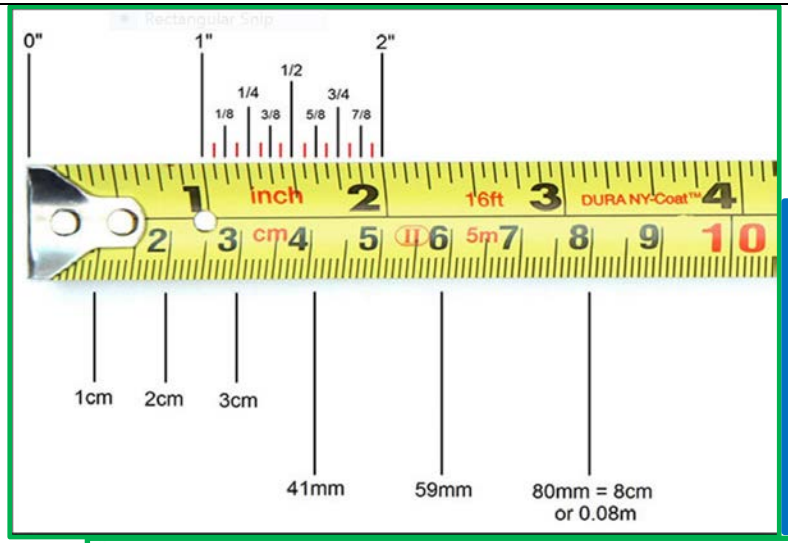
Units of Measure	 **Step 2: Convert the 4 gal left over to 16 qt and add to the 1 qt.** **Step 3:** $5\overline{)17\text{ qt}}$ → 3 qt, 15 **2 qt (left over)**  Mark $1\frac{1}{8}$", add $2\frac{3}{4}$". Hint: Convert both numbers to the same size mark when adding.

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Ratios	What is the ratio of 16 quarts to 5 gallons? **16 qt : 5 gal** Write the ratio. **4 gal : 5 gal** Change to the same units **~~4 gal~~ : 5 ~~gal~~** Cancel identical units **4 : 5** Ratio is now in lowest terms. This could be used to measure 4 cups to 5 cups, or 4 quarts to 5 quarts. 5. Concrete mix is an example of how ratios can show the relationship of more than two quantities. Cement, sand and crushed stone are mixed in the ratio of 1 : 2 : 5 by weight. For every pound of cement used, two pounds of sand and five pounds of crushed rock are used. How much of each component are needed for 4000 pounds of concrete? **1 + 2 + 5 = 8** There are 8 parts to the mix (denominator) **1/8** There is one part of cement in the mix **2/8 or 1/4** There are 2 parts of sand in the mix. **5/8** This is the portion of the ratio that is crushed rock **1/8 x 4000 = 500 lbs cement** **1/4 x 4000 = 1000 lbs sand** **5/8 x 4000 = 2500 lbs crushed rock** **500lbs cement + 1000 lbs sand + 2500lbs crushed rock = 4000 lbs total mixture**

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Fractions and Decimals	 1a. Convert .672 inches to the nearest 1/16-inch. 1b. Convert 7.821 inches to the nearest 1/32-inch. 1c. Convert 1.437 inches to the nearest ¼ inch. 2. Find the fraction ½ way between 5/32 and 3/16. 3a. Change 18.342 feet to feet and inches, to the nearest 1/16 inch. 3b. Change 8 ft. 3 inches to decimal feet. You could also have a day when you need to buy a piece of plywood. You might need five pieces that are thirteen and five eighths of an inch long. How much plywood would you need? You'll be multiplying fractions to get those numbers. (5 x 13 5/8 = ?)

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Reading: Be able to read and understand equipment, materials and chemical instructions, as well as safety data.	

SAFETY ALERT!

A "*DANGER, WARNING or CAUTION*" safety warning will be surrounded by a "SAFETY ALERT BOX". This box is used to designate and emphasize Safety Warnings that must be followed when operating this air compressor. Accompanying the safety warnings are "Signal Words" which designate the degree or level of hazard seriousness. The "Signal Words" used in this manual are as follows:

DANGER: **Indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.**

WARNING: **Indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury.**

CAUTION: **Indicates a potentially hazardous situation which, if not avoided MAY result in minor or moderate injury or damage to the air compressor.**

The symbols set to the left of this paragraph are "Safety Alert Symbols". These symbols are used to call attention to items or procedures that could be dangerous to you or other persons using this equipment.

ALWAYS PROVIDE A COPY OF THIS MANUAL TO ANYONE USING THIS EQUIPMENT. READ ALL INSTRUCTIONS IN THIS MANUAL AND ANY INSTRUCTIONS SUPPLIED BY MANUFACTURERS OF SUPPORTING EQUIPMENT BEFORE OPERATING THIS AIR COMPRESSOR AND ESPECIALLY POINT OUT THE "SAFETY WARNINGS" TO PREVENT THE POSSIBILITY OF PERSONAL INJURY TO THE OPERATOR.

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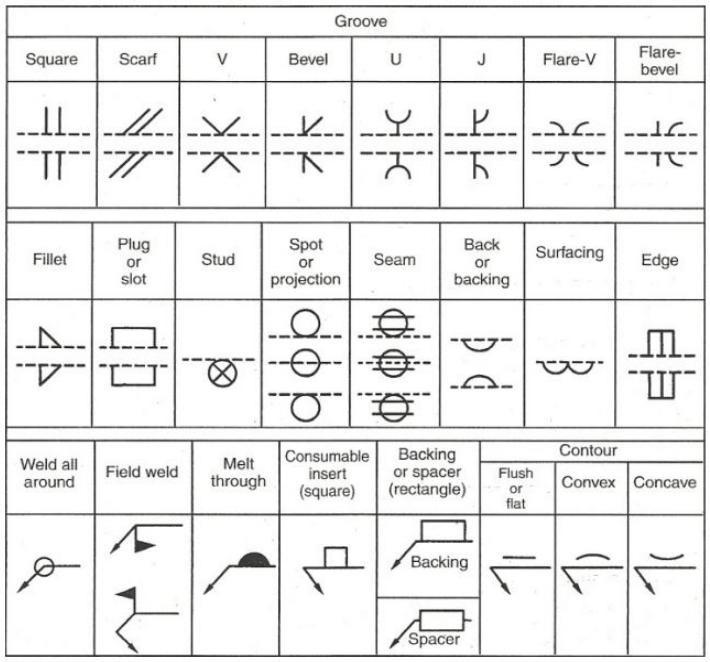
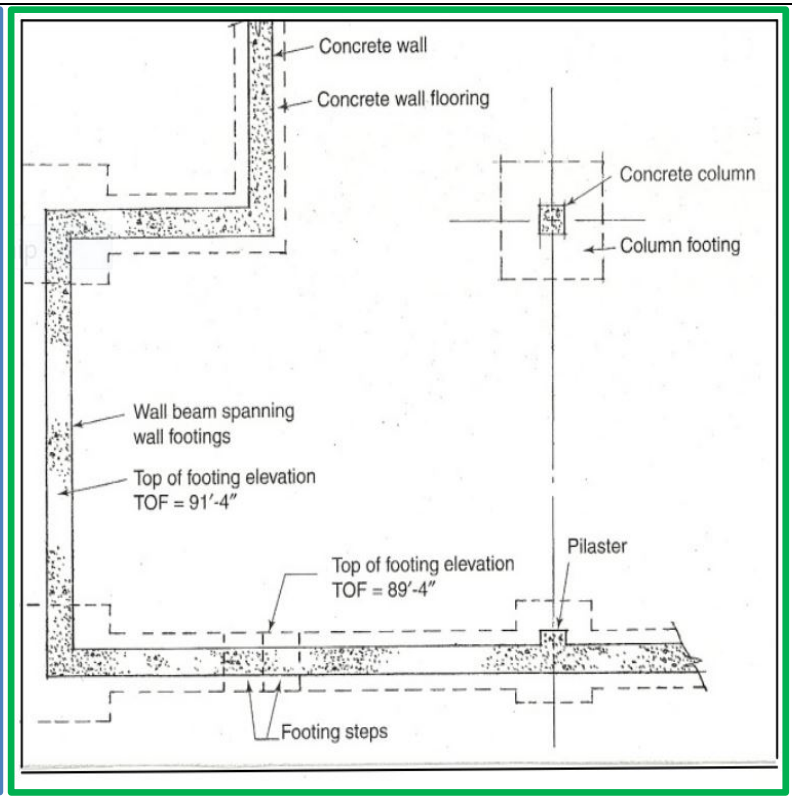
Blueprint Reading Familiarity	 Figure XII.2 Basic Weld Symbols 

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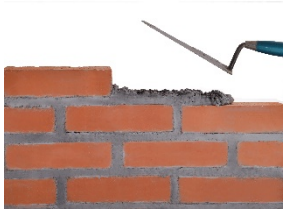
Tools and Equipment	Become familiar with use of various types of tools and equipment you'll encounter in the trade you pursue. Do your research to learn what is being used today. Drills, Hammers, Ladders, Levels, Measuring Tapes, Pliers, Safety Equipment, Saws, Screw Drivers, Shop Vacs, Trowels, Vice Grips, Wrenches, etc. 
Other success inducing skills and characteristics	✓ Communicate professionally: firm handshake, look people in the eye, listen. ✓ Have reliable transportation. ✓ Be on time. No excuse truly matters; plan ahead and plan for contingencies. ✓ Show up ready to work every day with your safety glasses, ear protection, gloves, hardhat, tools, work boots, and attire appropriate for the weather. ✓ Put your cell phone away. ✓ Be able to solve problems, and adapt to change. ✓ Have emotional intelligence to properly manage occasional difficulties; jobsites are fast paced, and challenging for everyone at times.