Math Trades 1
Video #1 - Whole Numbers

Name _____

WHAT DOES STEEL RECTANGULAR TUBING HAVE TO DO WITH MATH?

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Video Link:
https://www.youtube.com/watch?v=oQwluJoYCS8

Summary: In this video, you will need to determine the total amount of tubing (assume the top of the riser will be added later) needed to produce a riser that will be used in a robotic welding enclosure at KI in Green Bay. You will be challenged to understand a two-dimensional figure (blueprint) that represents a three-dimensional object. You will also look at the loss of material from cutting.

Company Information: KI is an international manufacturer of office and institutional furniture. KI has ten different manufacturing plants, with its headquarters located in Green Bay, Wisconsin. Each plant focuses on a different aspect of business. At the Green Bay plant the focus is on chairs, desks and tables. The largest part of what KI-Green Bay produces is for educational markets, in both K-12 and post-secondary settings. In 2012, KI shipped about 876,000 combined units total.

Part 1 (0:00-0:36)

* Play video (0:00-0:16), pause at (0:17) to answer the discussion questions.

* What exactly might the pedestal be used for? What type of item could be made by this welding robot?

* What knowledge and skills should Alex have to be able to accomplish the task given to him by his boss? His boss said that he will need to "fabricate and weld". What does it mean to fabricate something?

- Based on the blueprint Alex is given shown below, what type of material is being used?

|— 17.00 —|

17.00

Top View

|— 17.00 —|
14.00

18.00

1.50
2.00

End View

|— 17.00 —|
13.00

2.00

Side View
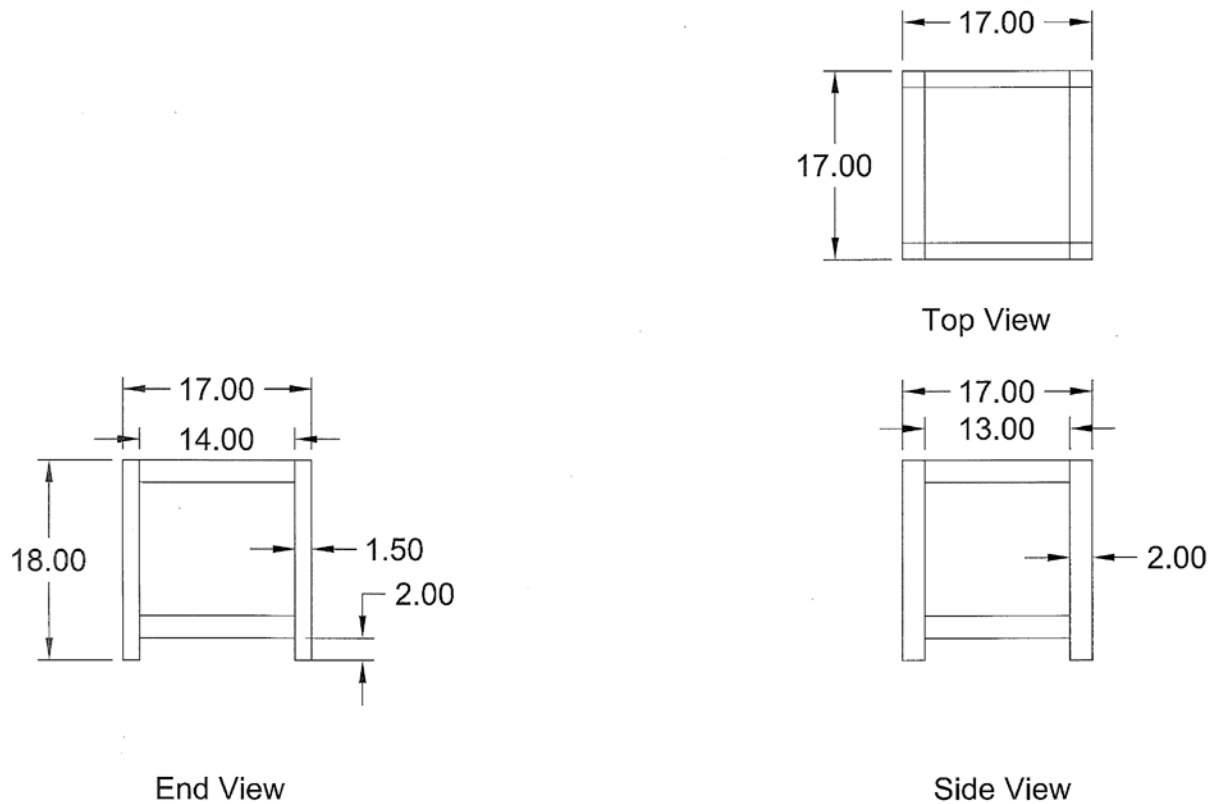
- Play video (0:18-0:31), pause at prompt (0:32-0:36) at "Break 1" to answer the questions below.

- Determine the total length needed for each pedestal

- Earlier in the video, Alex's boss said that four pedestals will be needed for the dolly robot. What is the total number of inches of tubing that will be needed for all four pedestals?

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Part 2 (0:37- 1:16)

- Play video (0:37-1:11), pause at (1:12-1:16) at "Break 2" to verify that you had the correct number of lengths needed, total number of inches of rectangular tubing for each riser, and for all four risers. Then answer the questions below.

- Steel tubing often comes in 20 foot lengths when ordered or pulled from the stock room at a company. Explain in your own words how and why Alex determined that 20 feet is equal to 240 inches.

- How many of these 20 foot lengths will be needed?

Part 3 (1:17-1:44)

- Play video (1:17-1:38), pause at prompt (1:39-1:44) at "Break 3" to discuss as a class who thought you needed three lengths versus four. Then answer the discussion questions below.

- Why do you think the width of saw blades typically are?

- In Alex's example he said, "I wouldn't be able to take two 12 inch pieces out of one 24 inch length of tube because I would come up a little bit short. I would need just over 24 inches to produce the two 12 inch pieces of material." Using his example, if the saw blade cut were to be $\frac{1}{16}$ ", exactly how much material would Alex need to start out with to get two 12 inch pieces?

Part 4 (1:45-2:05)

- Play video (1:45-2:00), pause at prompt (2:01-2:05) at "Break 4" to verify that you have determined that they would need 3 20-foot lengths exactly but realistically need four 20-foot lengths based on earlier discussion.

- Besides factoring in the loss of material due to each cut, for what other reason would it probably not work out to be able to use exactly three 20-foot lengths?

- What implications will there be if not enough material is ordered?

Part 5 (2:06-2:33)

- Play video (2:06-2:33) and then answer the discussion question below

- What additional things were needed to be done to the riser to produce the finished product?