

**Welding  
Material Layout Worksheet**

Name Key

1. Twenty-five sections of pipe are cut into 18-inch lengths. Allow 1/8 inch of waste for each cut. How many standard 21-foot lengths of pipe must be used?

$$21 \text{ ft} \cdot \frac{12 \text{ in}}{1 \text{ ft}} = 252 \text{ inches length of pipe}$$

$$18'' + \frac{1}{8}'' = 18\frac{1}{8}'' \text{ or } 18.125 \text{ length of cut section w/ waste}$$

$$252 \div 18.125 = 13.9 \quad \begin{array}{l} 13 \text{ pieces can} \\ \text{be cut from} \\ 21' \text{ length of pipe} \end{array}$$

Need 2  
pieces of 21'  
pipe

2. Sixteen pieces of 1/2 inch round stock, each 6 inches long, are cut from a bar. How much material is required? Allow 1/8 inch of waste for each cut.

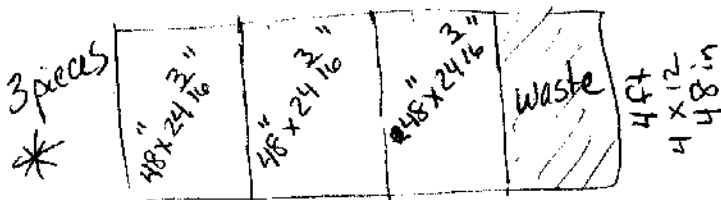
$$6'' + \frac{1}{8}'' = 6\frac{1}{8}'' \text{ or } \frac{49}{8}''$$

$$6\frac{1}{8}'' * 16 = \frac{49}{8}'' * \frac{16}{1} = 98 \text{ inches}$$

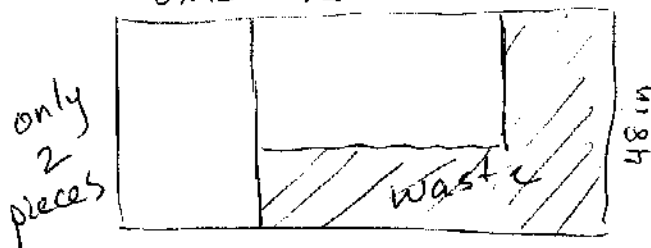
98 inches needed

3. How many 48 inch x 24 inch strips can be sheared from a 4 foot x 8 foot sheet of 15-gage steel? Assume a 3/16 inch kerf allowance.

Determine layout to  
minimize waste



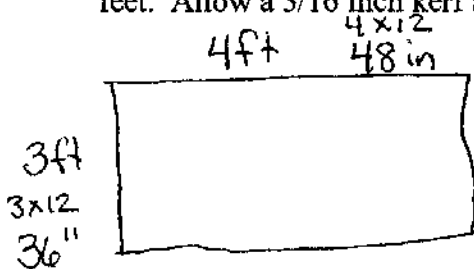
$$8 \text{ ft} \\ 8 \times 12 = 96 \text{ in}$$



$$96' \div \frac{24\frac{3}{16}''}{24.1875} = 3.96$$

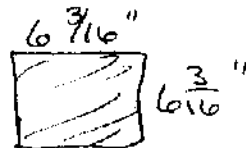
3 pieces

4. How many 6 inch x 6 inch squares can be cut from a  $\frac{3}{4}$  inch metal plate with dimensions of 3 feet x 4 feet. Allow a  $\frac{3}{16}$  inch kerf allowance.



$$6'' + \frac{3}{16} = 6\frac{3}{16}'' \text{ or } 6.1875''$$

Each square with Kerf is



$$48'' \div 6.1875'' = 7.76 \quad 7 \text{ full } \square$$

$$36'' \div 6.1875'' = 5.82 \quad 5 \text{ full } \square$$

$$7 \times 5 = \boxed{35 \text{ squares}}$$

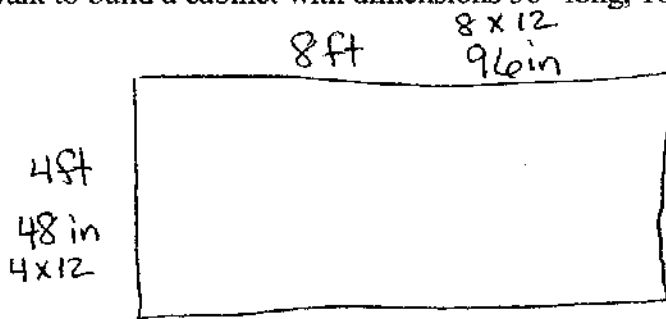
5. You have a 4' x 8' sheet of plywood. You want to build a cabinet with dimensions 36" long, 16" wide, and 36" high. The cut list includes:

2 - 30" x 16" rectangles

2 - 16" x 34.5" rectangles

1 - 16" x 28.5" rectangle

Do you have enough material?



$$2 \times 30 \times 16 = 960$$

$$2 \times 16 \times 34.5 = 1104$$

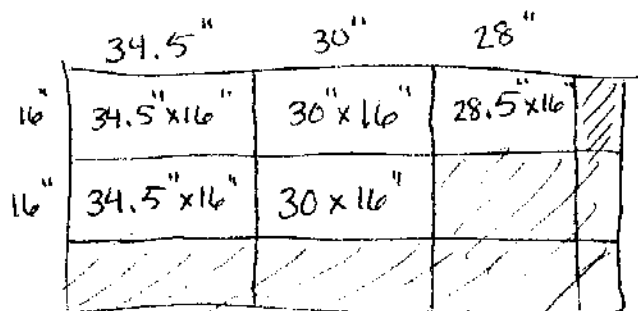
$$1 \times 16 \times 28.5 = 456$$

$$960 + 1104 + 456 = 2520 \text{ in}^2 \text{ needed}$$

$$48 \text{ in} \times 96 \text{ in} = 4608 \text{ in}^2 \text{ available}$$

There should be enough material.

Extension: How would you place the cuts?



EXAMPLE

ANSWERS can Vary.