

scan

Unit 1 Review

Slope and Rate of Change

Calculate Slope

A snowboard jump rises 1.25 m over 5 m of horizontal distance.

$$m = \frac{\text{rise}}{\text{run}}$$

$$m = \frac{1.25 \text{ m}}{5 \text{ m}} \\ = 0.25$$

Calculate Rise or Run

The slope of a staircase is 0.95. If it rises 210 cm, what is the run?

$$m = \frac{\text{rise}}{\text{run}}$$

$$\text{rise} = 210 \text{ cm}$$

$$m = 0.95$$

$$\text{run} = ?$$

$$0.95 = \frac{210 \text{ cm}}{\text{run}}$$

$$\times \text{run} \quad | \quad \times \text{run}$$

$$\frac{\text{run} \times 0.95 = 210}{\div 0.95 \quad | \quad \div 0.95}$$

$$\text{run} = 221.1 \text{ cm}$$

Calculate Rise or Run

The slope of a staircase is 0.95. If it rises 210 cm, what is the run?

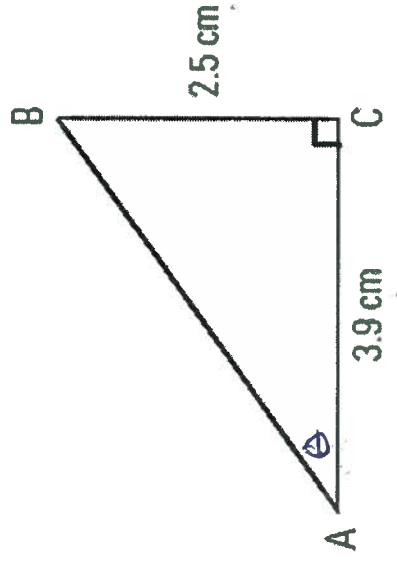
$$\text{slope} = \frac{\text{rise}}{\text{run}}$$

$$0.95 = \frac{210}{\text{run}}$$

$$\frac{\text{run} \times 0.95 = 210}{\div 0.95} \quad \frac{1}{\div 0.95}$$

$$\text{run} = 221.1$$

Calculate Angle of Elevation or Depression



$$\tan A = \frac{\text{opp}}{\text{adj}}$$

$$\text{opp} = 2.5 \text{ cm}$$

$$\text{adj} = 3.9 \text{ cm}$$

$$\angle A = ?$$

~~$$\tan A = \frac{2.5}{3.9}$$
$$\frac{\tan^{-1}}{\tan^{-1}} \left| \frac{\tan^{-1}}{\tan^{-1}} \right.$$~~

$$A = \tan^{-1}\left(\frac{2.5}{3.9}\right)$$

$$A = 32.7^\circ$$

Turn ratios to rise over run (pitch)

- 4:5, what is the rise, what is the run?

4:5

rise:run

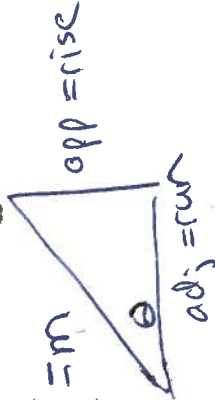
rise = 4

run = 5

Angles to Slope

Akiko works as a ski instructor. He has read that human-triggered avalanches occur most often on slopes with angles of elevation between 35° and 45° .

- a) What are the slopes of these two angles of elevation?

$$\tan A = \frac{\text{opp}}{\text{adj}} = \frac{\text{rise}}{\text{run}} = m$$


$$\tan A = m$$

← slope

$$\tan 35^\circ = 0.7$$

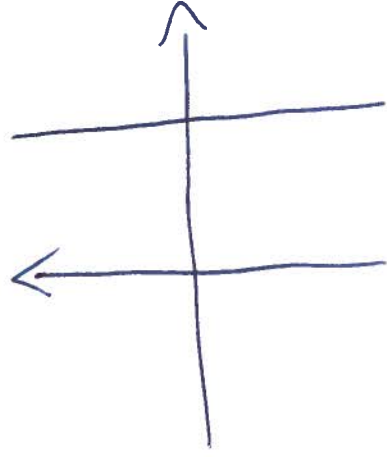
← slope

$$\tan 45^\circ = 1$$

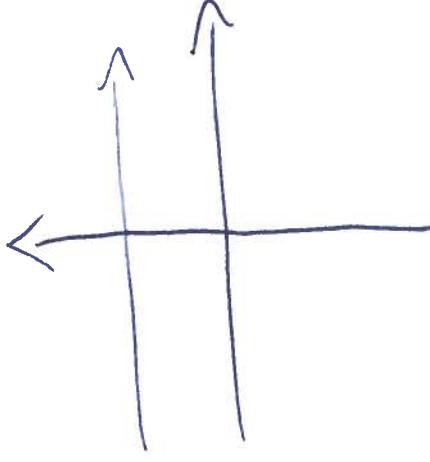
← slope

Types of Slope: undefined, zero, positive, negative

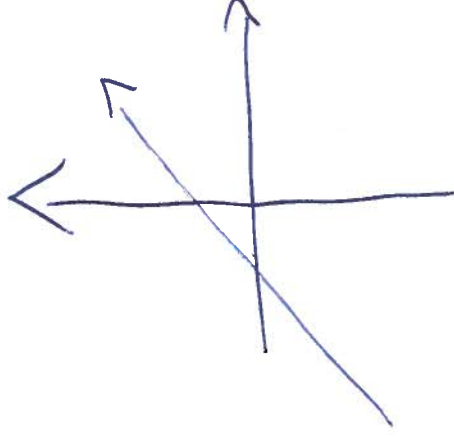
- Sketch each type:



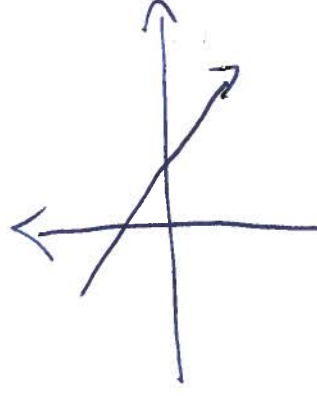
undefined



zero



positive



negative

Calculate Slope using Coordinates

- What is the slope if the coordinates (1, -5) and (4, 10) are on the graph?

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$(1, -5) = (x_1, y_1)$$

$$(4, 10) = (x_2, y_2)$$

$$m = \frac{10 - (-5)}{4 - 1}$$

$$m = \frac{15}{3}$$

$$m = 5$$

Determine Independent and Dependent Variables

- NOTE: Time is almost always independent

Mariya is filling a rectangular swimming pool with water. She knows that the pool will hold about 13 500 gallons of water. After 45 minutes she estimates that there are approximately 2250 gallons of water in the pool.

time : independent
amount of : dependent
water.

Calculate Rate

Mariya is filling a rectangular swimming pool with water. She knows that the pool will hold about 13 500 gallons of water. After 45 minutes she estimates that there are approximately 2250 gallons of water in the pool.

rate = m = slope (how fast is water filling up?)

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad (x_1, y_1) = (45, 2250) \\ (x_2, y_2) = (0, 0)$$

$$m = \frac{0 - 2250 \text{ gal}}{0 - 45 \text{ min}}$$

$$m = \frac{-2250 \text{ gal}}{-45 \text{ min}}$$

$$m = 50 \text{ gal/min}$$

Unit 5 Review

Scale Representations

Solve for x.

$$\text{a) } \frac{3}{8} = \frac{x}{168}$$

$$\times 168 \quad | \quad \cancel{\times 168}$$

$$168 \times \left(\frac{3}{8}\right) = x$$

$$63 = x$$

$$\text{d) } \frac{408}{x} = \frac{4}{9}$$

$$\frac{x}{408} = \frac{4}{9}$$

$$\cancel{\times 408} \quad | \quad \times 408$$

$$x = 408 \times \left(\frac{4}{9}\right)$$

$$x = 181$$

The ratio of the length to the width of a rectangle is 5:3. If the rectangle is 24 cm wide, how long is it?

$$5:3$$

length: width

$\frac{\text{model}}{\text{original}}$

$$\frac{\text{width}}{\text{length}} = \frac{\text{width}}{\text{length}}$$

$$24 \times \frac{5}{3} = L$$

$$40 \text{ cm} = L$$

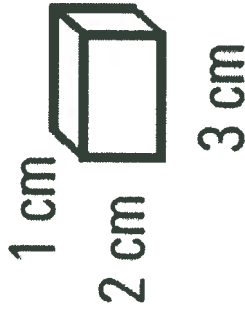
$$\frac{3}{5} = \frac{24 \text{ cm}}{L}$$

$$\frac{5}{3} = \frac{L}{24} \quad \begin{array}{l} \times 24 \\ \hline \end{array}$$

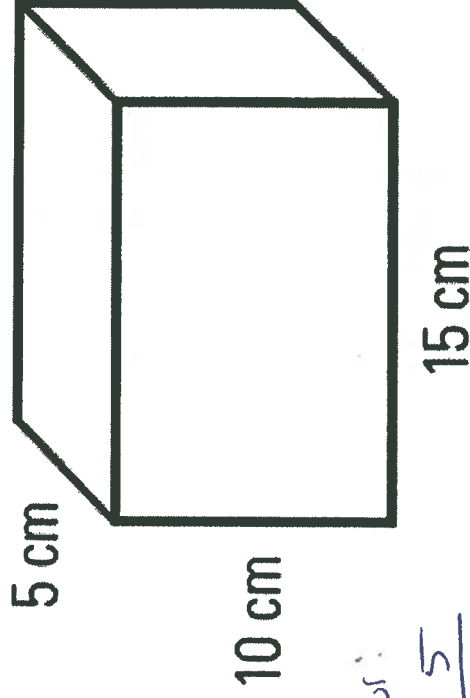
Write scale statement and scale factor

b)

original:



model:



Scale statement:
model : original

$$10 : 2$$

$$10 \div 2 : 2 \div 2$$

$$5 : 1 \leftarrow \begin{array}{l} \text{same} \\ \text{units} \end{array}$$

scale factor:

$$\frac{\text{model}}{\text{original}} = \frac{5}{1}$$

$$= 5$$

On a blueprint, $\frac{1}{4}$ inch is equal to 1 foot.

a) Write this as a scale statement, in the form 1:x.

b) What is the actual length of a room that measures $3\frac{3}{4}$ inches on the blueprint?

a) $1' \times 12 = 12''$

model: original

$\frac{1}{4}'' \div 12''$

$\frac{1}{4} \times 4 = 12 \times 4$

$1 : 48$

b) $\frac{\text{model}}{\text{original}} = \frac{\text{model}}{\text{original}}$

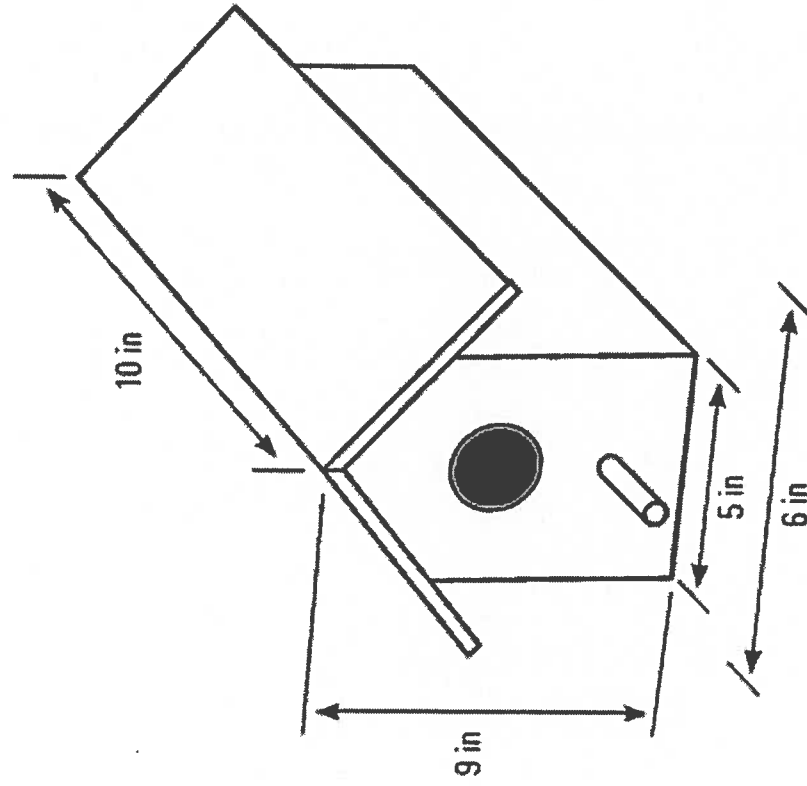
$\frac{1}{48} = \frac{3\frac{3}{4}}{x}$

$\frac{48}{1} = \frac{x}{3\frac{3}{4}} (3.75)$
 $\times 3.75 \mid \times 3.75$

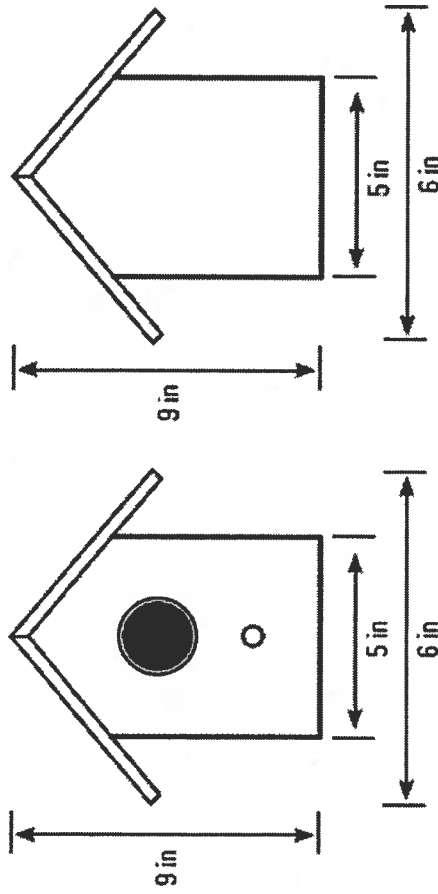
$48 \times 3.75 = x$

$180'' = x$

A simple birdhouse is rectangular in shape with a slanted roof. Draw the view of each face, labelled with the dimensions.

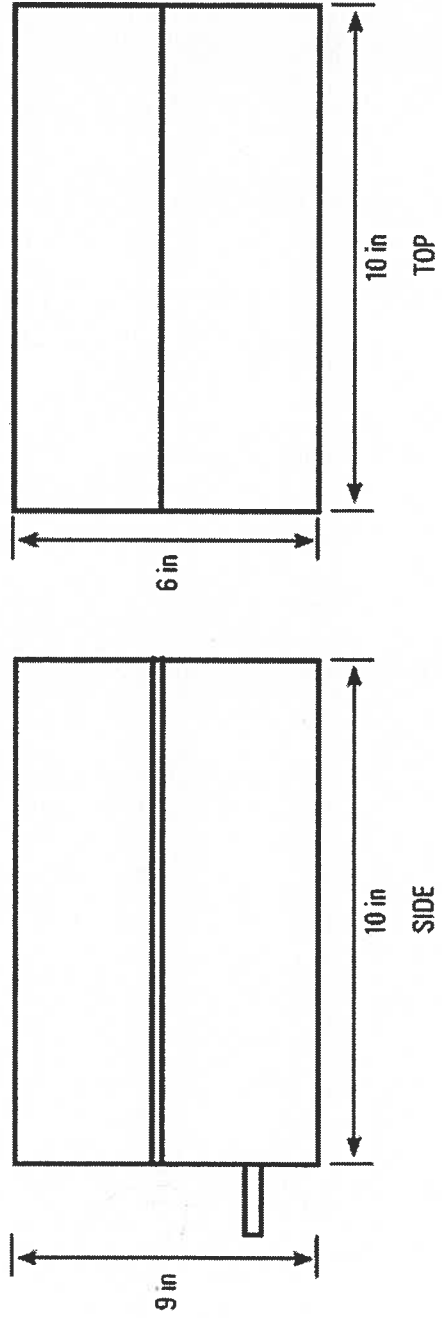


SOLUTION



BACK

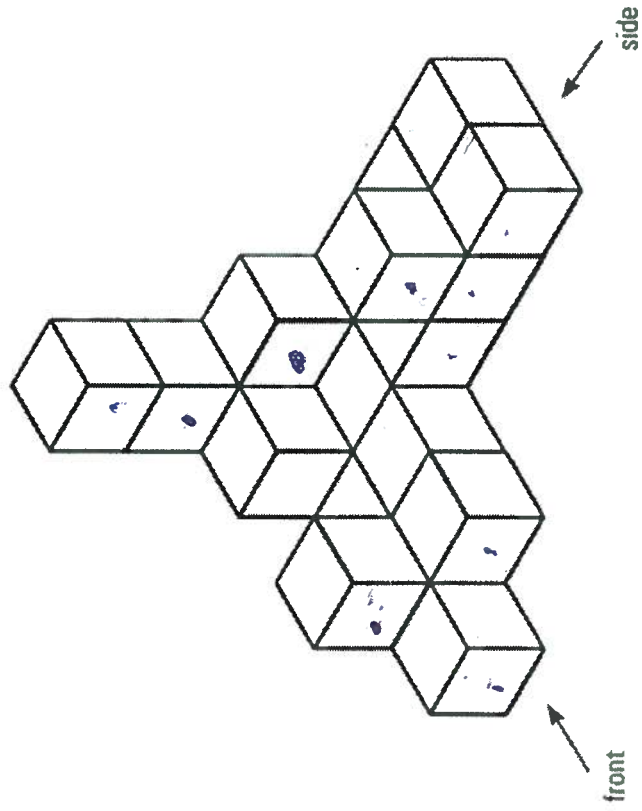
FRONT



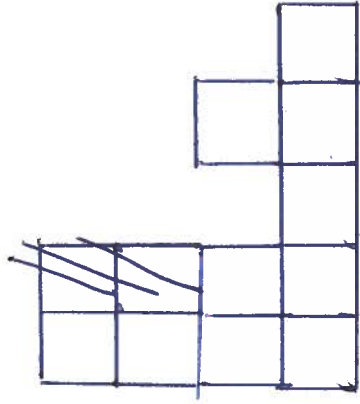
TOP

SIDE

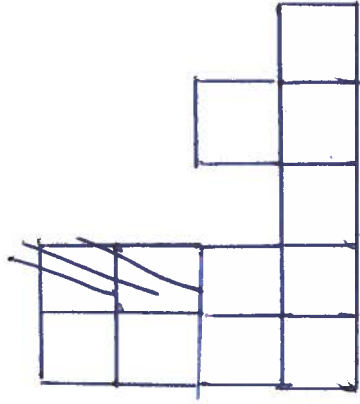
Draw the front view of this set of blocks.



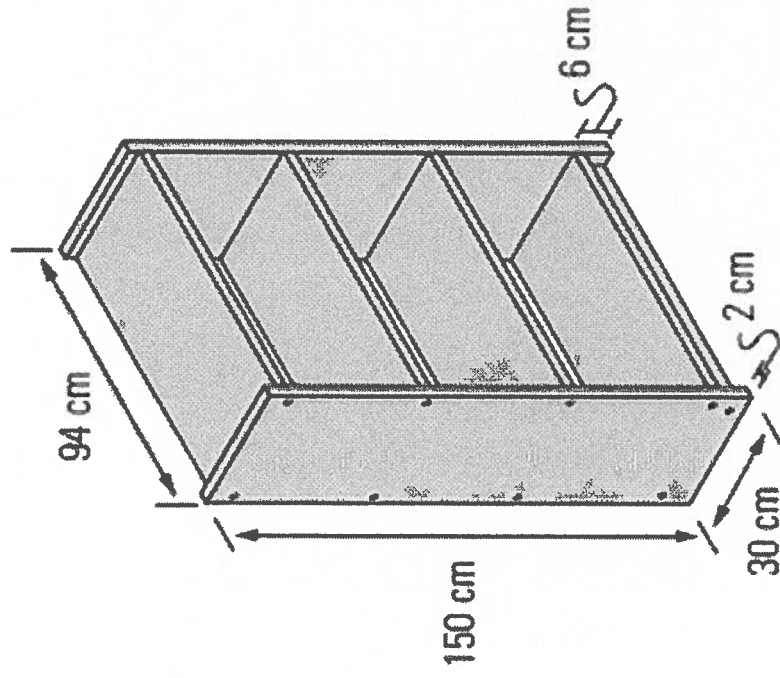
front view

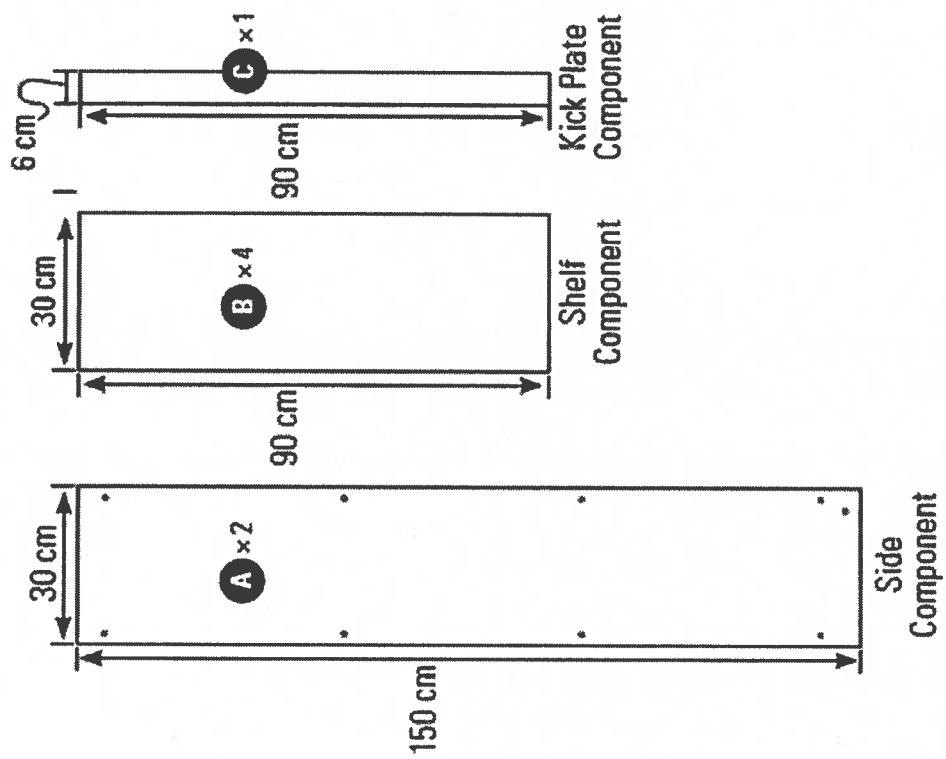


side view



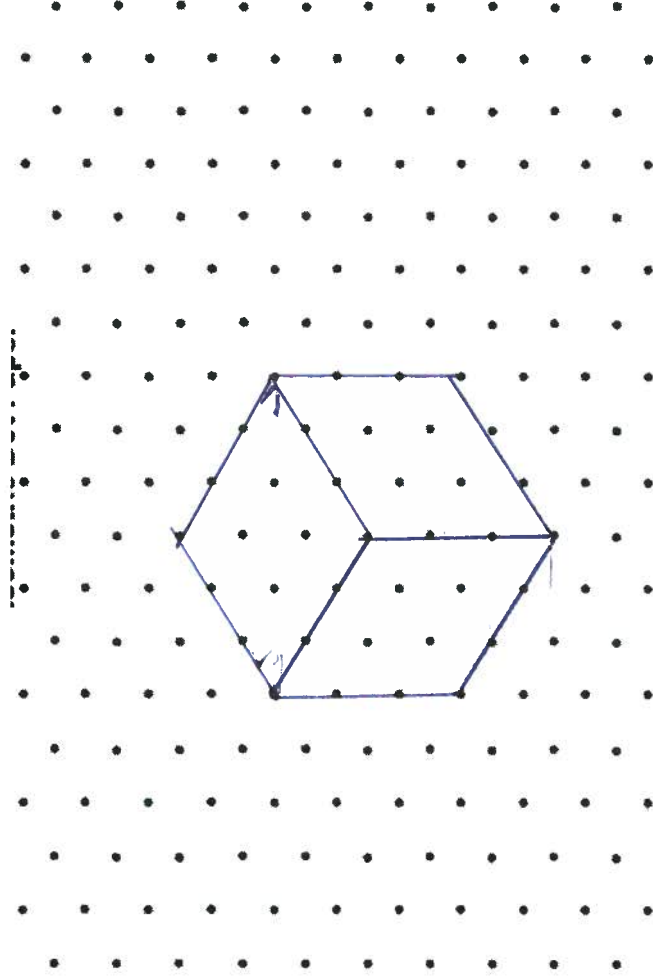
Draw the component parts of this bookcase. Label the dimensions.





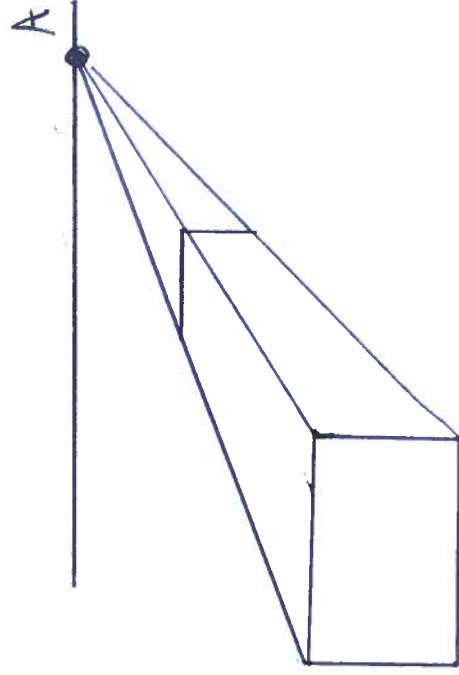
Example 1

Use isometric dot paper to draw a cube with sides that are each 3 units long.



Example 2

Use perspective drawing to create an image of a rectangular prism.



Exploded Diagram

- **Exploded diagram:** a 3-D representation of an object that shows how the components connect together; components are shown separated but in their relative positions
- Viewer can see where all the parts go and how they fit together.
- Parts of an object that are normally hidden in a drawing are visible

