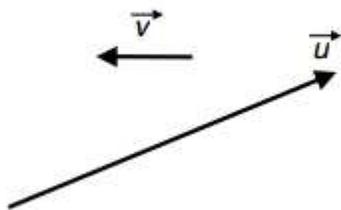


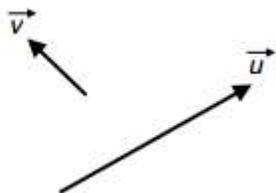
SPRING QUARTER REVIEW

BEGINNERS 05/31/2015

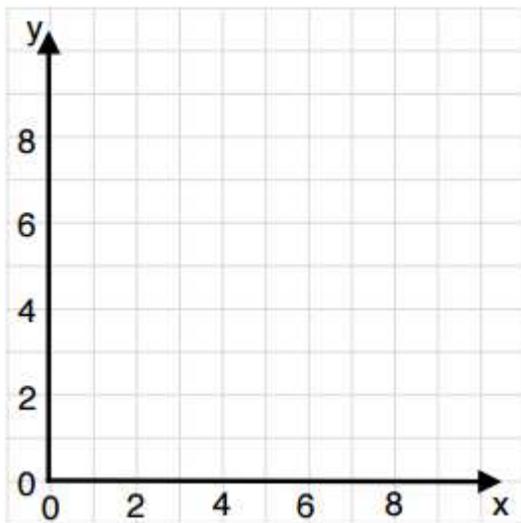
- (1) You are standing on a ship traveling at velocity \vec{u} with respect to the water. You start running with a velocity \vec{v} with respect to the ship. Draw the vector \vec{w} showing your velocity with respect to the water.



- (2) You are walking on a ship with a velocity \vec{v} with respect to the ship and velocity \vec{u} with respect to the water. Draw the vector \vec{w} showing the velocity of the ship with respect to the water.

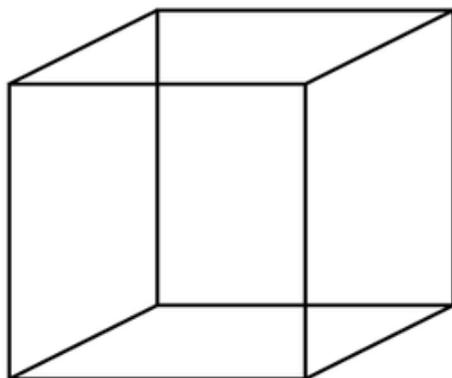
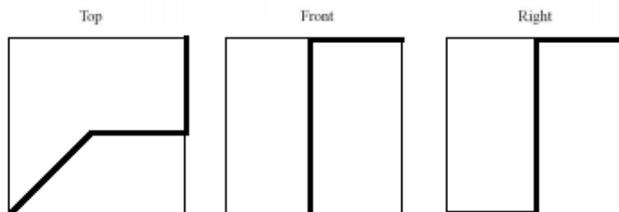


- (3) Use the coordinate plane below to draw the vector equal to the difference of vectors $\langle 7, 4 \rangle - \langle 6, 2 \rangle$.



Find components of this vector in the form $\langle x, y \rangle$?

- (4) The following cube represents an aquarium. Imagine that the darkened line shows the path that a fish takes. If three people look at the aquarium from the top, the front, and the right side respectively, they see that the fish takes the following path. Draw the path that the fish actually takes in the aquarium on the cube below.



- (5) These equations combine numbers, three-dimensional structures, and missing variables. Solve each equation for the missing number. Draw the missing section for each equation.

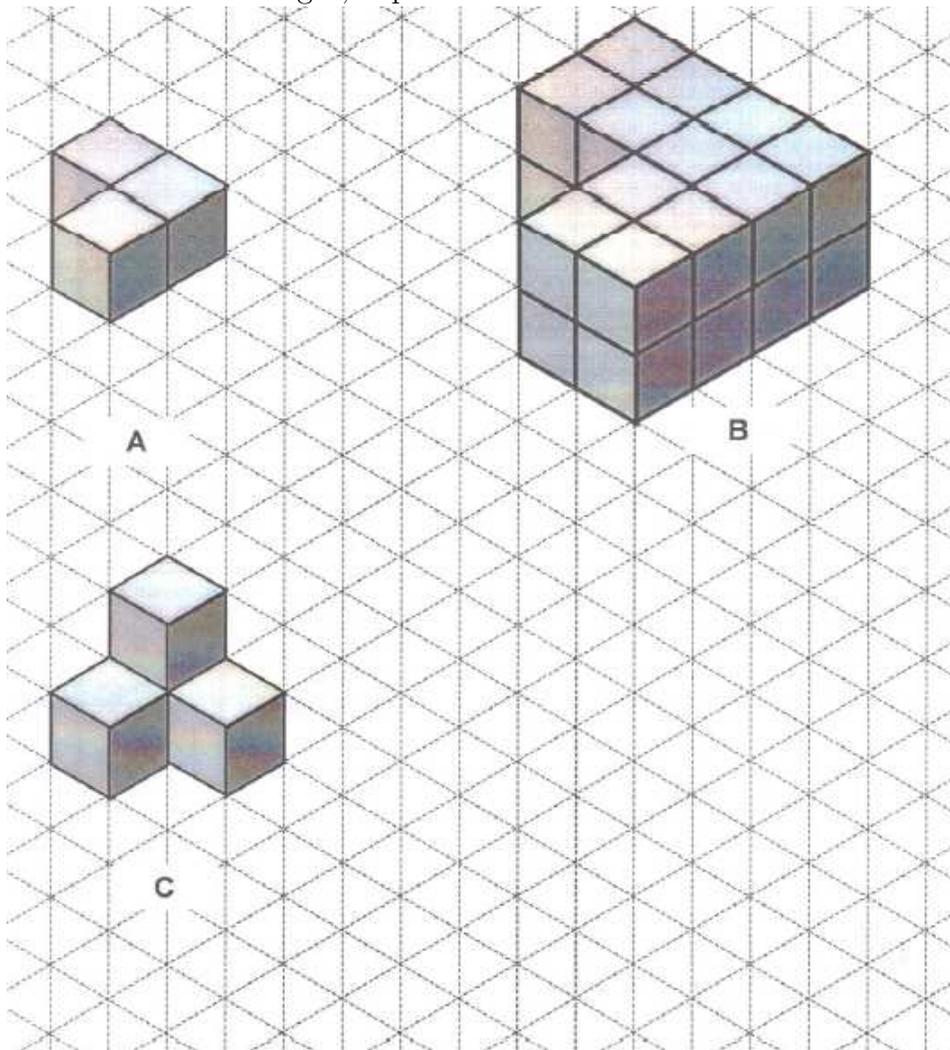
The image shows three math problems on a grid background, each involving 3D structures of cubes. The first problem shows a 2x2x2 cube on the left and a 3x2x2 cube on the right. The second problem shows an L-shaped structure of 7 cubes on the left and a 3x3x3 cube on the right. The third problem shows a 3x3x3 cube on the right and a 3x3x2 structure on the left.

Problem 1: A 2x2x2 cube + x = a 3x2x2 cube
 $x = \underline{\quad}$

Problem 2: An L-shaped structure of 7 cubes + $x = 3^3$
 $x = \underline{\quad}$

Problem 3: x + a 3x3x3 cube = 27
 $x = \underline{\quad}$

- (6) Consider figure *A* and *B*. *B* is a “doubled” version of *A*. *B* has been doubled in all three dimensions: height, depth and width.



- (a) Count the cubes in each model.

$$A = \quad .$$

$$B = \quad .$$

- (b) Consider figure *C*. Draw a doubled version of *C* and label it as *D*. Count the cubes in each model.

$$C = \quad .$$

$$D = \quad .$$

- (c) How is the number of cubes in the larger models related to the number of cubes in the smaller models?

(7) Let l be a straight line going through points A and B .



(a) Find all points P on line l such that $|AP| = 3|BP|$. Draw a picture.

(b) How many such points are there?

(c) For each solution, find the ratio of $|AB|/|BP|$.

(d) For each solution, find n such that $|AB| = n \times |BP|$.

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- (8) Points A , B and C lie on a line l . Find all possible values of $|AC|$ if $|AB| = 7$ and $|BC| = 10$. Draw pictures.

- (9) Let $|AB| = 100\text{mm}$. Let P be a point lying on the line l through A and B such that $3|AP| = 2|BP|$.

(a) Assume P is a point inside of AB . Is P closer to A or to B ? Draw a picture.

(b) Find n such that $|AB| = n \times |BP|$ when P is a point inside of AB .

(c) Find the values of $|AP|$ and $|BP|$ when P is a point inside of AB .