

1. For a science experiment, Quinn's class planted some sunflower seeds in two pots and began to make some observations. They controlled the amount of light that each plant received while making certain to hold other important variables constant (e.g., the amount of water that each plant receives, the amount of nutrients that each plant receives, the soil conditions) in an effort to determine how the amount of sunlight each plant receives affects the height of each plant after various weeks.

Here are some of the class observations.

	Plant A	Plant B
Week 3	5 inches	8 inches
Week 4	7 inches	10 inches

Students were asked: Which plant grew more between weeks 3 and 4?

Student A responded: The plants grew the same about, 2 inches, since $7 - 5 = 2$ and $10 - 8 = 2$.

Student B responded: Plant A grew more. Plant A grew 2 inches between weeks 3 and 4 which is $\frac{2}{5}$ of its height in week 3. Plant B also grew 2 inches but this is $\frac{2}{8}$ of its height in week 3 and $\frac{2}{5}$ is greater than $\frac{2}{8}$ (since the numerators are the same and the denominator is larger in $\frac{2}{8}$, making the parts smaller).

(5 points) What type of thinking is student A displaying and how can you tell?

(5 points) What type of thinking is student B displaying and how can you tell?

2. Proportion problems

- a. (5 points **each** method) On a walk Anne takes 3 steps for every 7 that Rod takes. How many steps has Anne taken when Rod has taken 42 steps? Use **two** methods to solve the problem.

Method 1:

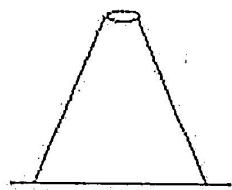
Method 2:

- b. (5 points) Sue and Julie were running equally fast around a track. Sue started first. When Sue had run 9 laps, Julie had run 3 laps. When Julie completed 15 laps, how many laps had Sue run?

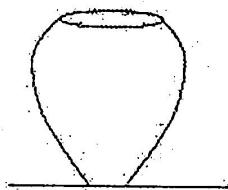
- c. (5 points) Explain why proportional reasoning might not be appropriate to use in the following problem: It took Denise 20 minutes to complete 10 out of 20 problems that were assigned. How long will it take her to complete all 20 problems?

d) (5 points) Six men can build a house in 3 days. Assuming that all of the men work at the same rate, how many men would it take to build the house in 1 day?

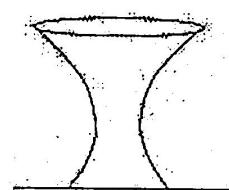
3. (3.3 points each) Water is flowing into each of the bottles at a steady rate. Make a sketch of the graph of the height to the water as a function of time.



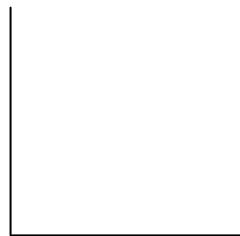
Bottle A



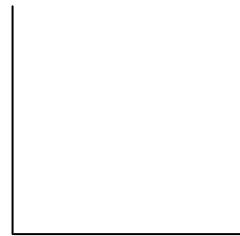
Bottle B



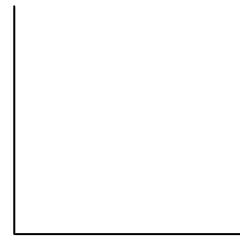
Bottle C



Bottle A



Bottle B



Bottle C

4. (3.3 for each) Complete the table below to show all three representations of each linear function given.

	Table	Equation	Graph														
a.	<table border="1"> <thead> <tr> <th>x</th> <th>y</th> </tr> </thead> <tbody> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> </tbody> </table>	x	y													$y = 5x - 6$	
x	y																
b.	<table border="1"> <thead> <tr> <th>x</th> <th>y</th> </tr> </thead> <tbody> <tr><td>-3</td><td>5</td></tr> <tr><td>-1</td><td>11</td></tr> <tr><td>1</td><td>17</td></tr> <tr><td>3</td><td>23</td></tr> <tr><td>5</td><td>29</td></tr> </tbody> </table>	x	y	-3	5	-1	11	1	17	3	23	5	29				
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5. (5 points each) Answer the following questions regarding $y = mx + b$:

a. What affect does changing the slope to a larger value have on the graph of the line?

b. What affect does making the y-intercept smaller have on the graph in a linear equation?

c. Explain how to find the y-intercept of a linear relationship from an equation, a graph, and a table.

Equation:

Graph:

Table:

d. If you have an equation of a linear function, how can you find the graph?

e. Change the equation $y = -\frac{1}{2}x - 3$ into the slope/x-intercept equation and use your equation to get the x-intercept.

6. (3.3 points each) Linear Algebra Tiles

a. Model how to use Algebra Tiles to solve the following linear equations:

$$-2x + 3 = -7$$

b. Model how to use Algebra Tiles to solve the following linear equations:

$$2x + 5 = x - 3$$

c. Explain the steps you used to solve b.

7. (3.3 points each) Quadratic Algebra Tiles

- a. Model how to use Algebra Tiles to subtract the following quadratic expressions. Also state the difference.

$$(x^2 - 2x + 2) - (-2x^2 + 3x + 4)$$

- b. Model how to use Algebra Tiles to multiply the following binomials. Also state the product.

$$(x + 3)(3x - 2)$$

- c. Model how to solve $(x - 2)^2$ using Algebra Tiles. Also state the solution.