

## Assessments/Higher Order Level Thinking

### PRE-PRE-ALGEBRA

Average Lifespans of Animals			
Animal	Lifespan (yr)	Animal	Lifespan (yr)
Black Bear	18	Guinea Pig	4
Dog	12	Puma	?
Giraffe	10	Tiger	16
Gray Squirrel	10	Zebra	?

1. The lifespan of a black bear is 3 years longer than the lifespan of a zebra.

Write an addition equation that you could use to find the lifespan of a zebra.

2. Solve your equation.

$$z = \text{zebra}$$

$$z + 3 = \text{bear}$$

total 18

$$z + 3 = 18$$

$$z = 15$$

### PRE-ALGEBRA

Write each decimal as a fraction, a power of 10, and a negative exponent.

$$0.01 = \frac{1}{100} = \frac{1}{10^2} = 10^{-2}$$

$$0.00000001 = \frac{1}{100000000} = \frac{1}{10^8} = 10^{-8}$$

$$0.0001 = \frac{1}{10,000} = \frac{1}{10^4} = 10^{-4}$$

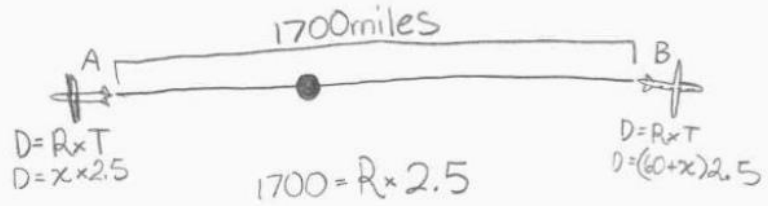
ALGEBRA 1

BONUS!!

$D = R \times T$

s: Remember Distance = Rate x Time

Two airplanes leave Phoenix at the same time and fly in opposite directions. One plane travels 60 miles per hour faster than the other. After  $2\frac{1}{2}$  hours they are 1700 miles apart. What is the rate of the slower plane?



$1700 = R \times 2.5$

$$\begin{array}{r} 680 \\ 2.5 \overline{) 17000} \\ \underline{-1500} \phantom{0} \\ 200 \phantom{0} \\ \underline{-200} \\ 000 \end{array}$$

$$\begin{array}{r} 310 \\ + 60 \\ \hline 370 \end{array}$$

$$\begin{array}{r} 680 \\ - 60 \\ \hline 620 \end{array} \quad 2 \overline{) 620}$$

The rate of the slower plane: 310 m/h

# GEOMETRY

<b>LAW OF SYLLOGISM</b>	<p>Allows you to draw a conclusion from _____ conditional statements in which the _____ of the first statement is the _____ of the second statement.</p> <p>Symbolic Map: <span style="border: 1px solid black; border-radius: 15px; display: inline-block; width: 60px; height: 40px; vertical-align: middle;"></span></p>
<p><b>Directions:</b> Use the Law of Syllogism to give a valid conclusion. If not possible, write <i>no valid conclusion</i>.</p>	
<p><b>6. Given:</b> If it is Saturday, then Jake has a baseball tournament. If Jake has a baseball tournament, then he will need to pack his lunch.</p> <p><b>Conclusion:</b> _____ _____</p>	
<p><b>7. Given:</b> If a number is divisible by 12, then it is divisible by 6. If a number is divisible by 6, then it is divisible by 3.</p> <p><b>Conclusion:</b> _____ _____</p>	
<p><b>8. Given:</b> If a quadrilateral is a square, then it is a rectangle. If a quadrilateral is a rectangle, then it has four right angles.</p> <p><b>Conclusion:</b> _____ _____</p>	
<p><b>9. Given:</b> If it is sunny this weekend, then you will go boating. If it is sunny this weekend, then you will wear shorts.</p> <p><b>Conclusion:</b> _____ _____</p>	
<p><b>10. Given:</b> If you shop at Target, then you will use your Target Red Card. If you do not use your Target Red Card, then you will not get 5% off.</p> <p><b>Conclusion:</b> _____ _____</p>	
<p><b>11. Given:</b> If it snows, then school will be canceled. If school is canceled, then students will need to make-up a day of school.</p> <p><b>Conclusion:</b> _____ _____</p>	

© Gina Wilson (All Things Algebra®, LLC), 2014-2020

# ALGEBRA 2

Using the given graph, make a guess as to how to graph this functions, which is called a "Piecewise Function."

Graph  $f(x) = \begin{cases} -x+3 & x \leq 4 \\ x-5 & x > 4 \end{cases}$

PRE-CALCULUS

11. (8 points) A bread company has four different bakeries, each of which produces three types of bread: white, rye, and whole wheat. The number of loaves of bread produced daily at each bakery is shown in the table. Put this matrix in your calculator. You can call this matrix A.

	Bakery A	Bakery B	Bakery C	Bakery D
White	180	200	250	100
Rye	50	75	100	50
Whole Wheat	200	250	300	175

bread  
↑  
3x4 → Production  
1x3 or 3x1

Profit on each loaf of bread is \$0.70 for white, \$0.45 for rye and \$0.50 for whole wheat. Write an appropriate size matrix for these 3 numbers. Label columns and rows with words. You can call this matrix B.

Using matrices (SHOW THE ORDER YOU ARE MULTPLYING THEM – is it A\*B or B\*A), find the amount of profit the company received from each bakery. Write your answer as a matrix and use words for the columns and rows.

Price [0.70 0.45 0.50] leaves of bread  
Answer: Profit [248.5 298.75 370 180] BAKERY  
1x4

CALCULUS

Assume that f(x) and g(x) are differentiable functions and have the values given in the table. Remember to take the derivative first – then on the second line, substitute the number in. Don't do both at the same time! SHOW WORK! (4 points each part)

x	f(x)	g(x)	f'(x)	g'(x)
-2	3	1	-5	8
-1	-9	7	4	1
0	5	9	9	-3
1	3	-3	2	6
2	-5	3	8	0

- a) Let  $h(x) = (g(x)) \sin(x)$ . What is  $h'(0)$ ?

$h'(x) = (g'(x))(\cos(x)) + (\sin(x))(g'(x))$   
 $h'(0) = (g'(0))(\cos(0)) + (\sin(0))(g'(0))$   
 $= 9(1) + 0(5) = 9$

- b) Let  $j(x) = (f(x) + x^2)^2$ . What is  $j'(1)$ ?

$j'(x) = 2(f(x) + x^2)(f'(x) + 2x)$   
 $j'(1) = 2(f(1) + 1^2)(f'(1) + 2)$   
 $= 2(3 + 1)(2 + 2) = 16$

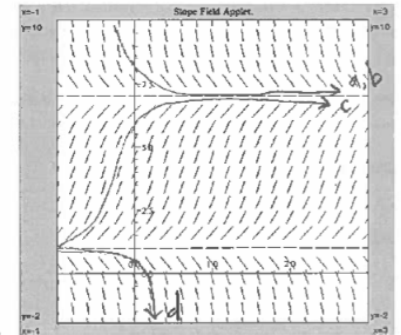
- c) Let  $l(x) = f(g(x))$ . What is  $l'(-2)$ ?

$l'(x) = f'(g(x))(g'(x))$   
 $l'(-2) = f'(g(-2))(g'(-2))$   
 $= f'(1)(8) = 16$

(20 points – 5 points each) Assume that the rate of population growth of paramecia is given by the equation:

$\frac{dP}{dt} = (P-1)(7-P)$ , where P (y-axis) is measured in thousands. There are equilibrium solutions at P = 1 and P = 7. The x-axis represents time in days.

For each, sketch the solution curve based on the initial condition given. Then, by observing the curve, answer the given question. Pay close attention to the question – is it asking about  $\frac{dP}{dt}$  or the actual population (P).



- a) If  $P(0) = 8$ , what happens to  $\frac{dP}{dt}$  as  $t$  gets very large?  
 $\frac{dP}{dt}$  approaches 0

- b) If  $P(0) = 8$ , what happens to P as  $t$  gets very large?  
 P approaches 7

- c) If  $P(0) = 6$ , what happens to P as  $t$  gets very large?  
 P approaches 7

- d) If  $P(0) = 0.5$ , what happens to P as  $t$  gets very large?  
 P = 0