Day 12

Geometric Sequences

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CW/HW Finish Pg. 21 & 22, Pg. 23 #7-9

Skills Check on Exponents and Equations

Warm Up

Tell whether each set of ordered pairs satisfies an exponential function. Explain your answer.

1. $\{(0, 0), (1, -2), (2, -16), (3, -54)\}$ No, x increase by 1 but no common multiplier in the y's.

2. $\{(0, -5), (1, -2.5), (2, -1.25), (3, -0.625)\}$

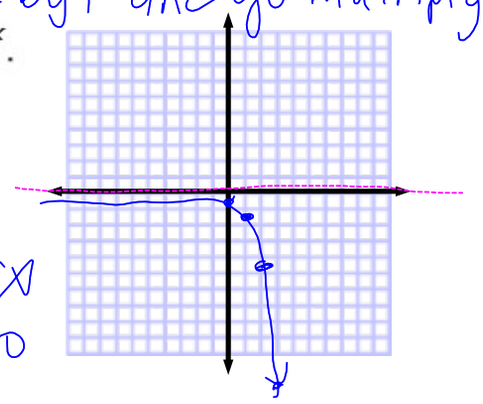
yes, x inc. by 1 and y's multiply by $\frac{1}{2}$.

3. Graph $y = -0.5(3)^x$.

y-intercept

reflects over x

asympt: y=0



0	-.5
1	-1.5
2	-4.5
3	-13.5

4. The function $y = 11.6(1.009)^x$ models residential energy consumption in quadrillion Btu where x is the number of years after 2003. What will residential energy consumption be in 2013?

$y = 11.6(1.009)^{10}$

12.7 Quadrillion Btu

Pg. 21

Main Ideas/Questions	Notes	
Geometric Sequences	Each term is found by multiplying the previous term by a constant.	
Common Ratio (r)	To find the common ratio, divide the second term by the first term.	
Identifying a Geometric Sequence $a_n = a_{n-1} \cdot r$ recursive	**Determine whether the following represent geometric sequences. If yes, identify the common ratio.**	
	1. 2, 10, 50, 250, ... Geometric $\frac{10}{2} = \frac{50}{10} = \frac{250}{50} = 5$	**2.** 135, 45, 15, 5, .. Geometric $\frac{45}{135} = \frac{15}{45} = \frac{5}{15} = \frac{1}{3}$
	3. 6, 18, 24, 30, ... not geom. $\frac{18}{6} \neq \frac{24}{18} \neq \frac{30}{24}$	**4.** 7, -14, 28, -56, .. Geometric $\frac{-14}{7} = \frac{28}{-14} = \frac{-56}{28} = -2$
	5. 80, -40, 20, -10, .. Geometric $r = -\frac{1}{2}$	**6.** -9, -36, -144, -576, ... Geometric $r = 4$

Continuing Geometric Sequences	Given the geometric sequence, find the next three terms.	
	7. 7, -21, 63, -189, 567, -1701	$r = -3$
	8. 3072, 768, 192, 48, 12, 3	$r = \frac{1}{4}$
	9. 8, 4, 2, 1, $\frac{1}{2}$, $\frac{1}{4}$	$r = \frac{1}{2}$
	10. -5, -25, -125, -625, -3125, -15625	$r = 5$

Geometric Sequence Formula	The nth term of a geometric sequence can be found using the following formula: $a_n = a_1 \cdot r^{n-1}$ explicit	
Examples	Write the rule for the nth term, then find a_7.	
	11. 3, 9, 27, ... $a_1 = 3, r = 3$ $a_n = 3 \cdot 3^{n-1}$ $a_7 = 3 \cdot 3^{7-1}$ $3 \cdot 3^6$ $3 \cdot 729$ $a_7 = 2{,}187$	**12.** -4, 20, -100, ... $a_1 = -4$ $r = -5$ $a_n = -4 \cdot (-5)^{n-1}$ $a_7 = -4 \cdot (-5)^{7-1}$ $a_7 = -62{,}500$