Warm Up 3/27/19

1. A line, y=mx + b passes through the point (1,6) and is parallel to y=4x + 6. What is the value of b?

$m=4$

$$y-6=4(x-1)$$
$$y-6=4x-4$$
$$+6 \qquad +6$$
$$y=4x+2$$

$$\boxed{2}$$

2. Find the y- intercept of: $y= 3x^2 + 12x - 5$

$$y=3(0)^2+12(0)-5$$
$$0+0-5$$
$$\boxed{(0,-5)}$$

3. What is the smallest of 3 consecutive positive integers if the product of the smaller two integer is 8 less than 8 times the largest integer?

mult

=

x

$x+1$

$x+2$

$$x(x+1)=8(x+2)-8$$
$$x^2+x=8x+16-8$$
$$x^2+x=8x+8$$
$$-8x \quad -8x-8$$
$$x^2-7x-8=0$$

$ac=-8$

$-8 \mid 1$

$$(x^2-8x)(+x-8)$$
$$x(x-8)1(x-8)$$
$$\boxed{(x+1)(x-8)}$$

Geometric Sequences

Main Ideas/Questions	Notes
Geometric Sequences	A sequence of numbers in which the ratio remains the same
Common Ratio	Dividing a term by the previous term
Identifying a Geometric Sequence	**Determine whether the following represent geometric sequences. If yes, identify the common ratio.** **1.** 2, 10, 50, 250, ... yes $r=5$ **2.** 135, 45, 15, 5, ... yes $r=1/3$ **3.** 6, 18, 24, 30, ... NO **4.** 7, -14, 28, -56, ... yes $r=-2$ **5.** 80, -40, 20, -10, ... yes $r=-1/2$ **6.** -9, -36, -144, -576, ... yes $r=4$
Continuing Geometric Sequences	**Given the geometric sequence, find the next three terms.** **7.** 7, -21, 63, -189, 567, -1701 **8.** 3072, 768, 192, 48, 12, 3 **9.** 8, 4, 2, 1, 1/2, 1/4 **10.** -5, -25, -125, -625, -3125, -15625

Geometric Sequence Formula	The n^{th} term of a geometric sequence can be found using the following formula: $a_n = a_1 \cdot r^{n-1}$ a_n = value of n^{th} term $a_1 = 1^{st}$ term	
Examples Write the rule for the nth term, then find a_7.	**11.** 3, 9, 27, ... $a_n = 3 \cdot 3^{n-1}$ $a_7 = 3 \cdot 3^{7-1}$ $3 \cdot 3^6$ $\boxed{2187}$	**12.** -4, 20, -100, ... $a_n = -4 \cdot -5^{n-1}$ $a_7 = -4 \cdot -5^{7-1}$ $= -4 \cdot -5^6$ $\boxed{-62,500}$

13. 400, 200, 100, ...	**14.** 1, 5, 25, ...
15. -1, -4, -16, ... $a_n = -1 \cdot 4^{n-1}$ $a_7 = -1 \cdot 4^{6}$ $\boxed{-4096}$	**16.** 729, -243, 81, ... $a_n = 729 \cdot -\frac{1}{3}^{n-1}$ $a_{12} = 729 \cdot -\frac{1}{3}^{11}$ $-\frac{1}{243}$ $= -0.0041152263$
17. 6, -12, 24, ... $a_n = 6 \cdot -2^{n-1}$ $a_7 = 6 \cdot -2^{6}$ $\boxed{384}$	**18.** 8, 12, 18, ... $a_n = 8 \cdot \frac{3}{2}^{n-1}$ $a_{10} = 8 \cdot \frac{3}{2}^{9}$ 307.546875

Real Life Application	The table to the left shows a car's value for 3 years after it is purchased.

Year	Value ($)
1	10,000
2	8,000
3	6,400

The table to the left shows a car's value for 3 years after it is purchased.

19. Write a rule to represent the car's depreciation.

value goes down

$a_1 = 10{,}000 \quad r = 4/5$

$\boxed{a_n = 10{,}000 \cdot 4/5^{\,n-1}}$

20. What will be the value of the car after 10 years?

$a_{10} = 10{,}000 \cdot \frac{4}{5}^{9}$

$\$1342.18$

Exponential Decay

<u>RECURSIVE FORMULA</u>

$$a_n = a_{n-1} * r$$

a_n = n^{th} term

a_{n-1} = previous term

r= common ratio

$-9(3)$ $-27(3)$

$-3(3)$

5 $a_n = a_{n-1}(3)$ $a_1 = -1$

$-1(3)$

$-1, -3, -9, -27, -81$

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6 $a_n = a_{n-1}\left(\frac{1}{4}\right)$ $a_1 = 216$

$216, 54, \frac{27}{2}, \frac{27}{8}, \frac{27}{32}$

$13.5, 3.375, 0.8437$