Friday 1/31

Simplify the following.

1. $3x + 4y + 5 + 12x - 27y$

2. $4(y - x) + 6y$

Name: Key Date: _____ Period: _____

Exponential Functions Quiz

1. Identify the parts of an exponential function.

$y = a(b)^x$

a = initial value b = common Ratio

2. Identify the asymptote and y-intercept.

Given: $y = (4)^x - 3$ Y-intercept: $(0, -2)$ Asymptote: $y = -3$

3. Graph and identify the y-intercept, asymptote, and state the domain and range.

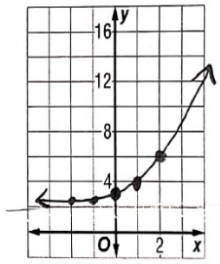
$y = (2)^x + 2$

Y-intercept: $(0, 3)$

Asymptote: $y = 2$

Domain: $-\infty < x < \infty$

Range: $y > 2$



X	Y
-2	
-1	5/2
0	3
1	4
2	6

Geometric Sequences

Recall: arithmetic sequences

0, 8, 16, 24, 32, ...

+8 +8 +8 +8

common difference

$d = 8$

Find the pattern.

1) 1, 3, 9, 27, ... (×3 ×3 ×3)

2) 4, 6, 8, 10, ... (+2 +2 +2)

Geometric Sequence

- Has a common ratio (r)
  - (* / ÷)
- Formula is : $a_n = a_1(r)^{n-1}$

  where a_1 is the first term and r is the common ratio.

Arithmetic Sequence

- Has a common difference (d)
  - (+ / -)
- Formula is : $a_n = a_1 + d(n-1)$

  where a_1 is the first term and d is the common difference.

The common ration can be found by dividing any term by its previous term.

$r = \frac{\text{New}}{\text{Old}}$

64, 48, 36, 27, ...

↑ previous

$r = \frac{48}{64} = \boxed{\frac{3}{4}}$

Determine whether each sequence is arithmetic, geometric, or neither.

1) 2, 8, 14, 22, ...

+6 +6 +8

$\frac{14}{8} = \frac{7}{4}$ $\frac{22}{14} = \frac{11}{7}$ Neither

2) -20, -15, -10, ...

+5 +5

Arithmetic

3) 1, 3, 9, 27, ...

x3 x3 x3

Geometric

Write the formula for each geometric sequence and find the next three terms.

$a_n = a_1(r)^{n-1}$

1) 100, 50, 25, ...

① ② ③

$\times\frac{1}{2}$ $\times\frac{1}{2}$

$r = \frac{1}{2}$ $a_1 = 100$

$a_n = 100\left(\frac{1}{2}\right)^{n-1}$

$a_4 = 100\left(\frac{1}{2}\right)^{4-1}$

$a_4 = 100\left(\frac{1}{2}\right)^3$

$a_4 = 12.5$

$a_5 = 100\left(\frac{1}{2}\right)^{5-1}$

$a_5 = 6.25$

$a_6 = 100\left(\frac{1}{2}\right)^{6-1}$

$a_6 = 3.125$

$\{12.5, 6.25, 3.125\}$

2) -7, 21, -63, ...

$\times -3$ $\times -3$

$r = -3$

$a_1 = -7$

$a_n = -7(-3)^{n-1}$

$a_4 = -7(-3)^{4-1}$

$a_4 = 189$

$a_5 = -7(-3)^{5-1}$

$a_5 = -567$

$a_6 = -7(-3)^{6-1}$

$a_6 = 1701$

$\{189, -567, 1701\}$

Write the nth term of the geometric sequence, then find the desired term.

1) $-6, -24, -96, \ldots$

$\times 4 \quad \times 4$

$a_1 = -6$

$r = 4$

$a_n = -6(4)^{n-1}$

$n = 5$

Find the 5th term.

$a_5 = -6(4)^{n-1}$

$a_5 = -1536$

2) $72, 48, 32, \ldots$

$\times \frac{2}{3} \quad \times \frac{2}{3}$

$\frac{48}{72} = \frac{2}{3}$

$a_n = 72\left(\frac{2}{3}\right)^{n-1}$

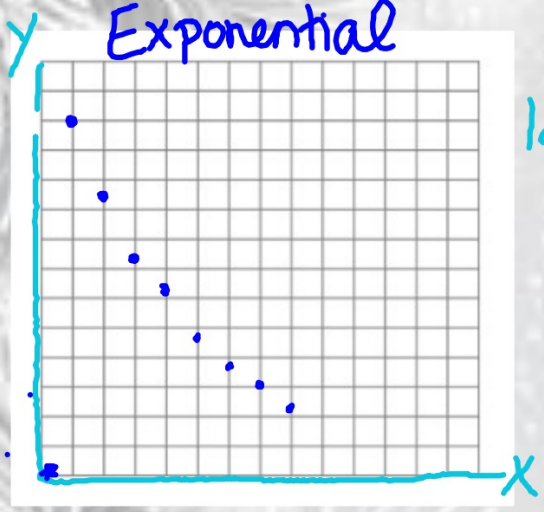
Find the 10th term.

$a_{10} = 72\left(\frac{2}{3}\right)^{10-1}$

$a_{10} = 1.87289$

$a_{10} = 1.87$

A tennis ball is dropped from a height of 12 ft. Each time the ball bounces back to 80% of the height from which it fell. Draw a graph to represent the height of the ball after each bounce.



12, 9.6, 7.68, 6.14, 4.92

Sequences, we do not connect the graph.

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