Algebra 1 Spring District Final Exam REVIEW Answer key
Free Response

1. Dylan has 31 marbles. Some are red and some are white. The number of red marbles is three more than six times the number of the white marbles.

(a) Define variables for the given situation.

Let r=#of red marbles

w=# of white marbles

(b) Write a system of linear equations to represent the situation using the variables from part (a) above.

r+w=31

r=6w+3

(c) Solve the system of linear equations written in part (b) above.

(4,27)

(d) How many red marbles does Dylan have? How many white marbles does Dylan have?

Dylan has 27 red marbles and 4 white marbles

2. Tia and Ken each sold snack bars and magazine subscriptions for a school fund-raiser, as shown in the table. Tia earned $132 and Ken earned $190.

Item	Number Sold	
	Tia	Ken
snack bars	16	20
magazine subscriptions	4	6

(a) Define variables for the given situation.

Let s=cost of a snack bar

m=cost of a magazine subscription

(b) Write a system of linear equations to represent the situation using the variables from part (a) above.

16s+4m=132

20s + 6m=190

(c) Solve the system of linear equations written in part (b) above.

(25,2)

(d) How much does a snack bar cost? How much does a magazine subscription cost?

A snack bar costs $2 and a magazine subscription costs $25.

3. Given the exponential function $f(x) = 4^{-x} - 5$, answer the following.

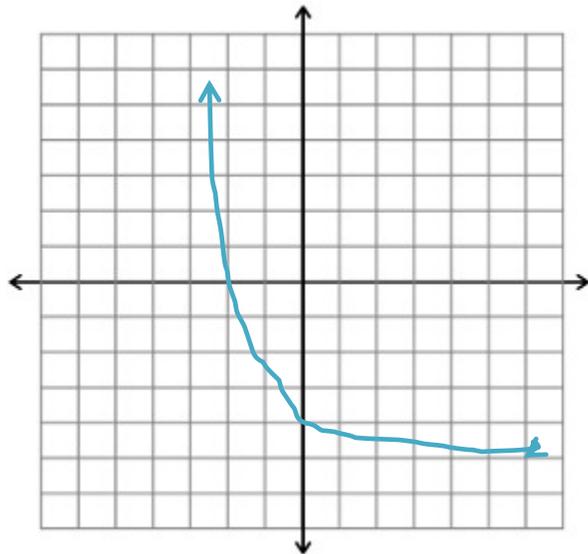   *y*-intercept: **(0,-4)**   Graph:

    Asymptote: **y=-5**

    Domain: **(-∞,∞)**

    Range: **(-5,∞)**

    Interval of increase/decrease: **dec (-∞,∞)**

    How is $f(x)$ a transformation of $g(x) = 4^x$?

    Reflect over the y-axis, down 5

4. Given the exponential function $f(x) = -\frac{1}{4}(2^{x+1}) + 3$, answer the following.

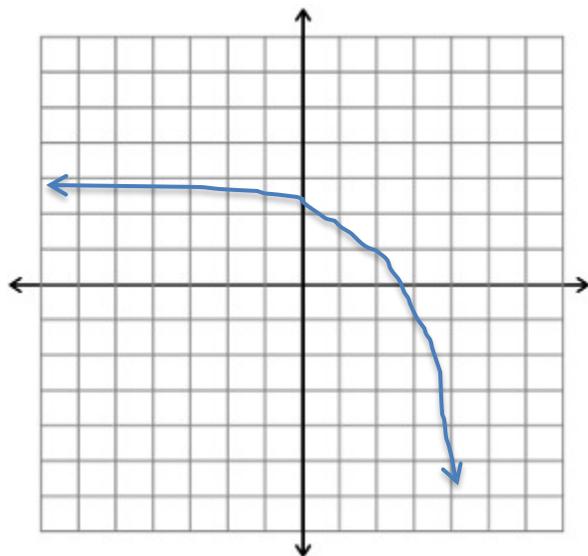   *y*-intercept: **(0,2.5)**   Graph:

Asymptote: **y=3**

    Domain: **(-∞,∞)**

    Range: **(-∞,3)**

    Interval of increase/decrease: **dec (-∞,∞)**

    How is $f(x)$ a transformation of $g(x) = 2^x$?

Reflect over x-axis, Vertical shrink of ¼, left 1, up 3

5. Given the quadratic, $p(x) = 2x^2 + 8x - 64$, answer the following.

Factored form: **p(x)=2(x+8)(x-4)**   Graph:

y-intercept: **(0,-64)**

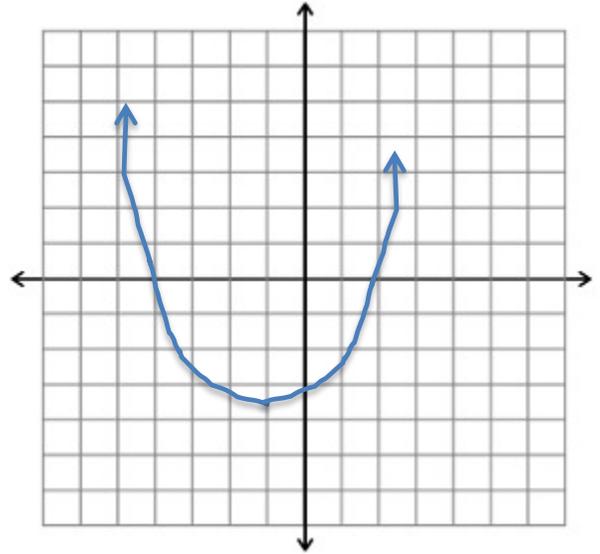x-intercepts/roots: **(-8,0), (4,0)**

Axis of symmetry: **x=-2**

Vertex: **(-2,-72)**

Domain: **(-∞,∞)**

Range: **[-72,∞)**

Interval of increase: **(-2,∞)**

Interval of decrease: **(-∞,-2)**

6. Julio throws a rock into the air, with an initial height of 48 inches. The equation $r(t) = -16x^2 + 32x + 48$ represents the height, $r(t)$, of the beach ball after t seconds. Using $r(t)$, answer the following.

Factored form: **r(t)=-16(x+1)(x-3)**   Graph:

y-intercept: **(0,48)**

x-intercepts/roots: **(-1,0), (3,0)**

Axis of symmetry: **x= 1**
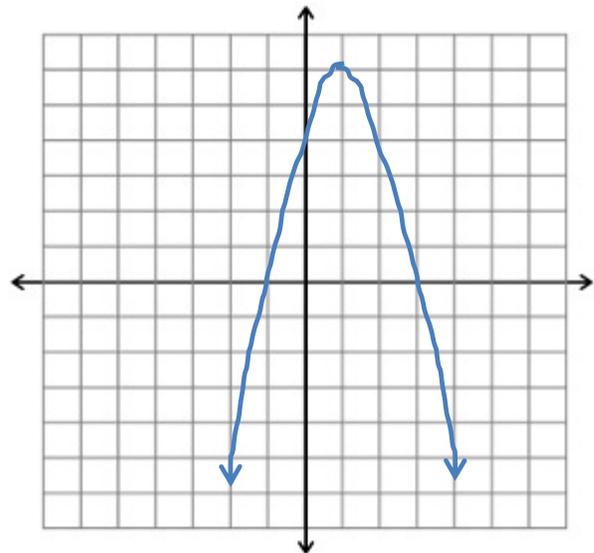
Vertex: **(1,64)**

Domain: **[0,3] THINK CONTEXT**

Range: **[0,64] THINK CONTEXT**

Interval of increase: **(0,1) THINK CONTEXT**

Interval of decrease: **(1,3) THINK CONTEXT**

(a) At what time will the rock reach its maximum height? **In 1 second**

(b) What is the maximum height of the rock? **64 feet**

(c) At what time will the rock hit the floor?**3 seconds**

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7. Given the sequence -10, -3, 4, 11,...

   (a) Find the next three terms of the sequence.

   18,25,32

   (b) Is this sequence arithmetic or geometric?

   Arithmetic sequence

   (c) Find the common difference or common ratio as appropriate.

   d=7

   (d) Write an explicit rule for the sequence above.

   $$a_n = -10 + (n-1)7$$
   $$a_n = 7n - 17$$

   (e) Write a recursive rule for the sequence.

   $$a_n = a_{n-1} + 7$$

8. Given the sequence 64, 16, 4,...

   (a) Find the next three terms of the sequence.

   $$1, \frac{1}{4}, \frac{1}{16}$$

   (b) Is this sequence arithmetic or geometric?

   Geometric sequence

   (c) Find the common difference or common ratio as appropriate.

   $$r = \frac{1}{4}$$

   (d) Write an explicit rule for the sequence above.

   $$a_n = 64 \left(\frac{1}{4}\right)^{n-1}$$

   (e) Write a recursive rule for the sequence.

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