STATION 1: GRAPHING EXPONENTIALS

1. Graph the following

$$f(x) = 2 \cdot 3^x$$
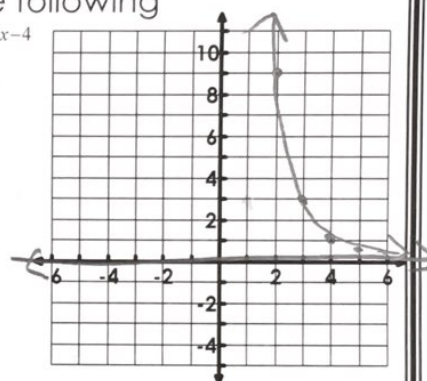
x	y
-2	.22
-1	.66
0	2
1	6
2	18
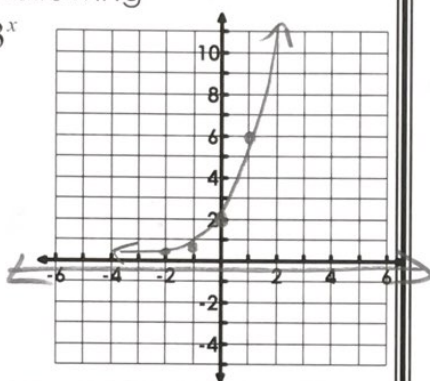
2. Graph the following

$$g(x) = \left(\frac{1}{3}\right)^{x-4}$$

x	y
2	9.16
3	3
4	1
5	.33
6	.11

3. Graph the following

$$h(x) = 2^{x+2} - 6$$

x	y
-4	-5.75
-3	-5.5
-2	-5
-1	-4
0	-2
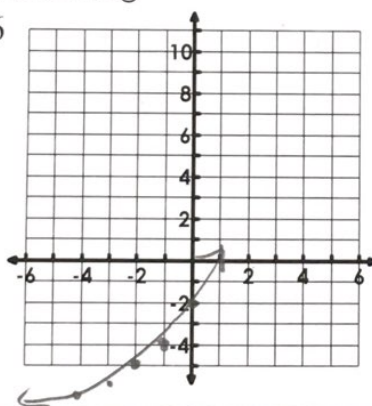
4. Graph the following

$$p(x) = -3^{x+4}$$

x	y
-6	-.11
-5	-.33
-4	-1
-3	-3
-2	-9
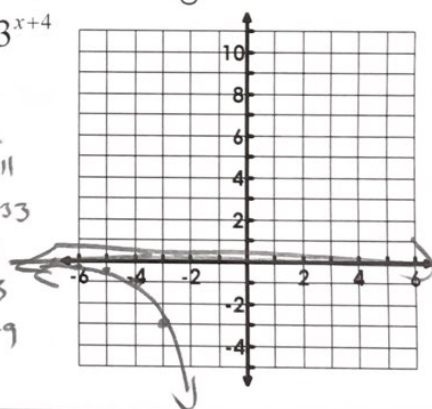
STATION 2: CHARACTERISTIC OF EXPONENTIALS

1. Graph the following and fill in information below
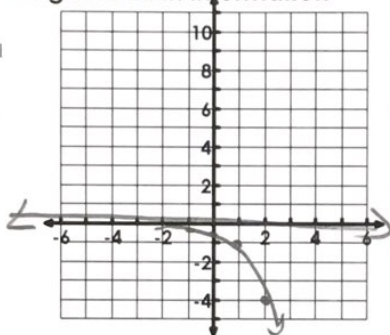
$$p(x) = -4^{x-1}$$

x	y
-1	-.06
0	-.25
1	-1
2	-4
3	-16

Domain: $\mathbb{R}$ Range: $y < 0$

X-intercept: N/A   y-intercept: $(0, -.25)$

Interval of Increase: N/A

Interval of Decrease: $\mathbb{R}$ Asy: $y = 0$

Maximum(s): N/A   Minimum(s): N/A

Symmetry: N/A   Negative: $\mathbb{R}$

End- Behavior:
as $x \to \infty$, $f(x) \to -\infty$
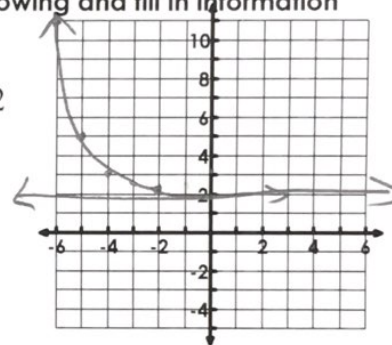as $x \to -\infty$, $f(x) \to 0$

Find the average rate of change from x=1 to x=2:

-3

2. Graph the following and fill in information below

$$g(x) = \left(\frac{1}{3}\right)^{x+4} + 2$$

x	y
-6	11.18
-5	5
-4	3
-3	2.33
-2	2.11

Domain: $\mathbb{R}$ Range: $y > 2$

X-intercept: N/A   y-intercept: $(0, 2.0119)$

Interval of Increase: N/A

Interval of Decrease: $\mathbb{R}$ Asy = $y = 2$

Maximum(s): N/A   Minimum(s): N/A

Symmetry: N/A   Negative: N/A

End- Behavior:
as $x \to \infty$, $f(x) \to 2$
as $x \to -\infty$, $f(x) \to \infty$

Find the average rate of change from x=1 to x=2:

STATION 3: TRANSFORMATION OF EXPONENTIALS

1. State the transformation for the following equation

$$y = \frac{1}{2}(2)^{x-7}$$

Shrink $\frac{1}{2}$

growth 2

right 7

2. State the transformation for the following equation

$$y = \left(\frac{1}{2}\right)^{-x} - 5$$

decay $\frac{1}{2}$

reflect y axis

down 5

3. Given the parent function $f(x) = 4^x$. Write the equation of the graph that is reflected over the x-axis and shift to the left 6.

$$f(x) = -4^{x+6}$$

4. Given the parent function $f(x) = 4^x$. Write the equation of the graph that is stretched by 3 and shifted up 11.

$$f(x) = 3 \cdot 4^x + 11$$

STATION 4: SOLVING EXPONENTIALS

1. Solve the following for x

$$3^{-4x-2} < 3^{-x}$$

$$-4x - 2 < -x$$
$$+4x \qquad +4x$$

$$\frac{-2}{3} < \frac{3x}{3}$$

$$\frac{-2}{3} < x$$

$$\boxed{x > \frac{-2}{3}}$$

2. Solve the following for x

$$9^{3x+16} = 81^{x+5}$$

$$9^{3x+16} = 9^{2(x+5)}$$

$$3x + 16 = 2x + 10$$
$$x + 16 = 10$$
$$\boxed{x = -6}$$

3. Solve the following for x

$$4^{4x} = 32^{x+3}$$

$$2^{2(4x)} = 2^{5(x+3)}$$

$$8x = 5x + 15$$

$$3x = 15$$

$$\boxed{x = 5}$$

4. Solve the following for x

$$36^{-4x-2} > 6^{-4x}$$

$$6^{2(-4x-2)} > 6^{-4x}$$

$$-8x - 4 > -4x$$

$$-4 > 4x$$

$$-1 > x$$

$$\boxed{x < -1}$$

STATION 5: WORD PROBLEMS WITH EXPONENTIALS

1. Luke deposits $2000 into a bank account that pays 5% interest compounded monthly. Find the balance in the account after 4 years.

$$2000\left(1+\frac{.05}{12}\right)^{12\cdot4}$$

$2441.79

2. A certain radioactive element decays at a rate of 21% per month. If the starting amount was 32 ounces, how much will be left after 1 year?

$$32(1-.21)^{12}$$

1.89

3. Given $y = 3(1.25)^x$ Determine if the function is growth or decay. Then determine its growth/decay factor and its growth/decay percent. What is the initial amount?

① Growth

② Factor   .25

③ Percent   25%

④ Initial   3

4. The value of Barbie Real Dream House is $12,500,000. The house is in a prime location and appreciates at a rate of 7% per year. How much will the house be worth in 5 years?

$$12\,500\,000\left(1+.07\right)^5$$

$17,531,896.63

STATION 6: GEOMETRIC SEQUENCES

1. Write both the explicit (closed) and recursive formula for the following sequence: 42, 336, 2688,…

   Ⓔ
   $a_n = 42 \cdot 8^{n-1}$

   Ⓡ $a_1 = 42$
   $a_n = 8(a_{n-1})$

2. Write both the explicit (closed) and recursive formula for the following sequence: 1250, 250, 50,…

   Ⓔ
   $a_n = 1250 \cdot \frac{1}{5}^{n-1}$

   Ⓡ $a_1 = 1250$
   $a_n = \frac{1}{5}(a_{n-1})$

3. Find the **third** term of the sequence whose first term is 10, and the **recursive** formula is $a_n = 15(a_{n-1})$.

   10, 150, ⟨2250⟩

5. Find the 17th term of the sequence $-2, -8, -32, \ldots$

   $= -2 \cdot 4^{17-1}$

   $= -8{,}589{,}934{,}592$