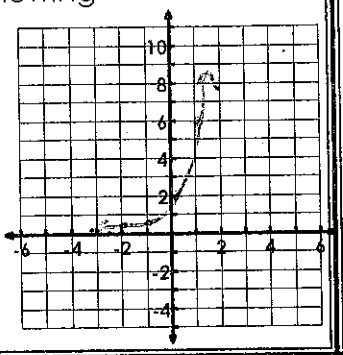
STATION 1: GRAPHING EXPONENTIALS

1. Graph the following

$f(x) = 2 \cdot 3^x$

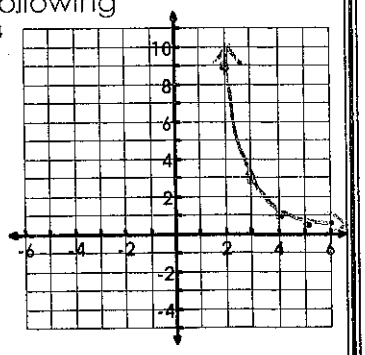
-2	.22
-1	.67
0	2
1	6
2	18



2. Graph the following

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

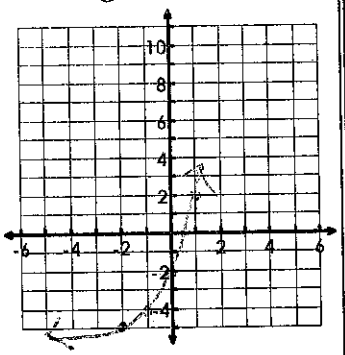
0	81
1	27
2	9
3	3
4	1
5	.3



3. Graph the following

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

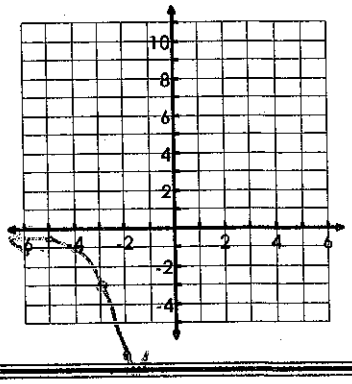
-2	-5
-1	-4
0	-2
1	2
2	10



4. Graph the following

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

-5	-.33
-4	-1
-3	-3
-2	-9

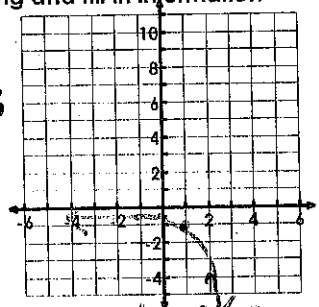


STATION 2: CHARACTERISTIC OF EXPONENTIALS

1. Graph the following and fill in information below

$p(x) = -4^{x-1}$

-1	-.063
0	-.25
1	-1
2	-4



Domain: $\mathbb{R}$ Range: $(-\infty, 0)$

X-intercept: NONE y-intercept: $(0, -.25)$

Interval of Increase: NONE

Interval of Decrease: $(-\infty, \infty)$

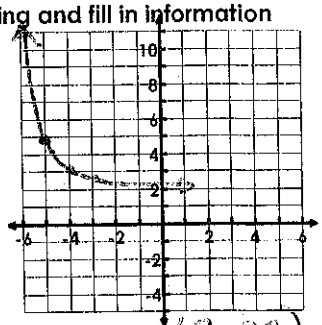
End- Behavior: as $x \to \infty$, $f(x) \to -\infty$; as $x \to -\infty$, $f(x) \to 0$

Asymptote: $y = 0$

2. Graph the following and fill in information below

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

-6	11
-5	5
-4	3
-3	2.3



Domain: $\mathbb{R}$ Range: $(2, \infty)$

X-intercept: NONE y-intercept: $(0, 2.012)$

Interval of Increase: NONE

Interval of Decrease: $(-\infty, \infty)$

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

Asymptote: $y = 2$

STATION 3: TRANSFORMATION OF EXPONENTIALS

1. State the transformation for the following equation

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

Right 7 units
Shrink by $\frac{1}{2}$

2. State the transformation for the following equation

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

down 5 units

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.

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

STATION 4: SOLVING EXPONENTIALS

1. Solve the following for x

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

$-4x-2 < -x$
$+4x \quad +4x$
$-2 < 3x$
$\frac{-2}{3} < \frac{3x}{3}$
$-\frac{2}{3} < x$

2. Solve the following for x

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

$9^{3x+16} = (9^2)^{x+5}$
$9^{3x+16} = 9^{2x+10}$
$3x+16 = 2x+10$
$-2x \quad -2x$
$x+16 = 10$
$-16 \quad -16$
$x = -6$

3. Solve the following for x

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

$(2^2)^{4x} = (2^5)^{x+3}$
$2^{8x} = 2^{5x+15}$
$8x = 5x+15$
$-5x \quad -5x$
$3x = 15$
$x = 5$

4. Solve the following for x

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

$(6^2)^{-4x-2} > 6^{-4x}$
$6^{-8x-4} > 6^{-4x}$
$-8x-4 > -4x$
$+8x \quad +8x$
$-4 > 4x$
$\frac{-4}{4} > \frac{4x}{4}$
$-1 > x$

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.

$A = P(1+\frac{r}{n})^{nt}$

$A = 2000(1+\frac{.05}{12})^{12 \cdot 4}$

$A = \$2,441.79$

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?

$A = P(1-r)^t$

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

$A = 1.89$ ounces

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?

Growth $b > 1$

factor 1.25

percent 25%

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?

$A = P(1+r)^t$

$A = 12,500,000(1+.07)^5$

$A = \$17,531,896.63$

STATION 6: FIND THE INVERSE

5. Find the inverse

$y = \frac{1}{2}x - 1$

$x = \frac{1}{2}y - 1$

$+1 \quad +1$

$2 \cdot x + 1 = \frac{1}{2}y \cdot 2$

$2(x+1) = y^{-1}$

6. Find the inverse

$y = \frac{3x-5}{4}$ 4. $x = \frac{3y-5}{4}$ .4

$4x = 3y - 5$

$+5 \quad +5$

$\frac{4x+5}{3} = \frac{3y}{3}$

$\frac{4x+5}{3} = y^{-1}$

7. Find the inverse.

$y = \sqrt[3]{x-3} + 5$

$x = \sqrt[3]{y-3} + 5$

$-5 \quad -5$

$(x-5)^3 = (\sqrt[3]{y-3})^3$

$(x-5)^3 = y-3$

$+3 \quad +3$

$(x-5)^3 + 3 = y^{-1}$

8. Find the inverse

$y = (\frac{x}{5})^2 - 25$

$x = (\frac{y}{5})^2 - 25$

$+25 \quad +25$

$\sqrt{x+25} = \sqrt{(\frac{y}{5})^2}$

$\pm\sqrt{x+25} = \frac{y}{5} \cdot 5$

$\pm 5\sqrt{x+25} = y^{-1}$

STATION 7: VERIFY THE TWO ARE INVERSE

1. Determine if $f(x) = 6 - 2x$ and $g(x) = \frac{6-x}{2}$ are inverse functions.

$f(g(x)) = 6 - 2\left(\frac{6-x}{2}\right)$

$= 6 - 6 + x$

$= x$ ✓

$g(f(x)) = \frac{6-(6-2x)}{2}$

$= \frac{6-6+2x}{2}$

$= \frac{2x}{2}$

$= x$ ✓

YES

2. DETERMINE IF $f(x) = 2x + 3$ AND $g(x) = x - 3$ ARE INVERSES

$f(g(x)) = 2(x-3)+3$

$2x - 6 + 3$

$2x - 3$

NO

3. Determine if $f(x) = 4 - x$ and $g(x) = x + 4$ are inverse functions.

$f(g(x)) = 4 - (x+4)$

$= 4 - x - 4$

$= -x$

NO