Unit 7 Review – Graphing and Characteristics

Name: _____

Date: _____ Block: _____

$f(x) = 2 \cdot 2^x - 4$

Transformations:

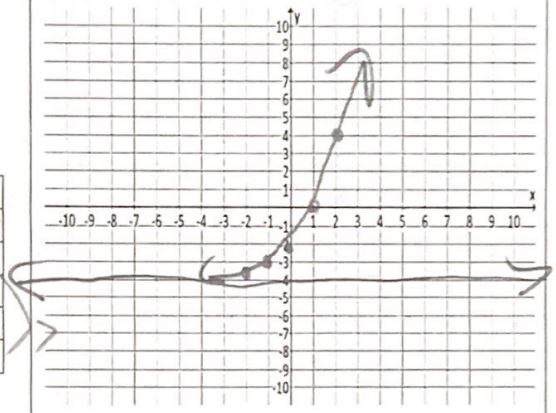
stretch 2

growth 2

down 4

x	y
-2	-3.5
-1	-3
0	-2
1	0
2	4

3



Domain: $\mathbb{R}$ Range: $y > -4$

X-intercept: (1, 0) y-intercept: (0, -2)

Interval of Increase: $\mathbb{R}$ Interval of Decrease: N/A

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

Symmetry: N/A Positive:

End- Behavior: as $x \to \infty$, $f(x) \to \infty$
as $x \to -\infty$, $f(x) \to -4$

Find the average rate of change from x=-1 to x=2: $7/3$

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

Transformations:

decay $\frac{1}{3}$

Left 4

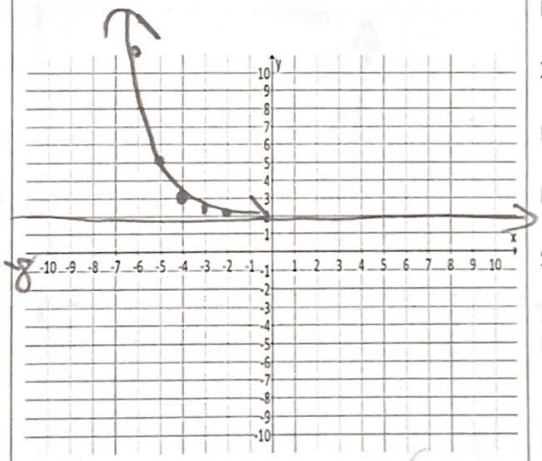
up 2

x	y
-6	11
-5	5
-4	3
-3	2.3
-2	2.1

-1

-2

2



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

X-intercept: N/A y-intercept: (0, 2.01)

Interval of Increase: N/A Interval of Decrease: $\mathbb{R}$

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

Symmetry: N/A Positive:

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=-6 to x=-4: $-8/2 = -4$

Unit 7 Review – Graphing and Characteristics

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

Transformations:

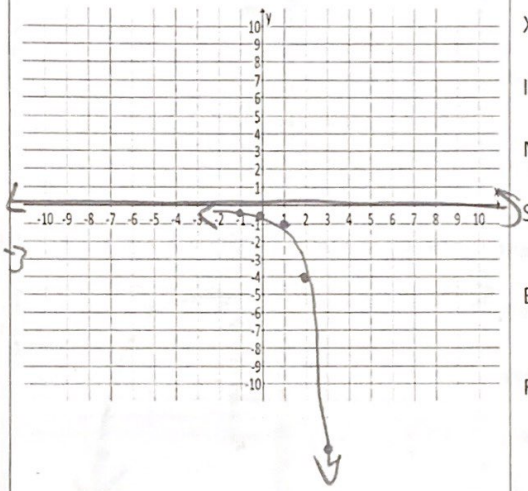
Reflect x

growth 4

right 1

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

1 3



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

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

Interval of Increase: N/A Interval of Decrease: $\mathbb{R}$

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

Symmetry: N/A Negative:

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

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

Transformations:

Reflect x

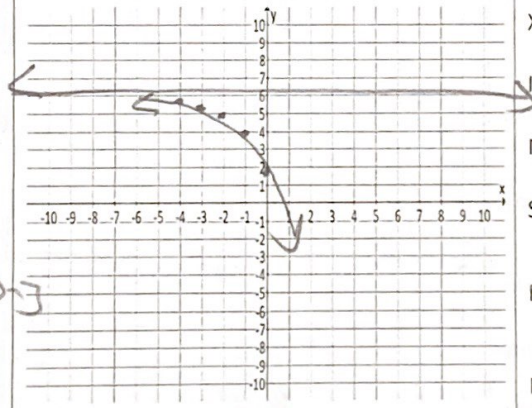
growth 2

left 2

up 6

x	y
-4	5.75
-3	5.5
-2	5
-1	4
0	2

2 3



Domain: $\mathbb{R}$ Range: $y<6$

X-intercept: $(.5,0)$ y-intercept: $(0,2)$

Interval of Increase: N/A Interval of Decrease: $\mathbb{R}$

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

Symmetry: N/A Negative:

End- Behavior: as $x \to \infty$, $f(x) \to -\infty$
as $x \to -\infty$, $f(x) \to 6$

Find the average rate of change from x=-2 to x=0: $-3/2$

Unit 7 Review – Exponentials

Solving Equations Review:

1. $9^{3x+16} = 81^{x+5}$

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

$3x+16 = 2x+10$

$x = -6$

2. $25^{3x-4} \geq 125$

$5^{2(3x-4)} \geq 5^3$

$6x - 8 \geq 3 + 8$

$+8$

$x \geq \frac{11}{6}$

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

$-4x-2 < -x$

$-2 < 3x$

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

4. $16^{2x} = 64$

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

$\frac{4x}{4} = \frac{3}{4}$

$x = 3/4$

5. $5^{2x+3} = 1$

$5^{2x+3} = 5^0$

$2x+3 = 0$

$x = -3/2$

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

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

$-8x-4 > -4x$

$-1 > x$

7. $4^{4x} = 32^{x+3}$

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

$8x = 5x+15$

$x = 5$

8. $7^{-x-6} = 7^{x+6}$

$-x-6 = x+6$

$-6 = 2x+6$

$-12 = 2x$

$x = -6$

Geometric Sequences Review:

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

1	2	3
10	150	2250

2. Write the **Explicit (closed)** Formula, ~~and then find~~ the 20th term of the sequence 3, 12, 48, 192, ...

$a_n = 3(4)^{n-1} = 8.25 \times 10^{11}$

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

$a_n = 42(8)^{n-1}$

$a_1 = 42$

$a_n = 8(a_{n-1})$

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

$a_n = 1250(\frac{1}{5})^{n-1}$

$a_1 = 1250$

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

5. Write the explicit (closed) and recursive formula for a geometric sequence whose 6th term is 4 and the 7th term is 2.

1	2	3	4	5	6	7
128	64	32	16	8	4	2

$a_n = 128(\frac{1}{2})^{n-1}$

$a_1 = 128$

$a_n = \frac{1}{2}(a_{n-1})$

6. Write a rule to find the nth term of a sequence whose first term is 12 and the rate is 15.

$a_n = 12(15)^{n-1}$

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

$a_n = -2(4)^{n-1} = -8589934592$

Applications Review: $y = a(1 \pm r)^t$ $A = P\left(1 + \frac{r}{n}\right)^{nt}$ $A = Pe^{rt}$

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

$2000\left(1 + \frac{.05}{12}\right)^{12(4)} = \$2441.79$

2. 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?

$12{,}500{,}000(1 + .07)^5 = \$17{,}531{,}896.63$

3. 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?

$32(1 - .21)^{12} = 1.89$

4. How much should Alex deposit into an account that pays 5% annual interest compounded quarterly so that she will have $10,000 in 6 years?

$10{,}000\left(1 + \frac{.05}{4}\right)^{4(6)} = \$13473.51$

5. 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.

Growth | Factor = .25

6. Matt bought a new car at a cost of $30,000. The car depreciates approximately 13% of its value each year. Decay Factor? Decay Percent?

1st = $26,100

$30{,}000(1 - .13)^1 =$ 2nd = $22707.00

Decay Factor = .13 Percent = 13%