GSE Algebra 1 **Unit 7 Review** Name: _____

Show all work to get full credit!

1) How has the following moved: $f(x) = (x + 6)^2$

left + 6

2) How does the following equation $g(x) = -3x^2$ compare to the graph of $f(x) = x^2$?

Reflect ↙ ↘ V. stretch / H. compress

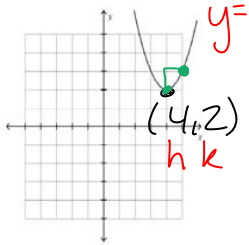
3) Translate the function $f(x) = 3^x$ 5 units to the left?

→ $f(x) = 3^{x+5}$

4) Translate the function $f(x) = 3^x$ 5 units down?

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

5) Make the equation for the graph provided in vertex form.

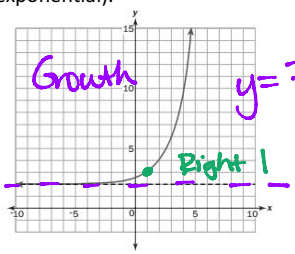


$y = 1(x-4)^2 + 2$

(4, 2)

h k

6) Make the equation for the graph provided (exponential).



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

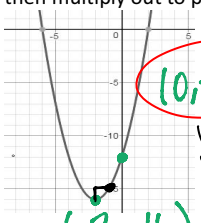
7) Identify the equation $y = a(1.6)^t$ as exponential growth or decay. Then give the rate of growth or decay as a percent.

1 → 1.6 160 → +60%

8) The function f(x) = x – 9 is shifted ~~4 units up~~ and 7 units to the left. Create the equation.

$x - 9 + 4 = x - 5$ $(x+7) - 5$

9) What is the y-intercept for the following equation? Write the equation in vertex form then multiply out to put in standard form.



(-2, -16)

(0, -12) Vertex

$y = 1(x+2)^2 - 16$

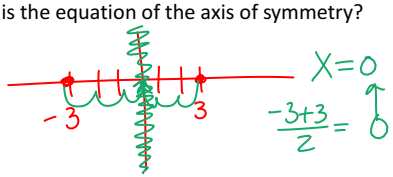
$(x+2)(x+2) - 16$

	x	2
x	x^2	2x
2	2x	4

$x^2 + 4x + 4 - 16$

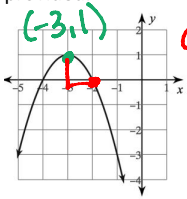
$x^2 + 4x - 12$

10) If the ~~roots/x-intercepts of~~ a quadratic function (parabola) are x = -3 and x = 3, what is the equation of the axis of symmetry?



$\frac{-3+3}{2} = 0$ $x = 0$

11) Make the equation in ~~vertex form~~ for the graph provided.



(-3, 1)

$a = -1$

$y = -1(x+3)^2 + 1$

12) What is the vertex of the graph of $f(x) = x^2 + 10x - 9$? Write the equation in vertex form.

std

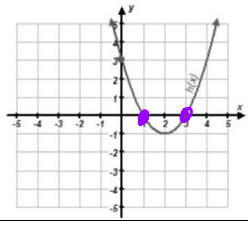
$a = 1$ $b = 10$ $c = -9$

$\frac{-b}{2a} = \frac{-(10)}{2(1)} = -5$ h

$(-5)^2 + 10(-5) - 9 = -34$ k

$y = 1(x+5)^2 - 34$

13) Write the equation in intercept form. Then multiply out to standard form.



$x=1$
$x=3$

$(x-1)(x-3)$ ✓

	x	-1
x	x^2	$-x$
-3	$-3x$	3

x^2-4x+3

14) Write a function that represents a quadratic after it has been translated up 3 units, reflected over the x-axis and vertically stretched 4 units.

x^2

$y=-4x^2+3$

15) Write a function that represents an exponential decay with an asymptote of -3 and shifts left 2.

$y=\frac{1}{2}^{x+2}-3$

16) Write a function that represents a line that has been horizontally stretched by a factor of 1/4, reflected about the x-axis, shifted left 2, and shifted down 7.

$y=-\frac{1}{4}(x+2)-7$

17) How do you know if a quadratic has a maximum or a minimum?

$a+ \rightarrow \cup$ min $\quad a- \rightarrow \cap$ Max

18) For the following, **convert** it to **standard form**. Then **convert** it to **vertex form**.

$y=3(x-2)(x+4)$ Intercept

	$3x$	-6
x	$3x^2$	$-6x$
4	$12x$	-24

$3x^2+6x-24$
$a=3 \quad b=6 \quad c=-24$

$\frac{-(6)}{2(3)}=-1$ h

$3(-1)^2+6(-1)-24$
-27 k

$y=3(x+1)^2-27$

19) Change $f(x)=3x^2-24x+5$ into vertex form **AND** state the vertex. Is the vertex a maximum or a minimum?

$a=3$
$b=-24$
$c=-5$

$\frac{-(-24)}{2(3)}=4$ h

$3(4)^2-24(4)+5=-43$ k

Vertex: $(4,-43)$

$y=3(x-4)^2-43$

20) You deposit $650 into an account that has 8% interest compounded semi-annually. What is the money worth

a. In 5 years?

$650\left(1+\frac{0.08}{2}\right)^{5(2)}=\$962.16$

b. In 25 years?

$650\left(1+\frac{0.08}{2}\right)^{25(2)}=\$4619.32$

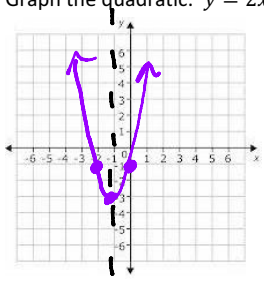
21) $f(x)=64(0.87)^x$

Initial amount	Ratio	Rate	Growth or Decay?	x = 13
64	0.87	-13%		10.47

$1 \rightarrow 0.87$
$-0.13 \rightarrow -13\%$

$64(0.87)^{13}$

22) Graph the quadratic: $y = 2x^2 + 4x - 1$



y-int	(0,-1)
vertex	(-1,-3)
Direction	up
Axis of symm	$x = -1$

$a=2$ $b=4$ $c=-1$ $\frac{-(4)}{2(2)} = -1$ h

$2(-1)^2+4(-1)-1$

-3 k

decay

23) Amy owns a graphic design store. She purchases a new printer to use in her store. The printer depreciates by a constant rate of 18% each year. The function $V = 3700(1 - 0.18)^t$ can be use to model the value of the printer in dollars after t years.

a. Explain what 3,700 represents in the equation of the function.

Initial Cost of Printer

b. What is the factor by which the printer depreciates each year?

OR -0.18 18% OR -18%

c. Amy also considered purchasing a printer that costs $4000 and depreciates by 25% each year. Which printer will have more value in 5 years?

$4000(1-0.25)^5 = \$949.22$

$3700(1-0.18)^5 = \$1371.74$ Orig

d. Amy wants to replace the original printer after 6 years. What is the cost of her printer after 6 years?

$3700(1-0.18)^6 = \$1124.82$

e. What would she have to sell the printer at to make a $200 profit?

$200 + 1124.82 = \$1324.82$

24) Joey and Jane were working on transformations together in Mrs. Jone's class. Each of them came up with a different answer when given a transformation problem. Determine if either student is correct. Also, determine which aspects of each student's answer is correct and/or incorrect (BE SPECIFIC!).

$-2(7)^{(x-5)} + 6$

PROBLEM:
Write a function that represents an exponential growth that is vertically stretched by a factor of 2, reflects about the x-axis, shifts right 5, and shifts up 6.

Joey's Answer:

$$y = -3(2)^{(x-5)} + 6$$

Jane's Answer:

$$y = -\frac{1}{2}(2)^{(x+5)} + 6$$

aa. Who is totally correct?

a. a) Joey b) Jane c) Neither

h

b. What is correct about Joey's answer and why?

+6 → up 6

-5 → Right 5 2 → growth

-→ Reflect

What is incorrect about Joey's answer and why?

3 → should be 2

c. What is correct about Jane's answer and why?

-→ Reflect +6 → up 6

2 → Growth

What is incorrect about Jane's answer and why?

$\frac{1}{2}$ → should be 2

+5 → -5 right

25) A super deadly strain of bacteria is causing the human population to decrease by 12% every day. There are currently 116,654 people still alive 60 days after the bacteria infected the public. How many people were there in the beginning?

$116{,}654 = P(1-0.12)^{60}$

$P = 233{,}308{,}000$ people

$\frac{116{,}654}{0.0005} = \frac{P(0.0005)}{0.0005}$