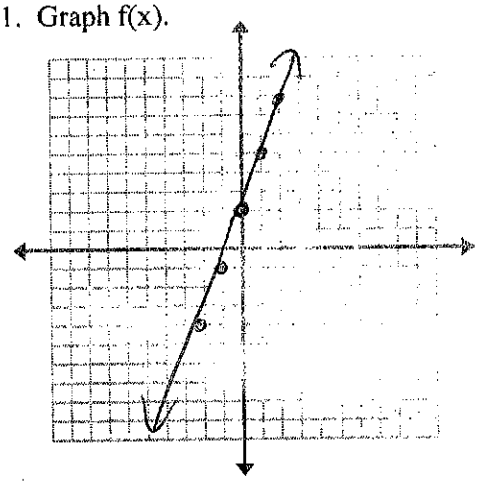
Name Key Hour ____ Date ____ Score

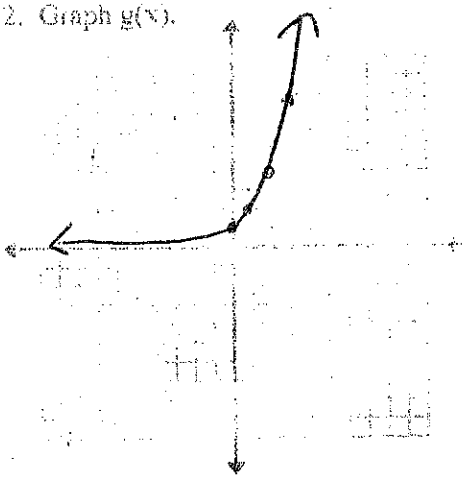
Transformations of Functions

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

1. Graph f(x).



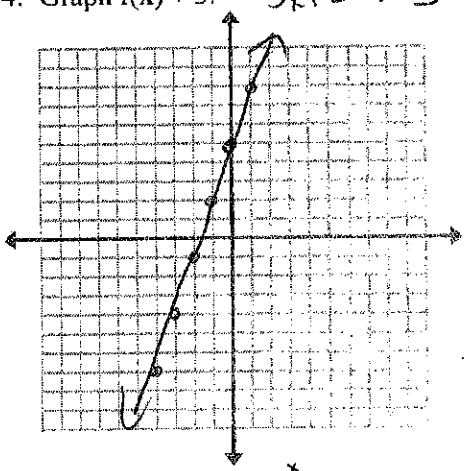
2. Graph g(x).



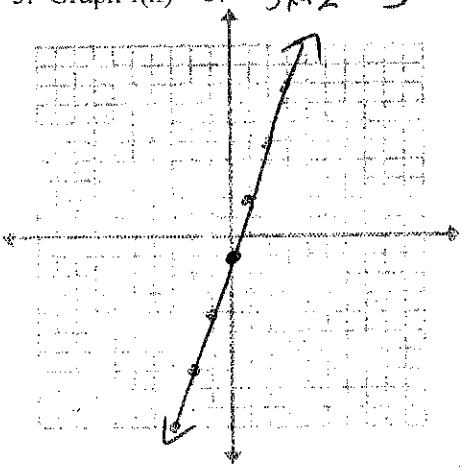
3. Compare and contrast the 2 graphs.

Ones linear the other is nonlinear
Both increasing

4. Graph f(x) + 3. $3x+2+3$



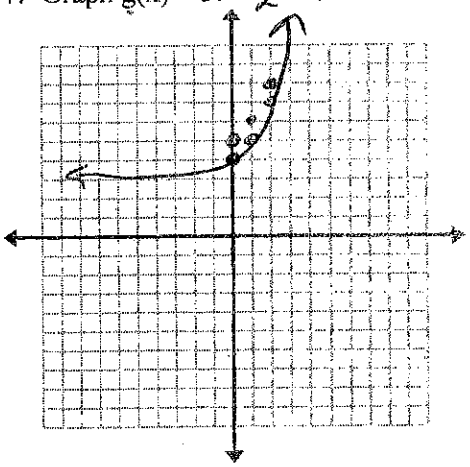
5. Graph f(x) – 3. $3x+2-3$



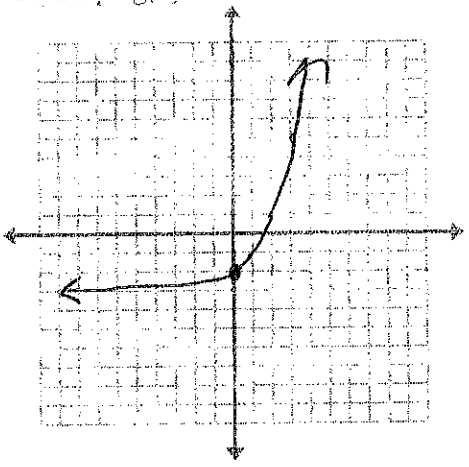
6. Compare and contrast the 2 graphs with the graph of f(x).

f(x)+3 is 3 higher
f(x)-3 is 3 lower
Shifted

7. Graph g(x) + 3. 2^x+3



8. Graph g(x) – 3.



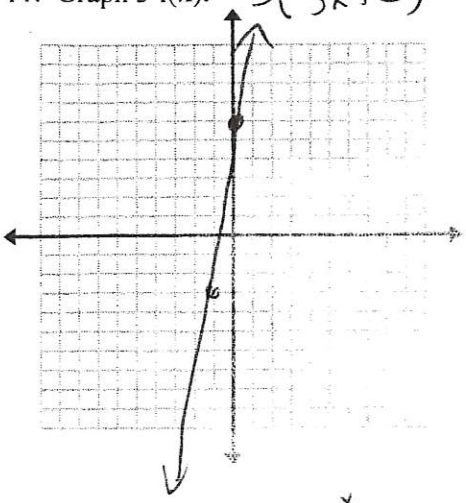
9. Compare and contrast the 2 graphs with the graph of g(x).

g(x)+3 is 3 higher
g(x)-3 is 3 lower
shifted

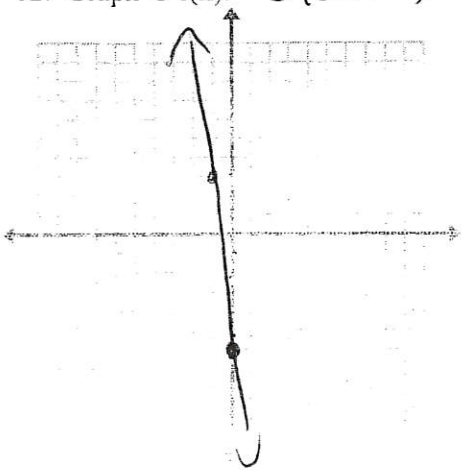
10. What does adding or subtracting a constant from the output of a function do to the graph of the function? ____

Shifts the graph up when adding, down when subtracting

11. Graph 3·f(x). $3(3x+2)$



12. Graph -3·f(x). $-3(3x+2)$

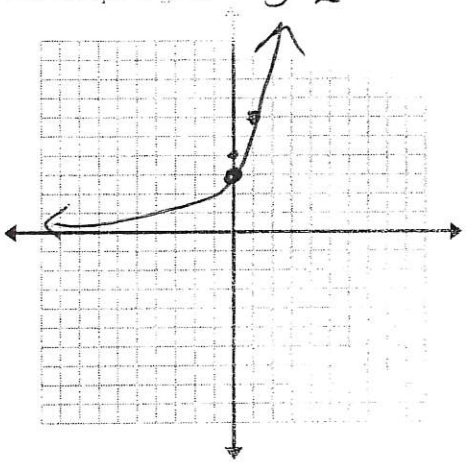


13. Compare and contrast the 2 graphs with the graph of f(x).

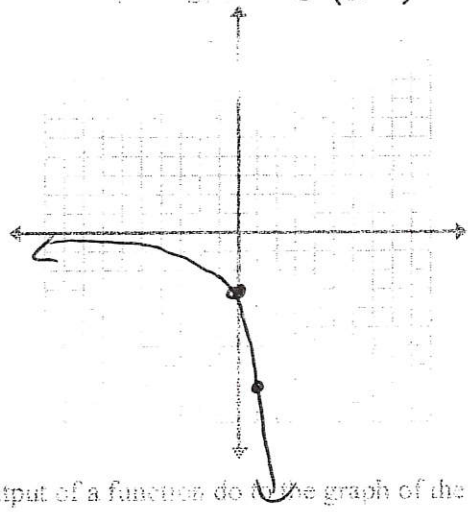
3·f(x) is vertically stretched - steeper

-3·f(x) is vertically stretched and reflected over x-axis

14. Graph 3·g(x). $3 \cdot 2^x$



Graph -3·g(x). $-3(2^x)$



Compare and contrast the 2 graphs with the graph of g(x).

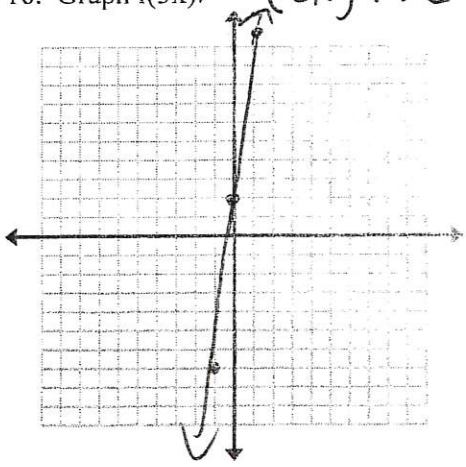
3·g(x) is vertically stretched

-3(g(x)) is vertically stretched and reflected over x-axis

17. What does multiplying a constant to the output of a function do to the graph of the function?

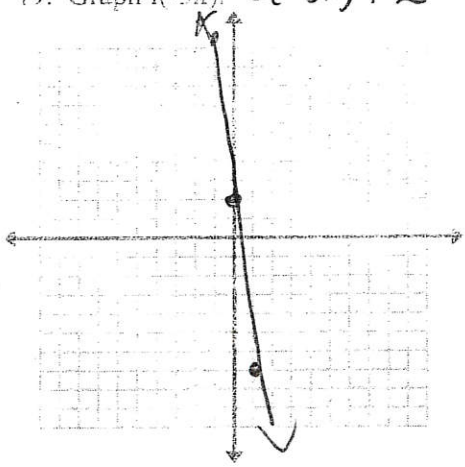
Vertically stretch the graph negative reflects over x-axis

18. Graph f(3x). $3(3x)+2$



stretched?

19. Graph f(-3x). $3(-3x)+2$

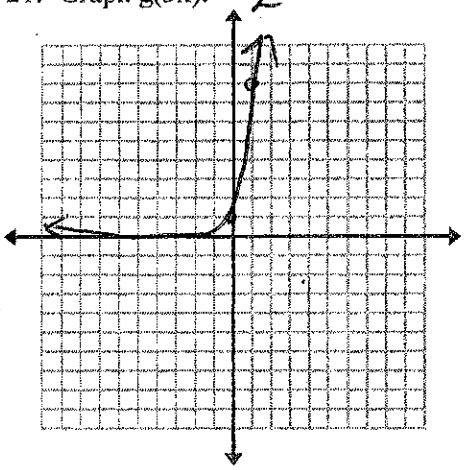


20. Compare and contrast the 2 graphs with the graph of f(x).

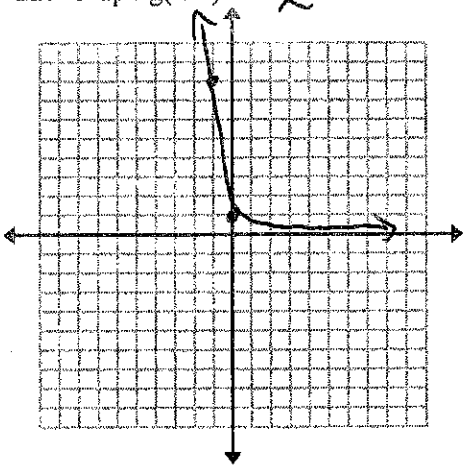
f(3x) is horizontally ~~stretched~~ compression

f(-3x) horizontally ~~stretched~~ compression and reflected over y-axis

21. Graph g(3x). 2^{3x}



22. Graph g(-3x). 2^{-3x}



23. Compare and contrast the 2 graphs with the graph of g(x).

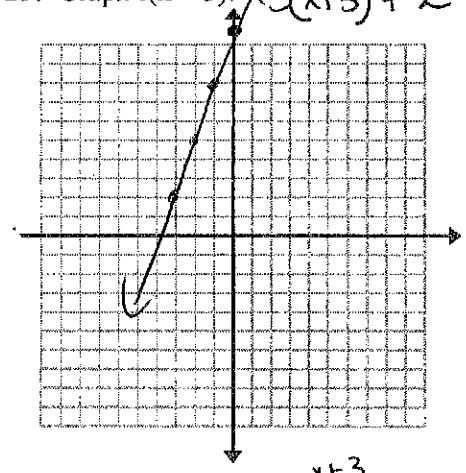
g(3x) is horizontally ~~Stretched~~ Compressed

g(-3x) is horizontally ~~Stretched~~ Compressed and reflected over y-axis

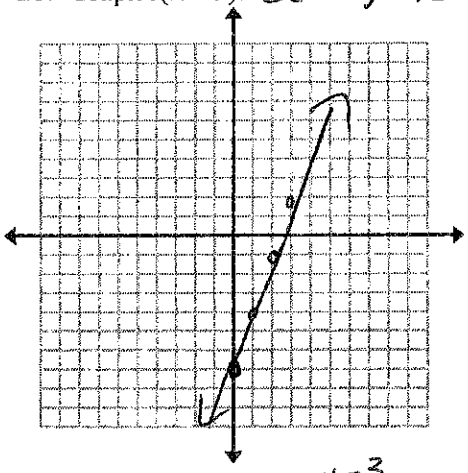
24. What does multiplying a constant to the input of the function do to the graph of the function? _____

~~Stretches~~ Compresses the graph horizontally and negative reflects it over the y-axis

25. Graph f(x + 3). $3(x+3)+2$



26. Graph f(x – 3). $3(x-3)+2$

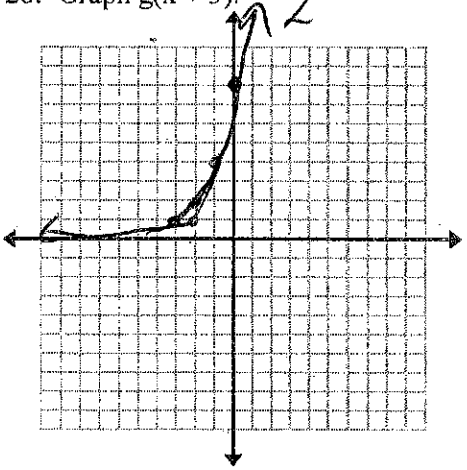


27. Compare and contrast the 2 graphs with the graph of f(x).

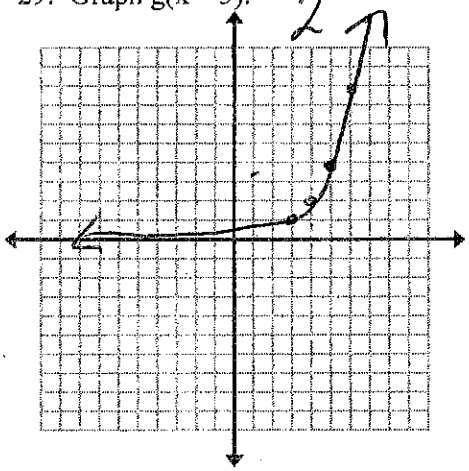
f(x+3) graph is shifted to the left 3

f(x-3) graph is shifted to the right 3

28. Graph g(x + 3). 2^{x+3}



29. Graph g(x – 3). 2^{x-3}



30. Compare and contrast the 2 graphs with the graph of g(x).

g(x+3) graph is shifted to the ~~right~~ left 3

g(x-3) graph is shifted to the right 3

31. What does adding or subtracting a constant to the input of the function do to the graph of the function? _____

Shifts the graph left when adding and right when subtracting

$af(b(x+c))+d$

$0<a<1$ vertical comp

$a>1$ vertical stretch

$a<0$ reflect over x-axis

↑ shifts up/down

left right

$c>0$ $c<0$

$0<b<1$ horizontal stretch

$b>1$ compress

$b<0$ reflected over y-axis