Transformations of Functions Practice name _____

Describe how the graph of g is obtained from the graph of f. (Do not sketch the graph.)

21. $f(x)=\sqrt{x}$. $g(x)=\sqrt{-x}-2$ reflect over y, down 2

22. $f(x)=x^3$. $g(x)=-2(x+5)^3$ reflect over x, vertical stretch(2) left 5

23. $f(x)=|x|$. $g(x)=-5|x-2|+1$ reflect over x, vertical stretch(5) right 2, up 1

24. $f(x)=x^2$. $g(x)=\frac{1}{6}(x+3)^2-7$ Vertical compression of 1/6, left 3 down 7

25. $f(x)=\frac{1}{x}$. $g(x)=\frac{3}{x+8}+2$ left 8, up 2, Vertical Stretch by 3

26. $f(x)=\sqrt[3]{x}$. $g(x)=\sqrt[3]{-x}+4$ reflect over y, up 4

Describe how the graphs of each of the following functions can be obtained from the graph of $y=f(x)$.

27. $y=f(x)+1$ up 1

28. $y=f(x-7)$ right 7

29. $y=f(-x)+3$ reflect over y, up 3

30. $y=-f(x+3)-8$ left 3, down 8, reflect over x axis

31. $y=-\frac{1}{4}f(x-2)-5$ reflect over x, Vertical Compression $\frac{1}{4}$ right 2, down 5

32. $y=-5f(-x)+1$ reflect over x, vertical stretch by 5, reflect y up 1

33. $y=f(7-x)+2$ reflect over y, left 7, up 2

34. $y=f(-x-5)-7$ reflect over y, right 5, down 7

Matching. The left-hand column contains equations that represent transformations of $f(x) = x^2$. Match the equations on the left with the description on the right of how to obtain the graph of g from the graph of f.

D 7. $g(x) = (x-4)^2$

J 8. $g(x) = x^2 - 4$

F 9. $g(x) = x^2 + 4$

I 10. $g(x) = (x+4)^2$

A 11. $g(x) = -x^2$

G 12. $g(x) = (-x)^2$

K 13. $g(x) = 4x^2$

L 14. $g(x) = \frac{1}{4}x^2$

C 15. $g(x) = -x^2 - 4$

H 16. $g(x) = (x+4)^2 + 3$

E 17. $g(x) = -(x-3)^2 + 4$

B 18. $g(x) = (-x+4)^2$

A. Reflect in the x-axis.

B. Shift left 4 units, then reflect in the y-axis.

C. Reflect in the x-axis, then shift downward 4 units.

D. Shift right 4 units.

E. Shift right 3 units, then reflect in the x-axis, then shift upward 4 units.

F. Shift upward 4 units.

G. Reflect in the y-axis.

H. Shift left 4 units, then shift upward 3 units.

I. Shift left 4 units.

J. Shift downward 4 units.

K. Stretch vertically by a factor of 4.

L. ~~Shrink~~ Compress vertically by a factor of $\frac{1}{4}$.