4.1 Transformations

PRACTICE

Name the parent function. Then describe the transformation (translation, scale, and reflection) of the function if it exists.

Translation **Vertical Shift up/down ?** **Horizontal Shift right/left ?**	**Scale** **Vertical Stretch/Shrink of ?** **Horizontal Stretch/Shrink of ?**	**Reflection** **About the *x*-axis** **About the *y*-axis**
1. $y = 2(x+1)^3$ NAME:_____ Translation: Scale: Reflection:	2. $y = -(x-11)^2 - 5$ NAME:_____ Translation: Scale: Reflection:	3. $f(x) = \|3x-6\| + 8$ NAME:_____ Translation: Scale: Reflection:
4. $f(x) = -\frac{1}{2}\sqrt{5-x}$ NAME:_____ Translation: Scale: Reflection:	5. $y = \log_2(-x) + 4$ NAME:_____ Translation: Scale: Reflection:	6. $f(x) = \frac{1}{3}e^{x-1} - 4$ NAME:_____ Translation: Scale: Reflection:
7. $y = -\frac{4}{2x+3} - 19$ NAME:_____ Translation: Scale: Reflection:	8. $f(x) = \left[\!\left[\frac{1}{4}x\right]\!\right] + 5$ NAME:_____ Translation: Scale: Reflection:	9. $y = 4 - x^3$ NAME:_____ Translation: Scale: Reflection:

Given the parent function $f(x) = |x|$, write the equation of the following transformation…

10. Vertical shift up 3 and horizontal shift right 2	11. Horizontal shift left 3, vertical stretch of 4	12. Reflect about *y*-axis, vertical shift up 2, horizontal stretch of 5

Given the parent function $f(x) = x^3$, write the equation of the following transformation…

13. Reflect about the *x*-axis, horizontal shift right 2, vertical shrink of ½	14. Horizontal shrink of $\frac{1}{4}$, vertical shift down 6	15. horizontal shift left 4, vertical shift down 7, horizontal stretch of 8

Given the parent function $f(x) = \frac{1}{x}$, write the equation of the following transformation…

16. Horizontal shift left 3, reflect about x-axis.

17. Vertical shift up 5

18. Vertical stretch 3, horizontal shift right 5

Given the parent function $f(x) = e^x$, write the equation of the following transformation…

19. Reflect about the y-axis and horizontal shift right 8

20. Horizontal shrink of ½ and reflect about the x-axis

21. Vertical stretch of 6, vertical shift down 3, horizontal shift right 5, reflect about x-axis

Given the parent function $f(x) = \log_2 x$, write the equation of the following transformation…

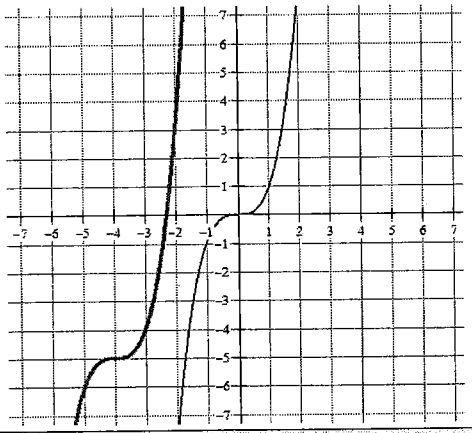
22. Horizontal shift right 3, vertical shift down 5

23. Reflect about the x-axis and vertical shift up 5

24. Vertical stretch of 5, reflect about the y-axis, horizontal stretch of 3

The graph of a parent function and a transformation of the parent function are given. Write the equation of the transformed function.

25.



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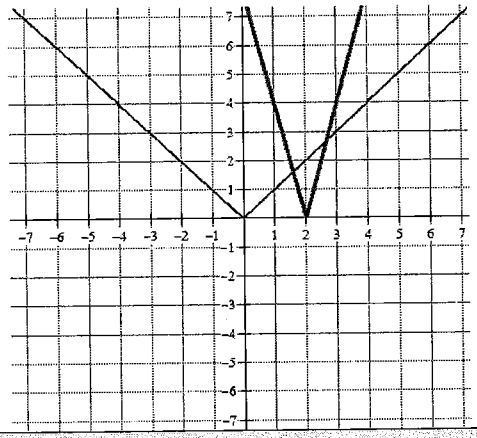

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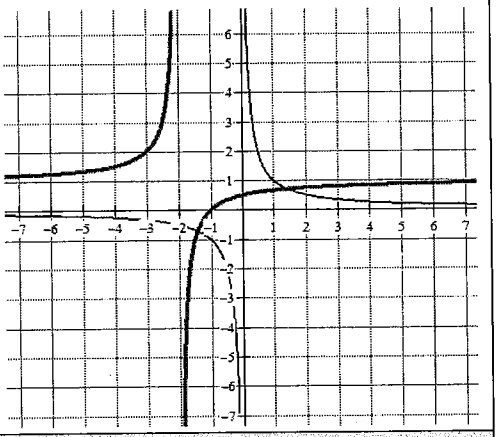
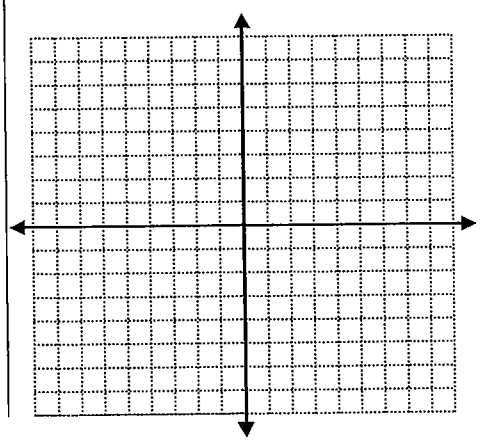
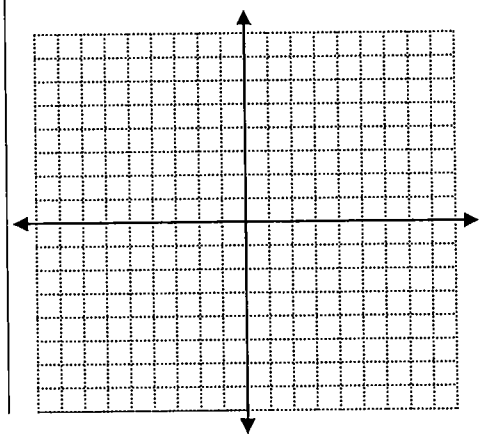


Sketch a graph of the following.

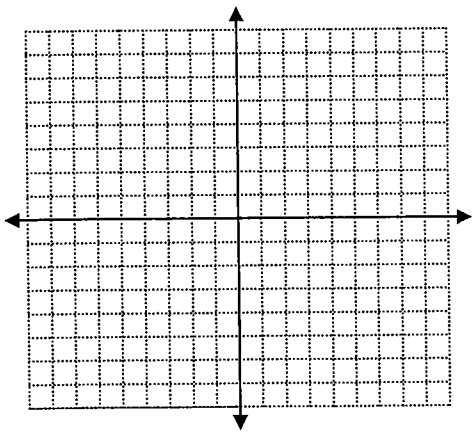
28. $y = 2(x+3)^3 - 2$



29. $f(x) = -\left(\frac{1}{3}x\right)^2 + 2$



30. $y = [\![x - 3]\!]$



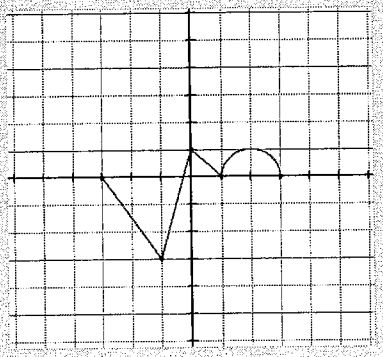
Describe the transformation (translation, scale, and/or reflection) that happens to the function $f(x)$.

6. $3f(x) + 2$

7. $f(3 - x) + 2$

8. $-5f(2x + 4) - 7$

Given the $h(x)$ is shown below:



Sketch a graph of the following:

9. $-h(x)$

10. $h(-x)$

11. $h(x) + 2$

12. $h(x + 2)$

13. $h(x - 1) + 2$

14. $-h(x + 3) - 2$

15. $2h(x)$

16. $h(2x)$

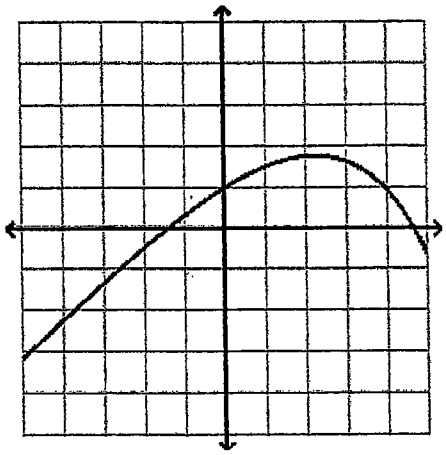
17. $\frac{1}{2}h(x)$

18. $h\left(\frac{1}{2}x\right)$

19. $-2h(x - 1) - 3$

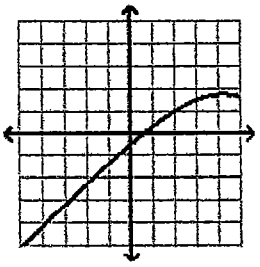
Identifying Graph Transformations **Name**_____

Match each transformation of $f(x)$ listed below with its graph from the bottom of the page. The original graph of $f(x)$ is shown at the right.



1. $f(x)-2$ _____
2. $f(2x)$ _____
3. $-f(x+2)$ _____
4. $2f(-x)$ _____
5. $f(x)/2$ _____
6. $f(x-2)$ _____
7. $-f(x/2)$ _____
8. $f(-x)+2$ _____
9. $2f(x)-2$ _____

A.



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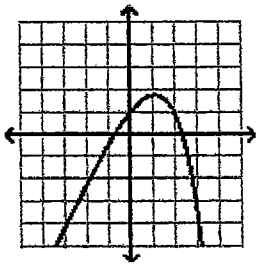

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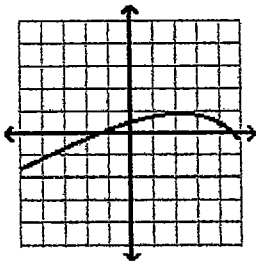

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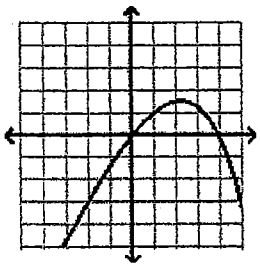

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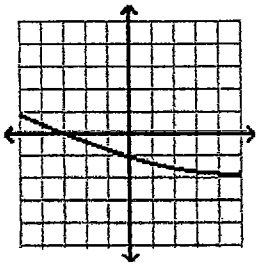

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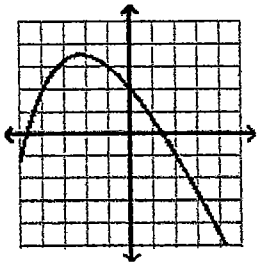

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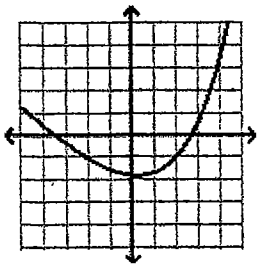
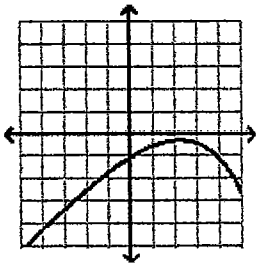


H.



I.