



Puzzle Time

What Happened To The Wooden Plane With The Wooden Wheels and Wooden Engine?

Write the letter of each answer in the box containing the exercise number.

Describe the transformation of $f(x) = x^2$ represented by g .

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|--------------------------------|---------------------------|
| 1. $g(x) = -2x^2$ | 2. $g(x) = (x - 1)^2$ |
| 3. $g(x) = x^2 - 1$ | 4. $g(x) = (x + 1)^2$ |
| 5. $g(x) = \frac{1}{2}x^2 - 2$ | 6. $g(x) = (x - 2)^2 - 1$ |

Write a rule for g described by the transformations of the graph of f .

7. $f(x) = x^2$; vertical stretch by a factor of 2 and a reflection in the x -axis, followed by a translation 3 units down
8. $f(x) = x^2$; vertical shrink by a factor of $\frac{1}{2}$, followed by a translation 3 units left
9. $f(x) = 4x^2 + 10$; horizontal stretch by a factor of 2, followed by a translation 3 units up
10. $f(x) = (x - 2)^2 - 8$; horizontal shrink by a factor of $\frac{1}{2}$ and a translation 5 units down, followed by a reflection in the x -axis

Answers

- G. $g(x) = x^2 + 13$
- T. translation 1 unit right
- O. $g(x) = -(2x - 2)^2 + 13$
- W. translation 1 unit down
- D. translation 2 units right, followed by a translation 1 unit down
- O. vertical shrink by a factor of $\frac{1}{2}$, followed by a translation 2 units down
- I. reflection in the x -axis and a vertical stretch by a factor of 2
- E. $g(x) = -2x^2 - 3$
- N. $g(x) = \frac{1}{2}(x + 3)^2$
- O. translation 1 unit left

1	2		3	4	5	6	7	8		9	10
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2.1 Extra Practice

In Exercises 1–9, describe the transformation of $f(x) = x^2$ represented by g .

Then graph each function.

1. $g(x) = x^2 + 3$

2. $g(x) = (x + 5)^2$

3. $g(x) = (x + 6)^2 - 4$

4. $g(x) = (x - 1)^2 + 5$

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

6. $g(x) = (x + 8)^2 - 2$

7. $g(x) = -\left(\frac{1}{2}x\right)^2$

8. $g(x) = \frac{1}{3}x^2 + 2$

9. $g(x) = \frac{1}{3}(x + 1)^2$

In Exercises 10 and 11, describe the transformation of the graph of the parent quadratic function. Then identify the vertex.

10. $f(x) = -3(x + 6)^2 - 4$

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

In Exercises 12 and 13, write a rule for g described by the transformations of the graph of f . Then identify the vertex.

12. $f(x) = x^2$; vertical shrink by a factor of $\frac{1}{2}$ and a reflection in the y -axis, followed by a translation 2 units left

13. $f(x) = (x + 4)^2 + 2$; horizontal shrink by a factor of $\frac{1}{3}$ and a translation 2 units up, followed by a reflection in the x -axis

14. Justify each step in writing a rule for g described by the transformations of $f(x) = 4x^2 - 3x$.

translation 3 units up followed by a reflection in the y -axis

$h(x) = f(x) + 3$	
$= 4x^2 - 3x + 3$	
$g(x) = h(-x)$	
$= 4x^2 + 3x + 3$	

15. The height (in feet) of water spraying from a garden hose can be modeled by $h(x) = -0.12x^2 + 0.84x + 2.16$, where x is the horizontal distance (in feet) from the opening of the hose. The hose is raised so that the water hits the ground 1 foot farther away. Write a function that models the new path of the water.