# PC12 Transformations Extra Practice Part I

Name: _____

1. $y = \frac{1}{3}f(x+2) - 2$. Describe this transformation.

   Multiply y's by $\frac{1}{3}$, shift 2 left, 2 down.

2. $f(x) = x^2$. $g(x) = -2f(x+1)$.
   a. Describe this transformation.
      Multiply y's by $-2$, shift 1 left

   b. Actual equation of $g(x)$?
      $g(x) = -2(x+1)^2$
      $g(x) = -2(x^2 + 2x + 1)$
      $g(x) = -2x^2 - 4x - 2$

3. $f(x) = \sqrt{x}$. If possible, describe the following transformation: $y = f\left(-\frac{x}{3}\right)$.

   $y = \sqrt{-\frac{x}{3}}$

   Multiply x's by $-3$

4. Describe the following transformation: $y = \frac{3}{2}f(4x+8) - 2$.

   $y = \frac{3}{2}f(4(x+2)) - 2$

   Multiply y's by $\frac{3}{2}$

   Multiply x's by $\frac{1}{4}$

   Shift 2 left, 2 down

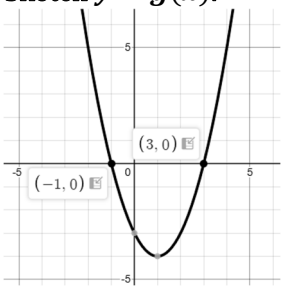
5. Describe the following transformation: $y = f\left(\frac{3}{4}x - 3\right)$.

   $y = f\left(\frac{3}{4}\left(x - \frac{4}{3}\cdot 3\right)\right)$

   $y = f\left(\frac{3}{4}(x-4)\right)$

   Multiply x's by $\frac{4}{3}$, then shift 4 right

6. $f(x) = x^2 + 4x$. $g(x) = f(x-3)$.
   a. Sketch $y = g(x)$.




   b. Evaluate $g(-1)$.
      **0**

7. $f(x) = x^2$. $g(x) = 9f(x)$. $h(x) = g(x) = f(kx)$. Find $k$.

$g(x) = 9f(x) = 9x^2$

$9x^2 = f(kx)$

$9x^2 = (kx)^2$

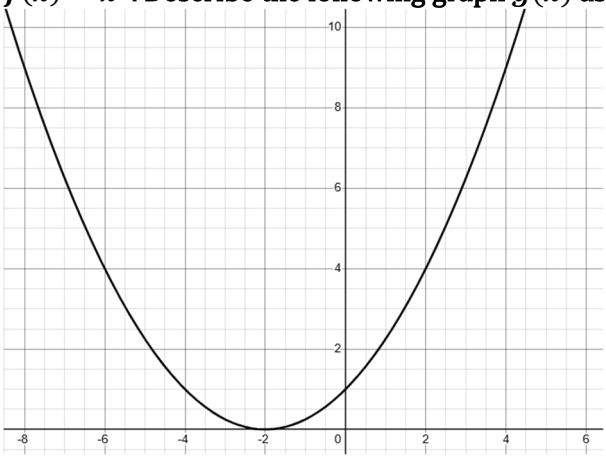
$9x^2 = k^2x^2$

Equating coefficients

$9 = k^2$

$k = \pm\sqrt{9} = \pm 3$

8. $f(x) = x^2$. Describe the following graph $g(x)$ as a transformation of $f(x)$:




$g(x) = a(x+2)^2$

Substitute the point $(0, 1)$

$1 = a(0+2)^2$

$1 = 4a$

$a = \frac{1}{4}$

Thus $g(x) = \frac{1}{4}(x+2)^2$

Now compare to $f(x) = x^2$

$g(x) = \frac{1}{4}f(x+2)$

i.e. Multiply y's by $\frac{1}{4}$, then shift 2 left.

9. $f(x)$ contains the point $(-6, 4)$. $g(x) = -3f(x+1) - 2$. What point must be on $g(x)$?

$(-6, 4) \rightarrow (-6, -12) \rightarrow (-7, -12) \rightarrow (-7, -14)$

Multiply y's by $-3$ One left 2 down

10. Describe the following transformation: $y = f\left(-\frac{3}{4}x + 1\right)$.

$y = f\left(-\frac{3}{4}\left(x - \frac{4}{3}\right)\right)$

Multiply x's by $-\frac{4}{3}$, shift $\frac{4}{3}$ right

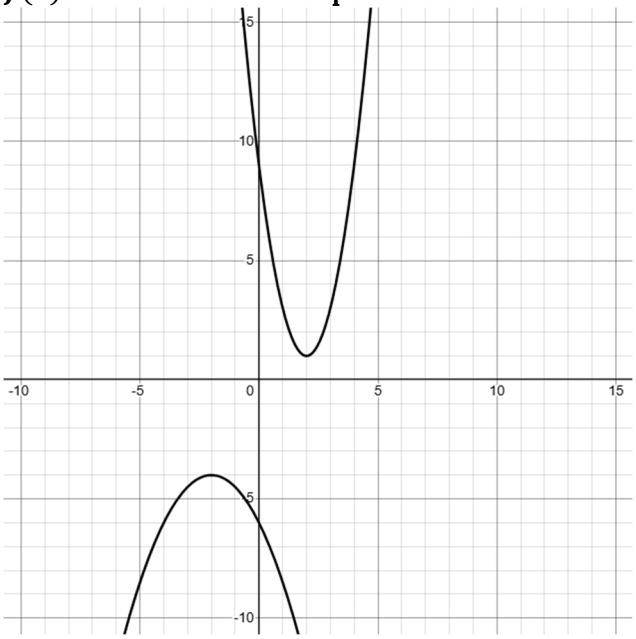
11. $f(x) = x^2 - 3x$. $g(x) = 3f(x+2) + f(x) - 1$.

What is the actual equation of $g(x)$?

$g(x) = 3\left[(x+2)^2 - 3(x+2)\right] + (x^2 - 3x) - 1$

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

12. $f(x)$ is the concave-down parabola below whereas $g(x)$ is the concave-up parabola.



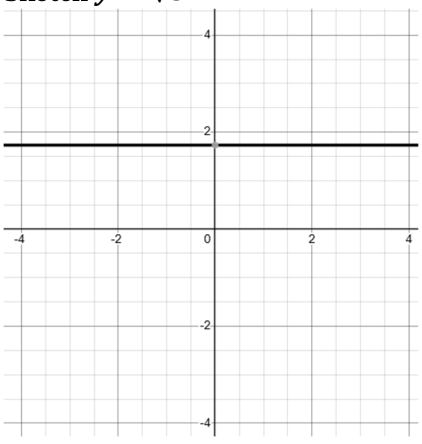

a. Find the equation of $f(x)$.
$f(x) = -\frac{1}{2}(x+2)^2 - 4$

b. Find the equation of $g(x)$.
$g(x) = 2(x-2)^2 + 1$

c. Describe the transformation from $f(x)$ to $g(x)$.
$g(x) = -4f(x-4) + 5$
Multiply y's by $-4$, shift 4 right and 5 right up

13. If possible:

a. Sketch $y = \sqrt{3}$

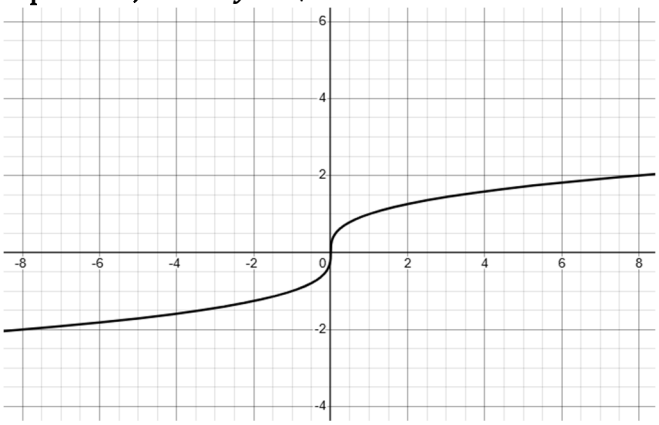



b. Evaluate $\sqrt{\frac{4}{25}}$
$2/5$

c. Evaluate $\sqrt[5]{-32}$
$-2$

d. Evaluate $\sqrt{-4}$
Undefined or $2i$

e. If possible, sketch $y = \sqrt[3]{x}$




14. $f(x) = x^3$. Sketch $y = -2f(x+2)$ and label 3 points.