

Tomorrow
In Class

- D 1. The graph $y = f(x)$ contains the point $(3, 4)$. After a transformation, the point $(3, 4)$ is transformed to $(5, 5)$. Which of the following is a possible equation of the transformed function?
 A $y + 1 = f(x + 2)$ B $y + 1 = f(x - 2)$ C $y - 1 = f(x + 2)$ D $y - 1 = f(x - 2)$
- C 2. The graph of $y = |x|$ is transformed by a vertical stretch by a factor of 3 about the x -axis, and then a horizontal translation of 3 units left and a vertical translation up 1 unit. Which of the following points is on the transformed function? $(x, y) \rightarrow (x-3, 3y+1)$
 A $(0, 0)$ B $(1, 3)$ C $(-3, 1)$ D $(3, 1)$
- A 3. Which of the following transformations would produce a graph with the same x -intercepts as $y = f(x)$?
 A $y = -f(x)$ B $y = f(-x)$ C $y = f(x + 1)$ D $y = f(x) + 1$

Ref: x -axis $(x, y) \rightarrow (x, -y)$

Ref: y -axis $(x, y) \rightarrow (-x, y)$

$(x, y) \rightarrow (x-1, y)$

$(x, y) \rightarrow (x, y+1)$

- B 4. Given the graph of $y = f(x)$, what is the invariant point under the transformation $y = f(-2x)$?

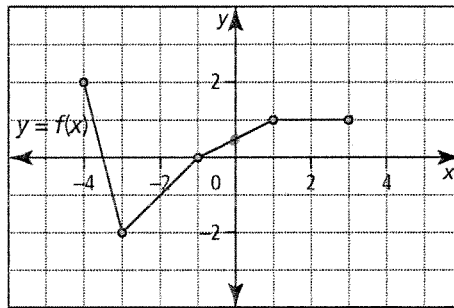
A $(-1, 0)$

B $(0, \frac{1}{2})$

C $(1, 1)$

D $(3, 1)$

Ref: y -axis
 H.S. = $\frac{1}{2}$
 $(x, y) \rightarrow (-\frac{1}{2}x, y)$
 $(0, \frac{1}{2}) \rightarrow (0, \frac{1}{2})$
 Invariant



- A 5. What will the transformation of the graph of $y = f(x)$ be if y is replaced with $-y$ in the equation $y = f(x)$?
 A It will be reflected in the x -axis. B It will be reflected in the y -axis.
 C It will be reflected in the line $y = x$. D It will be reflected in the line $y = -1$.

$-y = f(x)$

$y = -f(x)$

Ref: x -axis

Short Answer

6. If the range of function $y = f(x)$ is $\{y \mid y \geq 4\}$, state the range of the new function $g(x) = f(x + 2) - 3$.
 $\Rightarrow \{y \mid y \geq 1\}$
 3 units Down

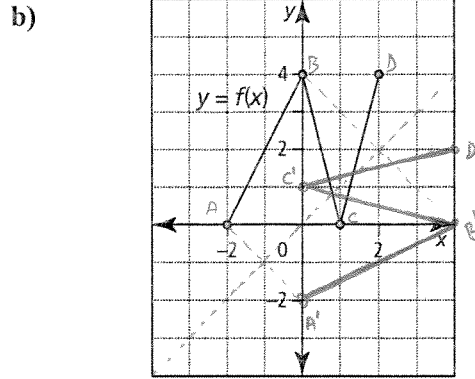
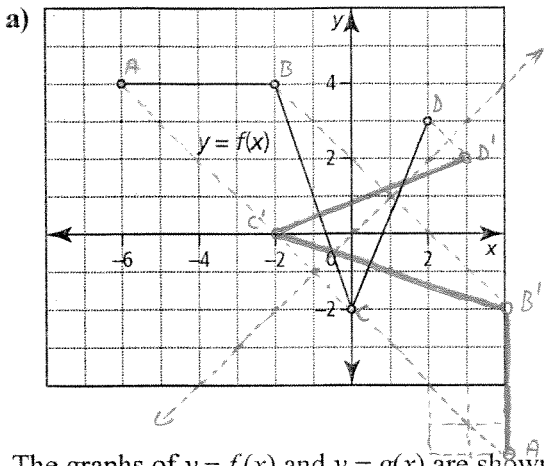
7. As a result of the transformation of the graph of $y = f(x)$ into the graph of $y = -3f(x + 2) - 5$, the point $(2, 5)$ becomes point (x, y) . Determine the value of (x, y) .
 $(x, y) \rightarrow (x-2, -3y-5)$ $(2, 5) \rightarrow (0, -20)$

8. The graph of $f(x)$ is stretched horizontally by a factor of $\frac{1}{2}$ about the y -axis and then stretched vertically by a factor of $\frac{1}{3}$ about the x -axis. Determine the equation of the transformed function.

V.S. = $\frac{1}{3}$ $y = f(x) \Rightarrow y = \frac{1}{3} \cdot f(2x)$
 H.S. = $\frac{1}{2}$

Extended Response

9. Copy the graph of each relation. Then, sketch the graph of the inverse relation.

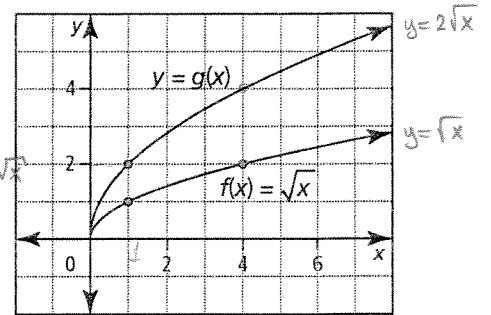


10. The graphs of $y = f(x)$ and $y = g(x)$ are shown.

a) If the point $(1, 1)$ on $y = f(x)$ maps onto the point $(1, 2)$ on $y = g(x)$, describe the transformation and state the equation of $g(x)$.

a) $y = g(x) = 2 \cdot \sqrt{x}$
 $(x, y) \rightarrow (x, 2y)$ v.s. = 2

b) $y = g(x) = \sqrt{4x} = 2\sqrt{x}$
 H.S. = $\frac{1}{4}$



b) If the point $(4, 2)$ on $y = f(x)$ maps onto the point $(1, 2)$ on $y = g(x)$, describe the transformation and state the equation of $g(x)$.

11. Consider the graph of the function $y = f(x)$.

- A $(-3, -1) \rightarrow (3/2, 1)$
- B $(-2, 1) \rightarrow (2, 7)$
- C $(2, 3) \rightarrow (0, 13)$
- D $(4, -3) \rightarrow (-1, -5)$

a) Describe the transformation of $y = f(x)$ to $y = 3f(-2(x-1)) + 4$.

v.s. = 3
 H.S. = $\frac{1}{2}$
 v.t. = 4 up
 H.T. = 1 Right

b) Sketch the graph.

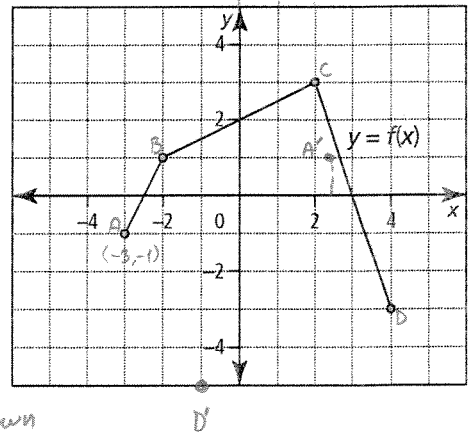
$(x, y) \rightarrow (-\frac{x}{2} + 1, 3y + 4)$ Reflection: y-axis

12. A function is defined by

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

a) If $g(x) = kf(x)$, describe how k affects the y-intercept of the graph of the function $y = g(x)$ compared to $y = f(x)$.

Directly Proportional with k
 moves Up or Down



b) If $h(x) = f(mx)$, describe how m affects the x-intercepts of the graph of the function $y = h(x)$ compared to $y = f(x)$.

$h(x) = f(mx) = (mx+2)(mx-3)$
 $x_1 = -2/m$
 $x_2 = 3/m$
 Inversely Proportional with m
 Graph gets wider or skinnier

13. Complete the following for the quadratic function $f(x) = x^2 - 2x + 1$.

a) Write the equation of $f(x)$ in the form $y = a(x-h)^2 + k$.

$= (x-1)^2$
 $\Rightarrow y = 1(x-1)^2 + 0$

b) Determine the coordinates of the vertex of $x = f(y)$.

$V(1, 0)$

c) State the equation of the inverse.

$(x-1)^2 \rightarrow x$
 $|x-1| \rightarrow \sqrt{x}$

d) Restrict the domain of $y = f(x)$ so that its inverse is a function.

$x \geq 1$
 $f^{-1}(x) = \sqrt{x} + 1$

$x-1 \rightarrow \sqrt{x}$ $-(x-1) \rightarrow \sqrt{x}$
 $x \rightarrow \sqrt{x+1}$ $-x+1 \rightarrow \sqrt{x}$
 $-x \rightarrow \sqrt{x-1}$
 $x \rightarrow -\sqrt{x+1}$