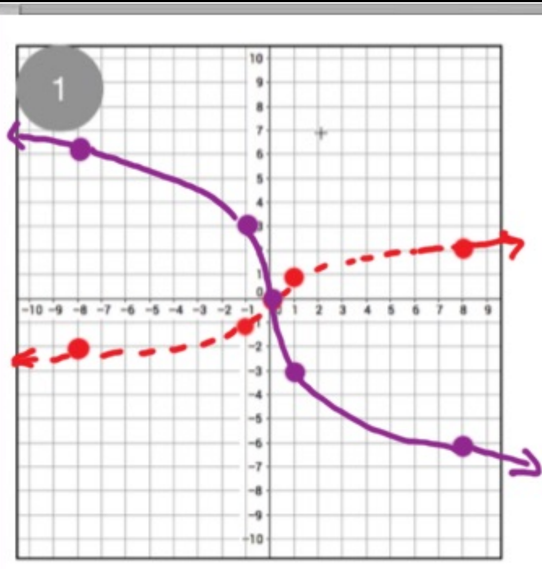
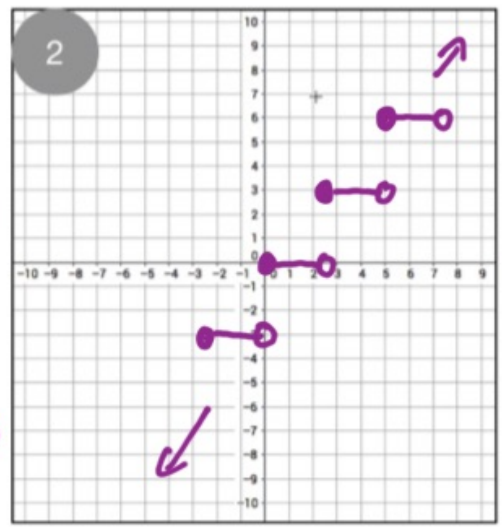
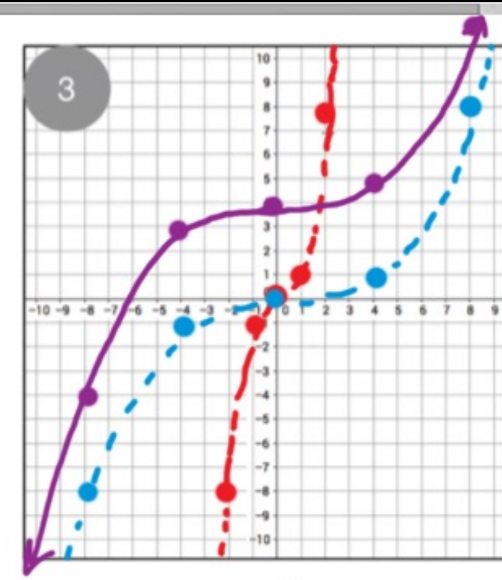






The following are graphs to be sketch on the opposite side of the paper. You MUST use accurate points. Show all iterations of the multiplier and shifts in different colors. After, state the domain of the function in interval notation.

1. $f(x) = -3\sqrt[3]{x}$

Domain: $(-\infty, \infty)$

2. $f(x) = 3\left[\!\left[\frac{2}{5}x\right]\!\right]$

Domain: $(-\infty, \infty)$

3. $f(x) = \left(\frac{1}{4}x\right)^3 + 4$

Domain: $(-\infty, \infty)$

4. $f(x) = -1|x+2| + 7$

Domain: ______________

5. $f(x) = -2\sqrt{-x}$

Domain: ______________

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

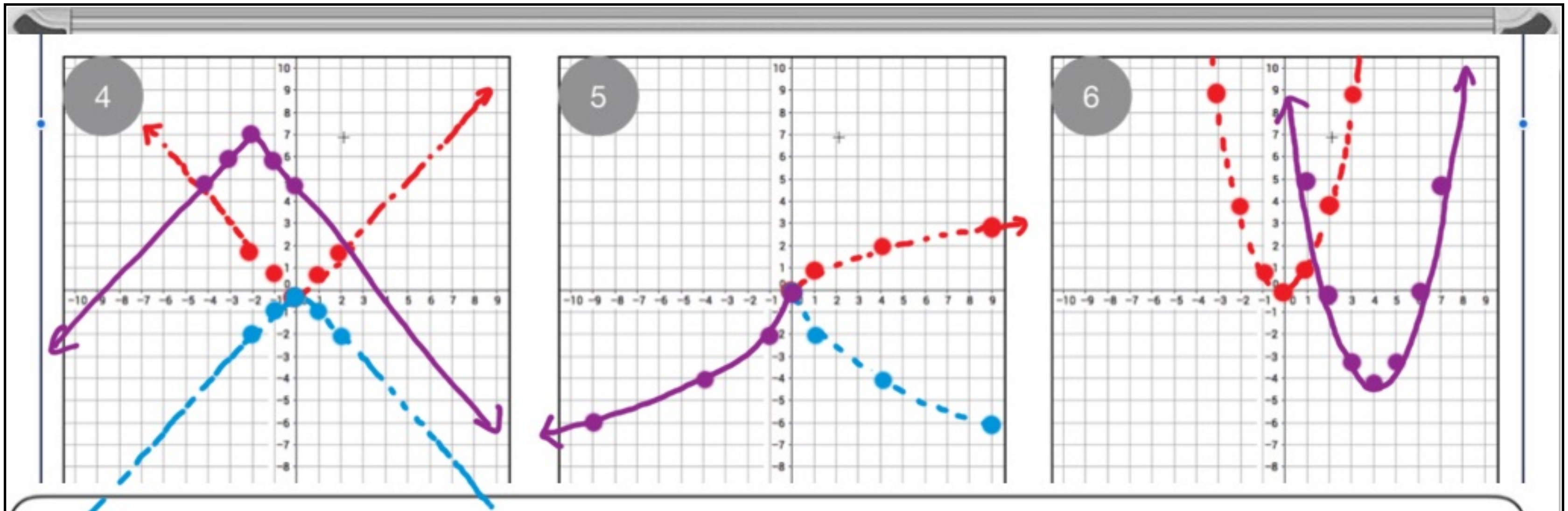
Domain: ______________

7. $f(x) = \begin{cases} x^2; \ x < 2 \\ -x + 6; \ x > 2 \end{cases}$

Domain: ______________

8. $f(x) = \begin{cases} -|x+6| + 3; \ -9 \le x \le -3 \\ x^2 - 9; \ -3 < x < 0 \\ \frac{1}{2}x - 9; \ x \ge 0 \end{cases}$

Domain: ______________



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Domain: $(-\infty, \infty)$

5. $f(x) = -2\sqrt{-x}$

Domain: $(-\infty, 0]$

6. $f(x) = (x-4)^2 - 4$ $(-\infty,\infty)$

Domain: ________________

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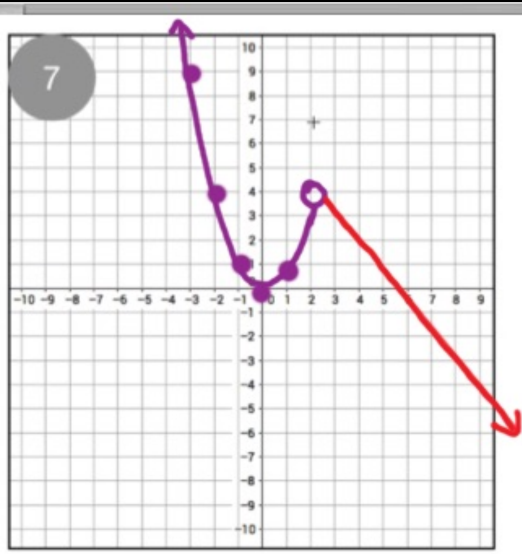

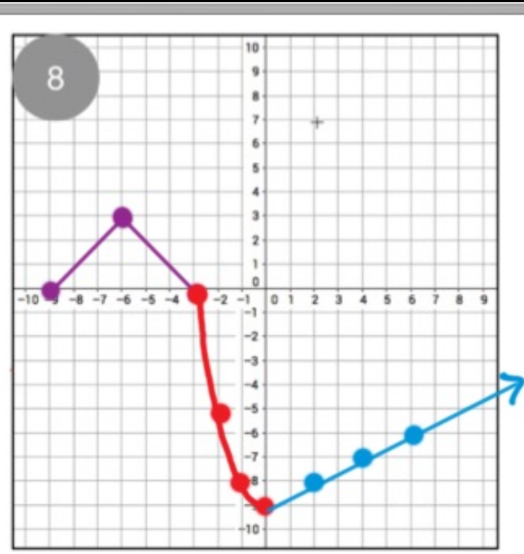

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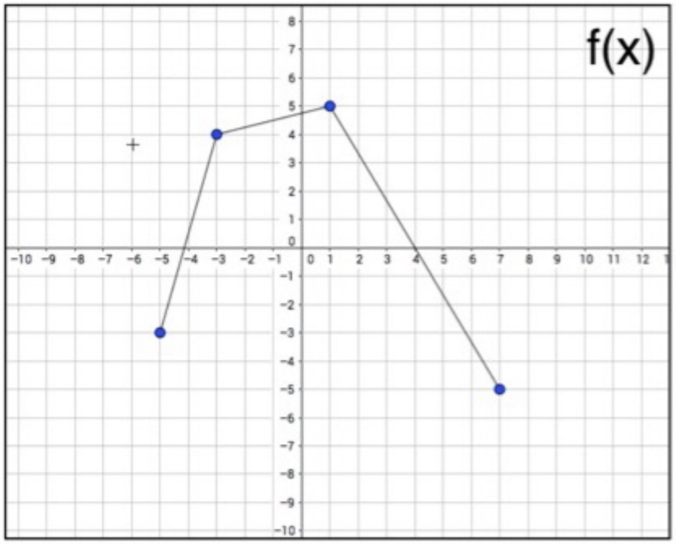
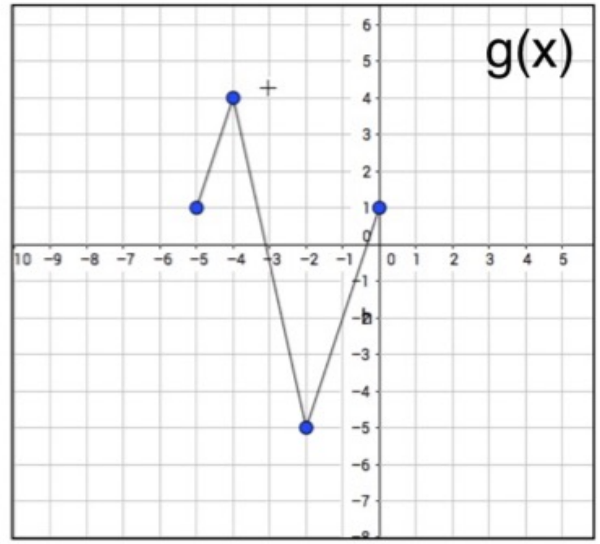




Evaluate the following based on the graphs of f(x) and g(x).

$f(7) =$ -5

$g(-4) =$ 4

$f^{-1}(5) =$ 1

$g^{-1}(-5) =$ -2

$5f(-5) + g^{-1}(4) =$ $5(-3) + (-4) = -19$

$(f \circ g)(-4) =$ $f(4) = 0$

$(g^{-1} \circ f)(7) =$ $g^{-1}(-5) = -2$

State three attributes of inverse functions.

a. The graphs of the inverses reflect over the y=x line.

b. The domain and ranges switch.

c. $f[f^{-1}(x)] = x$ and $f^{-1}[f(x)] = x$

Find the inverse of the following functions. Restrict the domain if necessary. Be prepared to state if the function is one-to-one and describe a test the reveals this attribute. Be prepared to decide if an inverse function cannot be determined by algebraic means.

$h(x) = \frac{-3}{2x-5} + 1$

$x = \frac{-3}{2y-5} + 1$

$x - 1 = \frac{-3}{2y-5}$

$(x-1)(2y-5) = -3$

$2xy - 5x - 2y + 5 = -3$

$y(2x-2) = 5x - 8$

$h^{-1}(x) = \frac{5x-8}{2x-2}$

$f(x) = -2\sqrt{x-4}$

$x = -2\sqrt{y-4}$

$-\frac{x}{2} = \sqrt{y-4}$

$y - 4 = \left(\frac{-x}{2}\right)^2$

$y = \frac{x^2}{4} + 4$

$f^{-1}(x) = \frac{x^2}{4} + 4; x \leq 0$

$g(x) = 2(x-4)^2 - 1$

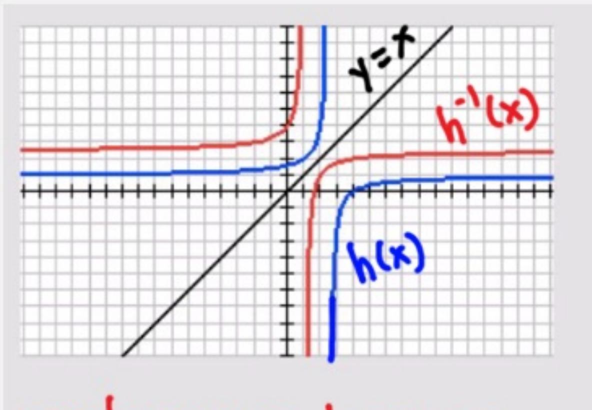
$x = 2(y-4)^2 - 1$

$\frac{x+1}{2} = (y-4)^2$

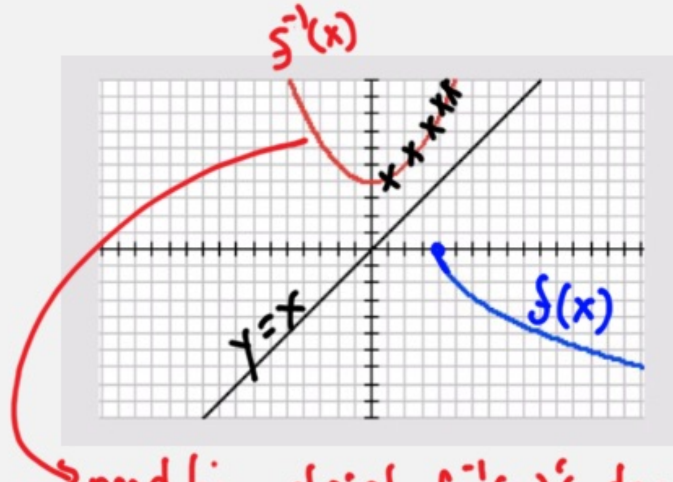
$y - 4 = \pm\sqrt{\frac{x+1}{2}}$

$y = \pm\sqrt{\frac{x+1}{2}} + 4$

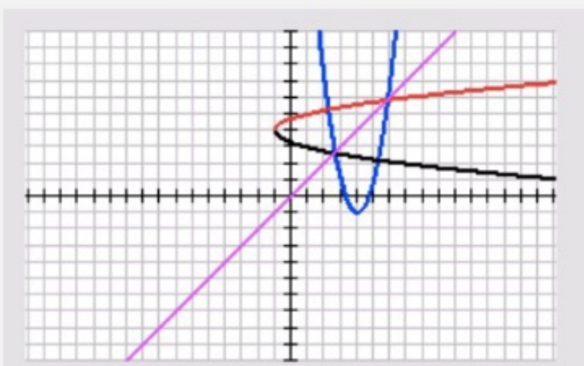
$g^{-1}(x) = \pm\sqrt{\frac{x+1}{2}} + 4$



graphs are one-to-one as original passes the H.L.T



need to restrict $f^{-1}(x)$'s domain so that it will follow the properties of inverses and be one-to-one.



$g(x)$ is not one-to-one as it fails the H.L.T test (and the relation build has a $\pm$)

Verify the following functions are inverses algebraically, numerically and graphically.

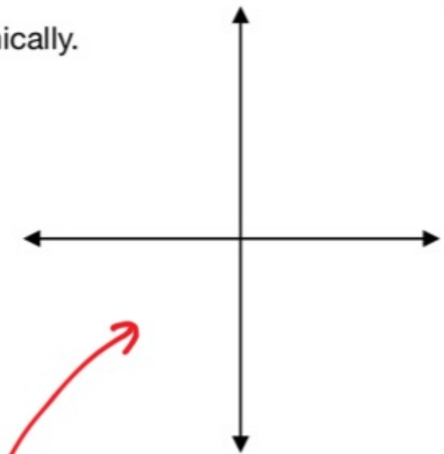
$f(x) = 2x^3 + 3 \qquad g(x) = \left(\dfrac{x-3}{2}\right)^{1/3}$

$f(3) = 57 \qquad g(3) = 0$

$g(57) = 3 \qquad f(0) = 3$

NORMAL FLOAT AUTO REAL RADIAN MP

X	Y_1	Y_2
3	57	0
0	3	-1.145
57	370389	3
X	f(x)	g(x)



$f \circ g(x)$

$f[g(x)]$

$2\left[\left(\dfrac{x-3}{2}\right)^{\cancel{1/3}}\right]^{\cancel{3}} + 3$

$\cancel{2}\left(\dfrac{x-3}{\cancel{2}}\right) + 3$

$x \cancel{-3} \cancel{+3} \rightarrow x$

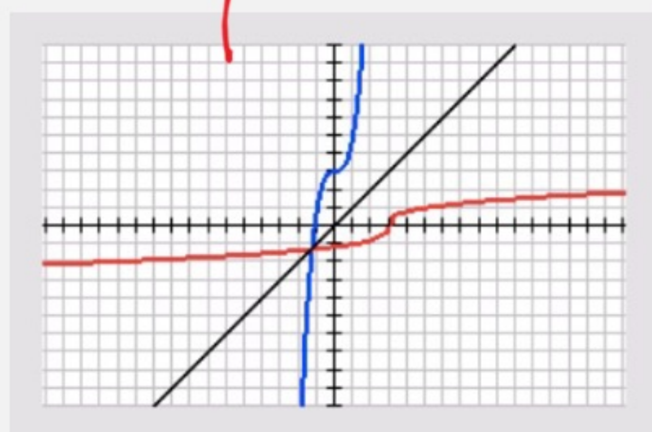
$g \circ f(x)$

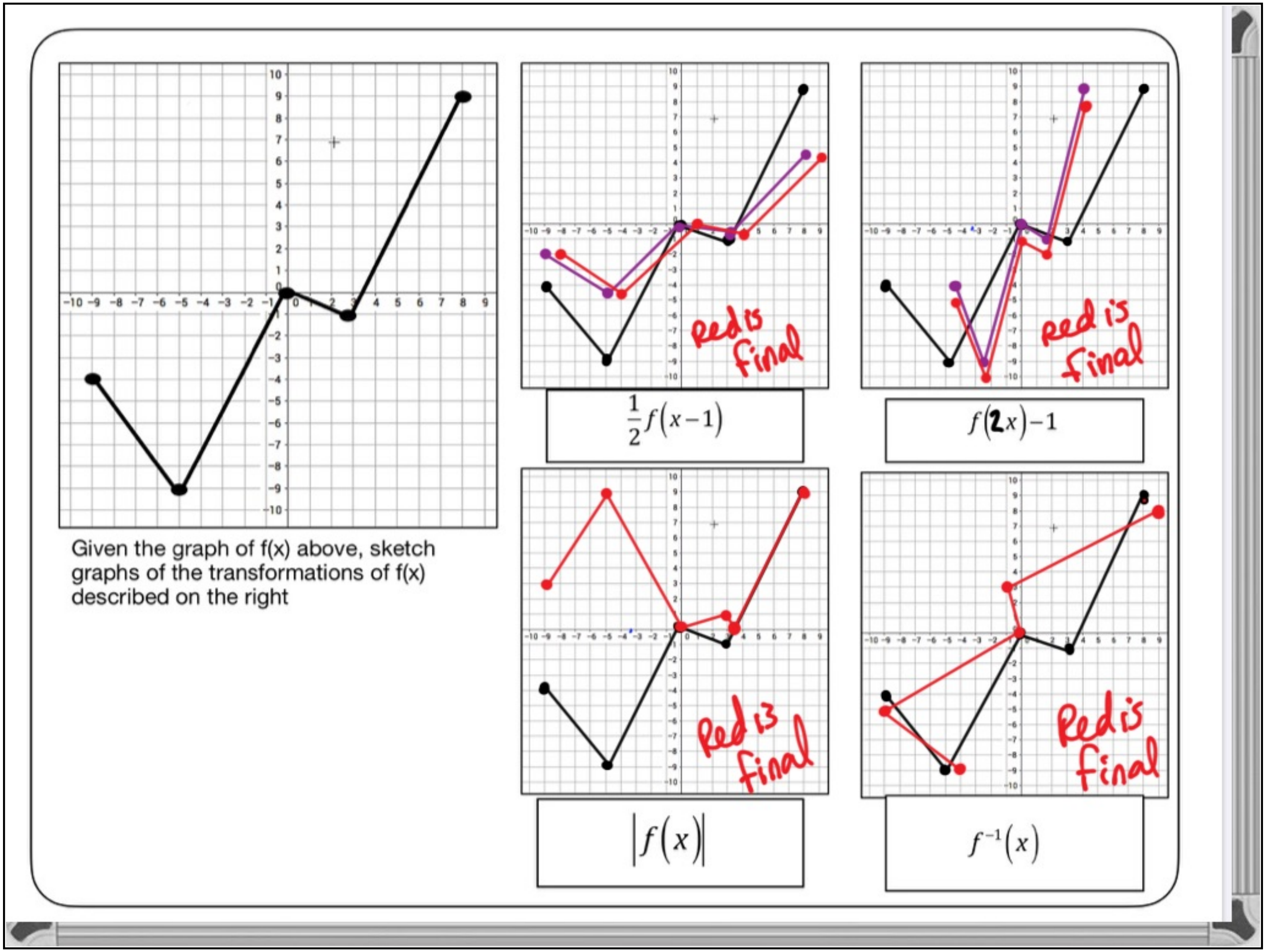
$g[f(x)]$

$\left[\dfrac{(2x^3 \cancel{+3}) \cancel{-3}}{2}\right]^{1/3}$

$\left(\dfrac{\cancel{2}x^3}{\cancel{2}}\right)^{1/3} \rightarrow (x^{\cancel{3}})^{\cancel{1/3}}$

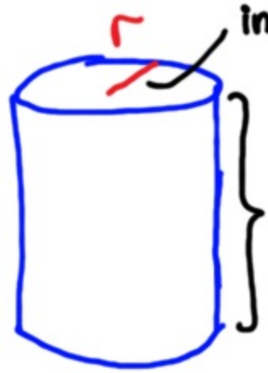
x




Given the graph of f(x) above, sketch graphs of the transformations of f(x) described on the right
$\frac{1}{2}f(x-1)$
Red is final
$f(2x)-1$
red is final
$|f(x)|$
Red is final
$f^{-1}(x)$
Red is final

Suppose a cylinder's radius is changing 4 inches per minute. If the cylinders is 14 inches tall AT ALL TIMES, write a function for the cylinder's volume (cubic feet) with respect to time in minutes. Then use the function and your graphing calc to complete the table below.

$V = \pi r^2 h$ is the volume of a cylinder so you don't have to google it.



Time in Minutes	Volume in Cubic Feet
1	0.407 ft^3
5	10.181 ft^3
10	40.724 ft^3
20	162.897 ft^3

$r(t) = \frac{1}{3}(t)$ $\quad V(r) = \pi r^2 \left(\frac{7}{6}\right)$

Need to convert to Feet to answer problem correctly.

4 inches/min $\rightarrow$ $\frac{1}{3}$ Feet/min

14 inches $\rightarrow$ $\frac{7}{6}$ feet

$$\boxed{V \circ r(t) = \pi \left[\frac{1}{3} t\right]^2 \left(\frac{7}{6}\right)}$$