7. Determine (yes/no) whether the functions below are inverse functions. Be sure to show all of the work for both compositions, $[f \circ g](x)$ and $[g \circ f](x)$ to prove.

$f(x) = 10 - \frac{x}{2}$ $\qquad$ $g(x) = 20 - 2x$

$f(20-2x) = 10 - \left(\frac{20-2x}{2}\right)$

$= 10 - (10 - x)$

$= 10 - 10 + x$

$= x$

$g\left(10 - \frac{x}{2}\right) = 20 - 2\left(10 - \frac{x}{2}\right)$

$= 20 - 20 + \frac{2x}{2}$

$= \frac{2x}{2}$

$= x$

yes

8. Graph. Then state the domain and range of the function.

$y = \sqrt{3x+9} - 2$

$3x + 9 \geq 0$

$3x \geq -9$

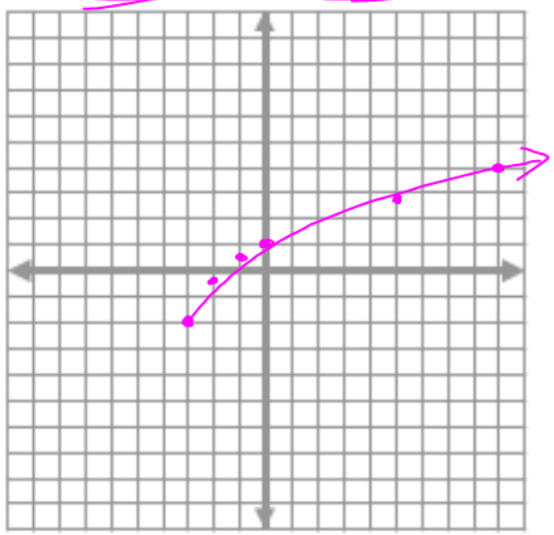
$x \geq -3$

Domain

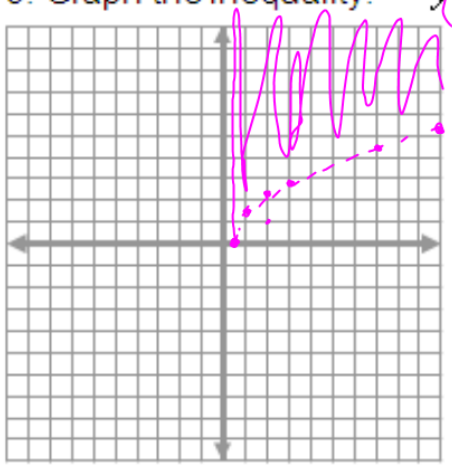
Range

$y \geq -2$

x	y
-3	-2
-2	-.3
-1	.4
0	1
5	2.9
9	4



9. Graph the inequality: $y > \sqrt{3m-1}$



m	y
$\frac{1}{3}$	0
1	1.4
2	2.24
3	2.8
7	4.5
10	5.3

$3m - 1 \geq 0$

$3m \geq 1$

$m \geq \frac{1}{3}$

$(2, 1)$

$1 > \sqrt{3(2)-1}$

$1 > \sqrt{5}$

$1 > 2.24$

false

17. $\frac{8}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{8\sqrt{2}}{\sqrt{4}} = \frac{8\sqrt{2}}{2} = 4\sqrt{2}$

25. $-4 + (3x+6)^{\frac{1}{2}} = 18$

$(\sqrt{3x+6})^2 = (22)^2$

$3x + 6 = 484$

$3x = 478$

$x = \frac{478}{3}$

$-4 + \sqrt{3(\frac{478}{3}) + 6} = 18$

$-4 + \sqrt{484} =$

$-4 + 22 =$

$18 = 18$

27

$$t = \sqrt{\frac{d}{16}}$$

$$(8)^2 = \left(\sqrt{\frac{d}{16}}\right)^2$$

$$(16)\,64 = \frac{d}{16}(16)$$

$$1024\text{ ft} = d$$

$$8 = \sqrt{\frac{d}{16}}$$

$$8 = \frac{\sqrt{d}}{\sqrt{16}}$$

$$(4)\,8 = \frac{\sqrt{d}}{4}(4)$$

$$(32)^2 = \left(\sqrt{d}\right)^2$$

$$= d$$

28

$$L = \pi r\sqrt{r^2+h^2}$$

$$\frac{6.5\cancel{\pi}}{5\cancel{\pi}} = \frac{\pi(5)\sqrt{5^2+h^2}}{5\pi}$$

$$(13)^2 = \left(\sqrt{25+h^2}\right)^2$$

$$169 = 25 + h^2$$

$$\pm\sqrt{144} = \sqrt{h^2}$$

$$\pm 12 = h$$

12 m

18. $\frac{4+\sqrt{2}}{2-\sqrt{2}} \cdot \frac{2+\sqrt{2}}{2+\sqrt{2}} = \frac{8+4\sqrt{2}+2\sqrt{2}+\sqrt{4}}{4+\cancel{2\sqrt{2}}-\cancel{2\sqrt{2}}-\sqrt{4}}$

-2

$= \frac{10+6\sqrt{2}}{2} = 5+3\sqrt{2}$

$x^2 \cdot x^7 = x^9$ $\quad (x^2)^5 = x^{10}$

$\frac{x^8}{x^6} = x^2$

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a. $\dfrac{c^{\frac{12}{5}} \cdot c^{\frac{3}{5}}}{c^3} = \dfrac{c^{\frac{15}{5}}}{c^3} = \dfrac{c^3}{c^3} = c^0 = 1$

c. $\dfrac{x^{\frac{9}{4}}}{x^{\frac{3}{2} \cdot \frac{2}{2}}} = \dfrac{x^{\frac{9}{4}}}{x^{\frac{6}{4}}} = x^{\frac{3}{4}}$

20 b. $\sqrt[4]{h^7}$ $\quad h^{\frac{7}{4}}$

3. If $f(x) = x^2 - 4x$ and $g(x) = x + 7$,
find $[f \circ g](x)$. $= f(x+7) = (x+7)^2 - 4(x+7)$

$(x+7)(x+7)$

$= x^2 + 7x + 7x + 49 - 4x - 28$

$= x^2 + 10x + 21$

$\left(\dfrac{f}{g}\right)(x) = \dfrac{3x+1}{2x-3}, \; x \neq \dfrac{3}{2}$

$2x - 3 = 0$
$2x = 3$
$x = \frac{3}{2}$

6. Find the inverse of the function below.
Then graph the function and its inverse.

$f(x) = -2x + 4$

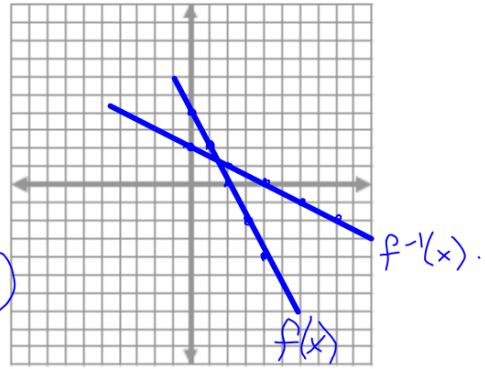
$y = -2x + 4$

$x = -2y + 4$

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

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

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



$\sqrt{2x^8}$

$20x^4\sqrt{2}$

$\cancel{4\sqrt{a}}$ $\sqrt[4]{a}$ $\sqrt{n^9}$

$32^{-\frac{2}{5}} = \frac{1}{32^{\frac{2}{5}}} = \frac{1}{\sqrt[5]{32^2}} = \frac{1}{4}$

(14) $(4\sqrt{12})(3\sqrt{20})$

$12\sqrt{240}$

$12\sqrt{16}\sqrt{15}$

$12 \cdot 4\sqrt{15}$

$48\sqrt{15}$