

Solve the equations. Be sure to check for extraneous solutions.

1. $\sqrt{x+3} - 1 = 7$

$$\begin{aligned} & \sqrt{x+3} = 8 \\ & (\sqrt{x+3})^2 = 8^2 \\ & x+3 = 64 \\ & \underline{-3 \quad -3} \\ & x = 61 \end{aligned}$$

2. $(x-3)^2 = \sqrt{2x-7}^2$

multiply using foil \rightarrow

$$\begin{aligned} (x-3)(x-3) &= 2x-7 \\ x^2 - 3x - 3x + 9 &= 2x-7 \\ x^2 - 6x + 9 &= 2x-7 \\ \underline{-2x+7 \quad -2x+7} & \\ x^2 - 8x + 16 &= 0 \end{aligned}$$

factor, solve for x

$$\begin{aligned} x^2 - 8x + 16 &= 0 \\ (x-4)(x-4) &= 0 \\ \boxed{x=4} \end{aligned}$$

3. $2 = \sqrt{\frac{x}{2}}$

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$4 = \frac{x}{2}$ opposite of division is multiplication (multiply 2 times 4)

$\boxed{x=8}$

4. $3\sqrt{x+6} - 10 = 14$

$$\begin{aligned} & \text{+10} \quad \text{+10} \\ 3\sqrt{x+6} &= 24 \\ \underline{\quad \quad \quad 3} & \\ \sqrt{x+6} &= 8 \end{aligned}$$

$$\begin{aligned} (\sqrt{x+6})^2 &= 8^2 \\ x+6 &= 64 \\ \underline{-6 \quad -6} & \\ \boxed{x=58} \end{aligned}$$

5. $x = 5 + (3x-11)^{1/2}$

$$\begin{aligned} x &= 5 + \sqrt{3x-11} \\ -5 \quad -5 & \\ x-5 &= \sqrt{3x-11} \end{aligned}$$

$$\begin{aligned} (x-5)^2 &= (\sqrt{3x-11})^2 \\ (x-5)(x-5) &= 3x-11 \\ x^2 - 5x - 5x + 25 &= 3x-11 \\ x^2 - 10x + 25 &= 3x-11 \end{aligned}$$

Set one side equal to zero

$$\begin{aligned} x^2 - 10x + 25 &= 3x - 11 \\ \underline{-3x + 11 \quad -3x + 11} & \\ x^2 - 13x + 36 &= 0 \end{aligned}$$

factor, solve for x

$$(x-9)(x-4) = 0 \quad 4$$

$x=9$

6. Describe the translation from the parent function, $y = \sqrt{x}$, of the graph to $-3\sqrt{x+4} - 2$

- reflection
- 3 vertical stretch
- +4 shifts left 4 units
- 2 shifts down 2 units

7. Describe the translation from the parent function, $y = \frac{1}{x}$ of the graph to $y = -\frac{1}{x}$

Next time we will cover inverse variation functions

8. Describe the translation from the parent function $y = \sqrt[3]{x}$ of the graph to $y = -\frac{1}{2} \sqrt[3]{x-2} + 4$

- reflections
- $\frac{1}{2}$ vertical compression
- 2 right 2 units
- 4 up 4 units

9. Find the inverse for the following relation. $\{(-3, 4), (2, -3), (-4, 5), (-1, -3)\}$

$$(4, -3)(-3, 2)(5, -4)(-3, -1)$$

WORKSHEET 14 INVERSES
 Step 1: Switch x and y
 Step 2: Solve for y

10. Find the inverse equation for the following.

a) $y = -3x - 12$

$$\begin{aligned} x &= -3y - 12 \\ +12 & \quad +12 \\ \hline x + 12 &= -3y \\ \frac{x+12}{-3} &= \frac{-3y}{-3} \end{aligned}$$

$-1/3x - 4 = y$

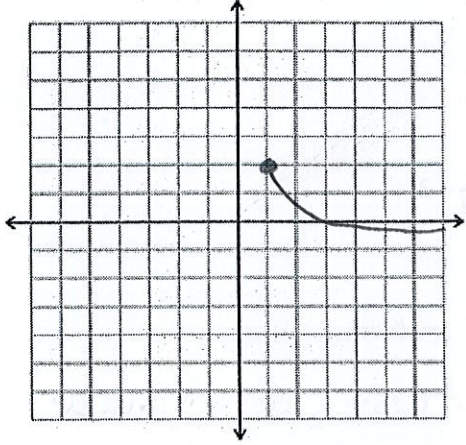
b) $y = -1/3x - 6$

$$\begin{aligned} x &= -1/3y - 6 \\ +6 & \quad +6 \\ \hline x + 6 &= -1/3y \\ \frac{x+6}{-1/3} &= \frac{-1/3y}{-1/3} \end{aligned}$$

$-3(x+6) = y$
 $-3x - 18 = y$

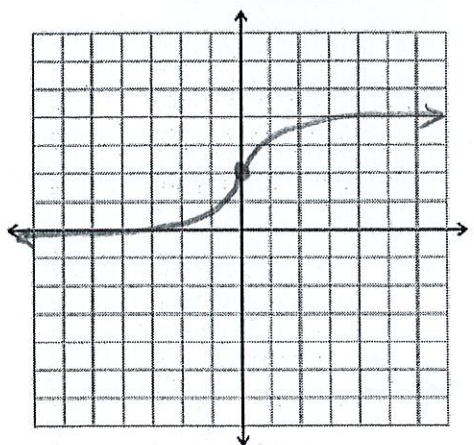
multiply by reciprocal ($-3/1$)

11. Graph the function $y = -3\sqrt{x-1} + 2$



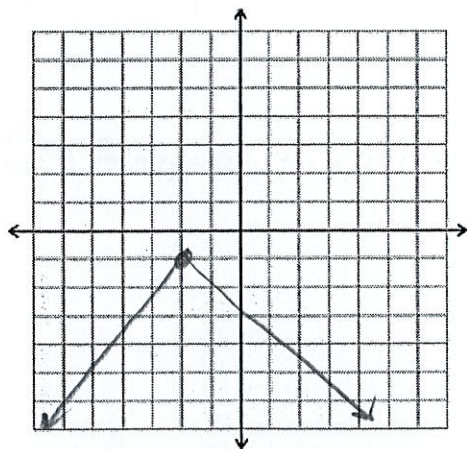
D: $x \geq 1$
 R: $y \leq 2$

12. Graph the function $y = 3\sqrt[3]{x} + 2$



D: $x = \mathbb{R}$
 R: $y = \mathbb{R}$

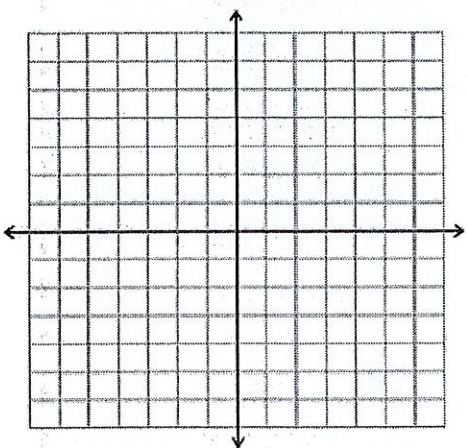
13. Graph the function $y = -2|x + 2| - 1$



$D: x = \mathbb{R}$

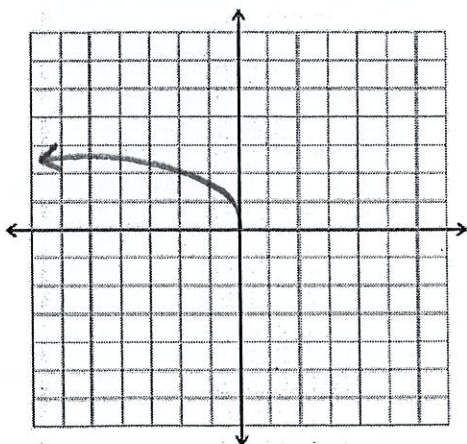
$R: y \leq -1$

14. Sketch the asymptotes and graph the function $y = -\frac{4}{x+2} - 3$



next time we
will test on inverse
functions

15. Graph the function $y = \sqrt{-x}$



$D: x \leq 0$

$R: y \geq 0$