

# Reversing Operations

$$K: \quad 3|x-5|+11=20$$

-11     -11

$$\frac{3|x-5|}{3} = \frac{9}{3}$$

$$|x-5|=3$$

$$x-5=3$$
$$x=8$$

$$x-5=-3$$
$$x=2$$

$$Q: \quad 5(x+1)^2+6=186$$

-6     -6

$$\frac{5(x+1)^2}{5} = \frac{180}{5}$$

$$(x+1)^2=36$$

$$x+1=6$$

$$x=5$$

$$x+1=-6$$

$$x=-7$$

$$J: \quad 3\left(\frac{x-5}{3}-4\right)=-11$$

$$x-5-12=-33$$

$$x-17=-33$$

$$x=-16$$

$$10: \quad \frac{1}{2} \sqrt[3]{x+1} - 5 = -3$$

+5     +5

$$2 \cdot \left(\frac{1}{2} \sqrt[3]{x+1}\right) = (2) \cdot 2$$

$$\left(\sqrt[3]{x+1}\right)^3 = (4)^3$$

$$x+1=64$$

$$x=63$$

$$9) \quad \begin{array}{r} 4 - 5|x+1| = -21 \\ -4 \qquad \qquad -4 \end{array}$$

$$\begin{array}{r} -5|x+1| = -25 \\ -5 \qquad \qquad -5 \end{array}$$

$$|x+1| = 3$$

$$\begin{array}{l} x+1 = 3 \\ \hline x = 4 \end{array}$$

$$\begin{array}{l} x+1 = -3 \\ \hline x = -4 \end{array}$$

$$8) \quad \begin{array}{r} 4(x-2)^3 - 7 = 101 \\ +7 \qquad +7 \end{array}$$

$$\begin{array}{r} 4(x-2)^3 = 108 \\ 4 \qquad \qquad 4 \end{array}$$

$$\sqrt[3]{(x-2)^3} = \sqrt[3]{27}$$

$$x-2 = 3$$

$$x = 5$$

$$\rightarrow \left( \frac{1}{x+2} - 3 \right) = \left( \frac{10}{x+2} \right) (x+2)$$

$$1 - 3x - 6 = 10$$

$$-3x - 5 = 10$$

$$\begin{array}{r} -3x - 5 = 10 \\ +5 \qquad +5 \\ -3x = 15 \\ \hline -3 \qquad -3 \\ x = -5 \end{array}$$

$$6) \quad |x-4| = 2x$$

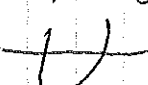
$$\begin{array}{l} x-4 = 2x \\ -x \qquad -x \\ \hline -4 = x \end{array}$$

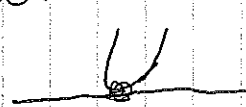

$$\begin{array}{l} x-4 = -2x \\ -x \qquad -x \\ \hline -4 = -3x \end{array}$$

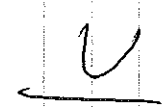

$$\frac{4}{3} = x$$

# Extra Practice

3) SADMEP: Subtract  $k$ ,  
Divide  $a$ ,  
Square root,  
Add  $h$

Usually get 2 solutions because graph looks like this:  or because positive numbers have 2 square roots ( $\sqrt{9} = \pm 3$ )

Get 1 solution if graph looks like this:  or  or because zero has 1 square root ( $\sqrt{0} = 0$ )

Get 0 solutions if graph looks like this:  or  or because negatives don't have square roots ( $\sqrt{-3} \neq ?$ )

4)  $p(t) = -16(t-2)^2 + 70$

a) Platform means  $t=0$ .  $p(0) = -16(0-2)^2 + 70$

$-16(4) + 70 = -64 + 70 = 6$

6 feet high

b) Max height = Vertex =  $(2, 70)$ . 70 feet high.

c)  $-16(t-2)^2 + 70 = 50$

$-16(t-2)^2 = -20$

$(t-2)^2 = \frac{5}{4}$

$t-2 = \pm\sqrt{5/4}$

$t = 2 + \sqrt{5/4}$

Ignore the negative

$$5a) \sqrt{x-1} + 2 = 5$$

$$(\sqrt{x-1})^2 = (3)^2$$

$$x-1=9$$

$$x=10$$

$$b) -12 + 4\sqrt{x+1} = -8$$

$$4\sqrt{x+1} = 4$$

$$\sqrt{x+1} = 1$$

$$x+1=1$$

$$x=0$$

$$c) 2\sqrt{3x-2} + 4 = 16$$

$$\frac{2\sqrt{3x-2}}{2} = \frac{12}{2}$$

$$\sqrt{3x-2} = 6$$

$$3x-2=36$$

$$3x=38$$

$$x = \frac{38}{3}$$

$$d) \sqrt{x+2} = x$$

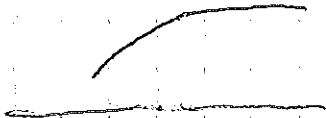
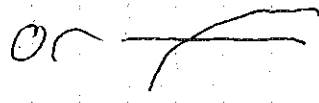
$$x+2 = x^2$$

$$0 = x^2 - x - 2$$

	$x-2$
$x$	$x^2 - 2x$
$1$	$x - 2$

$$(x+1)(x-2)$$

$$x = -1 \quad x = 2$$

6) SADMIP. 1 solution or 0 solutions depending on graph  or 

$$7) a) 5(x-1)^3 + 1 = -4$$

$$5(x-1)^3 = -5$$

$$(x-1)^3 = -1$$

$$(x-1) = -1$$

$$x = 0$$

$$b) \frac{3\sqrt{x+4}}{2} - 1 = \frac{1}{2}$$

$$2 \left( \frac{3\sqrt{x+4}}{2} \right) = \left( \frac{3}{2} \right) \cdot 2$$

$$3\sqrt{x+4} = 3$$

$$x+4 = 27$$

$$x = 23$$

$$7c) \quad \begin{array}{r} 3\sqrt[3]{x-4} + 2 = 5 \\ -2 \quad -2 \end{array}$$

$$\frac{3\sqrt[3]{x-4}}{3} = \frac{3}{3}$$

$$(\sqrt[3]{x-4})^3 = 1^3$$

$$x-4=1$$

$$x=5$$

d) Same order.  
SADMEP.

$$8a) \quad \begin{array}{r} |x-6| - 2 = 14 \\ +2 \quad +2 \end{array}$$

$$|x-6| = 16$$

$$\begin{array}{l} x-6=16 \\ x=22 \end{array}$$

$$\begin{array}{l} x-6=-16 \\ x=-10 \end{array}$$

$$b) \quad \begin{array}{r} 5|x+3| + 1 = 26 \\ -1 \quad -1 \end{array}$$

$$\frac{5|x+3|}{5} = \frac{25}{5}$$

$$|x+3| = 5$$

$$x+3=5$$

$$x=2$$

$$x+3=-5$$

$$x=-8$$

$$c) \quad \begin{array}{r} 2 - 3|x+11| = \frac{13}{2} \\ -2 \end{array}$$

$$\frac{-3|x+11|}{-3} = \frac{-15}{-3}$$

$$|x+11| = 5$$

$$x+11=5$$

$$x=-6$$

$$x+11=-5$$

$$x=-16$$

$$d) \quad \frac{2|x+3|}{2} = \frac{6x}{2}$$

$$|x+3| = 3x$$

$$x+3=3x$$

$$3=2x$$

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

$$x+3=-3x$$

$$3=-4x$$

$$-\frac{3}{4} = x$$

