

Equations and Graphs Extra Practice

SOLVE

1. $|x+3|=8$

$$x+3=8$$

$$\boxed{x=5}$$

$$-x-3=8$$

$$\boxed{x=-11}$$

$$|x+3| = \begin{cases} x+3 & \text{if } x \geq -3 \\ -x-3 & \text{if } x < -3 \end{cases}$$

Solutions: $\{-11, 5\}$

2. $|3x+2|=4x+5$

$$3x+2=4x+5$$

$$-3=x$$

TEST \times

$$-3x-2=4x+5$$

$$-7=7x$$

$$\boxed{x=-1}$$

$$|3x+2| = \begin{cases} 3x+2 & \text{if } x \geq -\frac{2}{3} \\ -3x-2 & \text{if } x < -\frac{2}{3} \end{cases}$$

Solution: $\{-1\}$

3. $|5x+1|+7=3$

$$5x+1=-4$$

$$5x=-5$$

$$x=-1$$

TEST

$$-5x-1=-4$$

$$-5x=-3$$

$$x=\frac{3}{5}$$

TEST

$$|5x+1| = \begin{cases} 5x+1 & \text{if } x \geq -\frac{1}{5} \\ -5x-1 & \text{if } x < -\frac{1}{5} \end{cases}$$

NO SOLUTION

4. $\sqrt{x-1}+7=13$

• Restrictions: $x \geq 1$

• Resolution: $\sqrt{x-1}=6$

$$x-1=36$$

$$\boxed{x=37}$$

• TEST

$$\sqrt{x-1}+7=13$$

$$\begin{array}{r|l} \sqrt{36}+7 & 13 \\ 13 & \checkmark \end{array}$$

Sol: $\{37\}$

5. $x=\sqrt{2-x}$

• Restrictions: $x \leq 2$

• Resolution: $x^2=2-x$

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

$$(x+2)(x-1)=0$$

$$x=-2 \quad \boxed{x=1}$$

• TESTS

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

$$\begin{array}{r|l} -2 & \sqrt{4} \\ & 2 \quad x \end{array}$$

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

$$\begin{array}{r|l} 1 & \sqrt{2-1} \\ & 1 \quad \checkmark \end{array}$$

6. $-x+\sqrt{6x+19}=2$

• Restrictions: $x \geq -\frac{19}{6}$

• Resolution: $\sqrt{6x+19}=x+2$

$$6x+19=x^2+4x+4$$

$$x^2-2x-15=0$$

$$(x-5)(x+3)=0$$

$$\boxed{x=5} \quad x=-3$$

TEST \checkmark TEST \times

TESTS

$$-x+\sqrt{6x+19}=2$$

$$\begin{array}{r|l} -5+\sqrt{30+19} & 2 \\ -5+7 & \checkmark \\ 2 & \end{array}$$

$$-x+\sqrt{6x+19}=2$$

$$\begin{array}{r|l} 3+\sqrt{-18+19} & 2 \\ 4 & x \end{array}$$

7. $x^2+6x+8=0$

$$(x+2)(x+4)=0$$

$$x=-2 \quad x=-4$$

Solutions $\{-4, -2\}$

8. $-3(x+1)^2 = -48$

$(x+1)^2 = 16$

$x+1 = \pm 4$

$x = -1 \pm 4$

$x = -5 \quad x = 3$

solutions: $\{-5, 3\}$

9. $2x^2 + 5x = 8$

$2x^2 + 5x - 8 = 0$

$\Delta = 25 - 4(2)(-8) = 89$

$x = \frac{-5 \pm \sqrt{89}}{4}$

10. $\frac{2}{3}(x+5) = \frac{x+2}{4}$

$\frac{2}{3}x + \frac{10}{3} = \frac{1}{4}x + \frac{2}{4}$

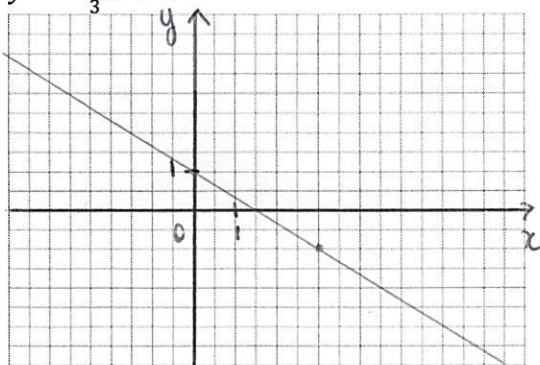
$8x + 40 = 3x + 6$

$5x = -34$

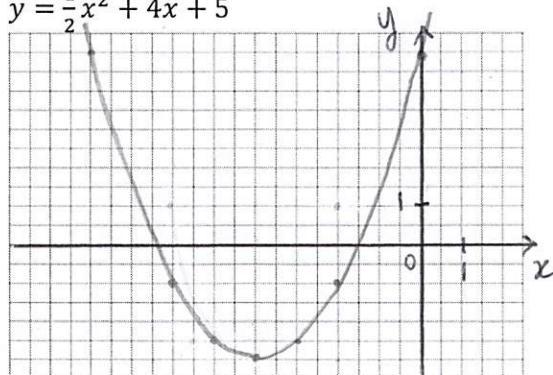
$x = -\frac{34}{5}$

GRAPH

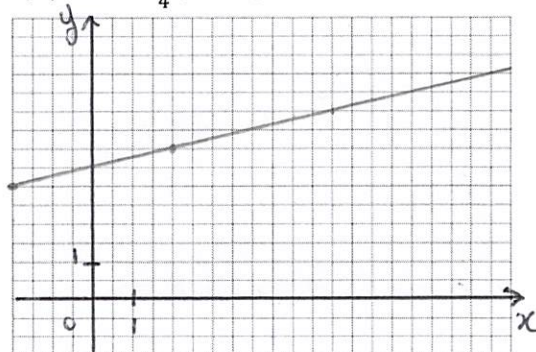
1. $y = -\frac{2}{3}x + 1$



2. $y = \frac{1}{2}x^2 + 4x + 5$

vertex: $(-4, -3)$

3) $y - 3 = \frac{1}{4}(x + 2)$

Point: $(-2, 3)$