Algebra 1: Problem Set 4 Solving first degree equations, first degree inequalities, linear absolute value equations, and quadratic equations

1. $3(x+2)=5x-2$

2. $3(x-1)=5(x-2)+1$

3. $\frac{x}{5}-2=\frac{x}{3}$

4. $\frac{5}{8}x+4=\frac{3}{4}x+7$

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

6. $\frac{2}{x^2+4x-12}=\frac{5}{x+6}-\frac{3}{x-2}$

7. $x^2-8x+15=0$

8. $5x^2=30$

9. $x^2-2=-4x$

10. $-x-2<4$

11. $15-3x+1\geq x+4$

12. $|2x-5|=2$

13. If $A=\frac{1}{2}h(a+b)$, solve for b.

Solutions to Odd Problems:

1.

$$\begin{aligned} 3(x+2)&=5x-2\\ 3x+6&=5x-2\\ 6&=2x-2\\ 8&=2x\\ 4&=x \end{aligned}$$

3.

$$\begin{aligned} \frac{x}{5}-2&=\frac{x}{3}\\ 15\left(\frac{x}{5}\right)-15(2)&=15\left(\frac{x}{3}\right)\\ 3x-30&=5x\\ -30&=2x\\ -15&=x \end{aligned}$$

5.

$$\begin{aligned} \frac{3}{x-1}+\frac{5}{x+1}&=2\\ (x+1)(x-1)\left(\frac{3}{x-1}+\frac{5}{x+1}\right)&=2(x+1)(x-1)\\ 3(x+1)+5(x-1)&=2(x^2-1)\\ 3x+3+5x-5&=2x^2-2\\ 0&=2x^2-8x\\ 0&=2x(x-4)\\ 2x=0 \quad &\text{or} \quad x-4=0\\ x=0 \quad &\text{or} \quad x=4 \end{aligned}$$

7.

$$\begin{aligned} &x^2-8x+15=0\\ &(x-3)(x-5)=0\\ &x-3=0 \quad or \quad x-5=0\\ &x=3 \quad or \quad x=5 \end{aligned}$$

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9.

$$x^2 - 2 = -4x$$
$$x^2 + 4x - 2 = 0$$
$$x = \frac{-4 \pm \sqrt{4^2 - 4(1)(-2)}}{2(1)}$$
$$x = \frac{-4 \pm \sqrt{16+8}}{2}$$
$$x = \frac{-4 \pm 2\sqrt{6}}{2} = -2 \pm \sqrt{6}$$

11.

$$15 - 3x + 1 \geq x + 4$$
$$16 - 3x \geq x + 4$$
$$12 \geq 4x$$
$$3 \geq x$$

13.

$$A = \frac{1}{2}h(a+b)$$
$$2A = h(a+b)$$
$$\frac{2A}{h} = a + b$$
$$b = \frac{2A}{h} - a \quad or \quad \frac{2A - ah}{h}$$

Answers to Even Problems:

2. x = 3 4. x = -24 6. x = 15

8. $x = \pm\sqrt{6}$ 10. $x > -6$ 12. $x = \frac{7}{2} \quad or \quad \frac{3}{2}$