Topic: Solving Variable Equations

objective: use rules of algebra to solve for x

Golden Rule of Algebra: whatever you do to one side of the equation, you must do onto the other

Game: Get "x" by itself

way to play: use opposites and reciprocals to get x by itself

(ex) $2x + -3 = 11$

$+3 \quad +3$

$\frac{1}{2} \cdot 2x = 14 \cdot \frac{1}{2}$

$x = 7$

add the opposite of -3 to both sides

multiply by the reciprocal of $\frac{2}{1}$

(ex) $-3x + 5 = 23$

$+-5 \quad +-5$

$\frac{1}{-3} \cdot -3x = 18 \cdot -\frac{1}{3}$

$x = -6$

add the opposite of 5 to both sides

multiply by the reciprocal

(ex) $\frac{x}{2} + 4 = 5$

$\frac{1}{2} \cdot x + 4 = 5$

$-4 \quad -4$

$\left(\frac{2}{1}\right)\frac{1}{2} \cdot x = 1\left(\frac{2}{1}\right)$

$x = 2$

rewrite division as multiplication

(ex) $\frac{2}{5}x + -4 = 6$

$+4 \quad +4$

$\left(\frac{5}{2}\right)\frac{2}{5}\cdot x = \frac{10}{1}\left(\frac{5}{2}\right)$

$\boxed{x = 25}$

(ex) $5x + -2x + 6 = -12$ combine like terms

$3x + 6 = -12$ add opposite

$+-6 \quad +-6$

$3x + 0 = -18$

$\left(\frac{1}{3}\right)\frac{3}{1}\cdot x = -18\left(\frac{1}{3}\right)$ multiply by the reciprocal

$\boxed{x = -6}$

(ex) $8 + -\frac{x}{4} = -2$ re-write

$8 + -\frac{1}{4}x = -2$

$+-8 \quad +-8$ add an opposite to both sides

$\left(\frac{4}{1}\right) - \frac{1}{4}\cdot x = -10\left(-\frac{4}{1}\right)$

$\boxed{x = 40}$