

## P3 Linear Equations &amp; Inequalities

Obj: Solve linear equations/inequalities

Ex1 Prove  $x = -2$  is a solution for

$$x^3 - x + 6 = 0$$

$$(-2)^3 - (-2) + 6 = 0$$

$$-8 + 2 + 6 = 0 \checkmark$$

Linear Equation:  $ax + b = 0$  $a, b$ : real #s and  $a \neq 0$ Ex2 Is  $2z - 4 = 0$  linear? yes

$$3u - 12 = 0 \quad \text{no}$$

Ex3 Solve:  $2(2x - 3) + 3(x + 1) = 5x + 2$ 

$$x = 5/2 \text{ or } 2.5$$

Ex4:  $8\left(\frac{5y - 2}{8}\right) = 8\left(\frac{2}{1} + \frac{y}{4}\right) \quad \frac{8y}{4}$

$$5y - 2 = 16 + 2y$$

$$-2y + 2 \quad +2 \quad -2y$$

$$\frac{3y}{3} = \frac{18}{3} \quad \boxed{y = 6}$$

Ex5:  $\frac{1}{1}\left(\frac{t - 1}{3} + \frac{t + 5}{4}\right) = \left(\frac{1}{2}\right)12$

$$\frac{4 \cdot 12(t - 1)}{3} + \frac{3 \cdot 12(t + 5)}{4} = \frac{12 \cdot 6}{2}$$

$$4t - 4 + 3t + 15 = 6$$

$$7t + 11 = 6$$

$$-11 - 11$$

$$\frac{7t}{7} = \frac{-5}{7}$$

$$\boxed{t = -\frac{5}{7}}$$

Ex6:  $5\left(\frac{x - 1}{3}\right) + 3\left(\frac{x + 2}{5}\right) = 5(7)$

$$5x - 5 + 3x + 6 = 105$$

$$8x + 1 = 105$$

$$\frac{8x}{8} = \frac{104}{8}$$

$$\boxed{x = 13}$$

Linear Inequalities:  $ax+b > 0$

$a, b$  are real #s,  $a \neq 0$

$<$   
 $>$   
 $\leq$   
 $\geq$   
 $=$

Solve:  $3(x-1)+2 \leq 5x+6$

$$\begin{array}{r} \cancel{3x} - 3 + 2 \leq 5x + \cancel{6} \\ -3x \quad -6 \quad -3x - 6 \end{array}$$

$$\frac{-7}{2} \leq \frac{2x}{2}$$

$$x \geq -\frac{7}{2} \quad \leftarrow \rightarrow -\frac{7}{2} \leq x$$



Double inequality:

$$3(-3) \leq \frac{3}{1} \left( \frac{2x+5}{3} \right) \leq (5)3$$

$$\begin{array}{r} -9 \leq 2x+5 \leq 15 \\ -5 \quad \quad -5 \quad \quad -5 \end{array}$$

$$\frac{-14}{2} \leq \frac{2x}{2} \leq \frac{10}{2}$$

$$-7 \leq x \leq 5$$

