

1.1 Solution of Linear Equations and Inequalities in one variable 1

Thursday, December 7, 2023 8:47 AM



Exp Solve (حل)

①

$$2x - 5 = 3$$

+5 +5

معادلة
Equation
linear

أزهر مجموعة الحل
Solution set
أزهرية الحلول

Equivalent equations
(لهم نفس مجموعة الحل)
They have same S.S

$$\frac{2x}{2} = \frac{8}{2}$$

$$x = 4$$

للتأكد

$$2(4) - 5 \stackrel{?}{=} 3$$

$$8 - 5 = 3$$

solution set = {4}

$$\underline{\underline{S.S = \{4\}}}$$

②

$$3y - 6 = 2 - y$$

+6 +6

linear Eq.

Equivalent Equation

$$3y = 8 - y$$

+y +y

$$? \quad 1 = 2 - (2)$$

L-4-
Equation
↓
they have
same S.S.

$$x + y = \frac{8}{4}$$

$$y = 2$$

لنا

$$S.S = \{2\}$$

$$3(2) - 6 = 2 - (2)$$

$$6 - 6 = 2 - 2$$

③ $x + 6 = 6(x + 1)$

linear Eq.

$$x + 6 = 6x + 6$$

$$x = 6x$$

$$-x = -x$$

$$0 = 5x$$

$$0 = x$$

لنا

$$S.S = \{0\}$$

$$0 + 6 = 6(0 + 1)$$

$$6 = 6$$

④ $\frac{3x}{3x} \frac{3x+1}{2} = \frac{x \times 2}{3 \times 2} - \frac{3 \times 6}{1 \times 6}$

لنا في المقام لاول

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

$$\frac{-9+1}{2} = -1 - 3$$

$$\frac{3(3x+1)}{6} = \frac{2x}{6} - \frac{18}{6}$$

LCD $\frac{6}{6} - \frac{6}{6} \frac{6}{6}$

$$\frac{9x+3}{6} = \frac{2x-18}{6}$$

$$\frac{-8}{2} \stackrel{??}{=} -4$$

$$-4 = -4$$

$$\cancel{6}(9x+3) = \cancel{6}(2x-18)$$

$$9x+3 = 2x-18$$

$$9x = 2x - 21$$

$$\frac{7x}{7} = -\frac{21}{7}$$

$$\boxed{x = -3} \Rightarrow \text{لستك} \Rightarrow \text{s.s} = \{-3\}$$

5

$$\frac{2x-1}{x-3} = \frac{4}{x-3} + \frac{5}{x-3}$$

Fraction Equation (=)

معادلة كسرية

يكون متغير في المقام

$$\frac{2x-1}{x-3} = \frac{4(x-3)}{x-3} + \frac{5}{x-3}$$

$$= \frac{4x-12}{x-3} + \frac{5}{x-3}$$

$$\frac{2(3)-1}{3-3} = 4 + \frac{5}{3-3}$$

لستك

$$= \frac{4x-12}{x-3} + \frac{5}{x-3}$$

$$= \frac{4x-12+5}{x-3}$$

$$\frac{6-1}{3-3} = 1 + \frac{5}{3-3}$$

$$\frac{6-1}{0} = 4 + \frac{5}{0}$$

$$\frac{2x-1}{x-3} = \frac{4x-7}{x-3}$$

$$(2x-1)(\cancel{x-3}) = (\cancel{x-3})(4x-7)$$

$$2x-1 = 4x-7$$

$$\cancel{2x} = 4x - 6$$

$$0 = 2x - 6$$

$$\frac{2x}{2} = \frac{6}{2}$$

$$\boxed{x=3} \Rightarrow \text{لناكد} \Rightarrow S.S = \{ \}$$

$$= \emptyset$$

$$(6) \quad y - 4 = -2(x + 4)$$

Solve for y اصل y موضع القانون

Solve for

$$y - 4 = -2x - 8$$

~~+4~~ +4

$$y = -2x - 4$$

⑦ $y - 4 = -2(x + 4)$

Solve for x

$$y - 4 = -2x - 8$$

~~+8~~ +8

$$\frac{y + 4}{-2} = \frac{-2x}{-2}$$

$$x = \frac{y + 4}{-2}$$

⑦ $3y - 7 \leq 5 - y$

~~+7~~ +7

$$3y \leq 12 - y$$

~~+y~~ +y

$$4y \leq \frac{12}{4}$$

$$y \leq 3$$

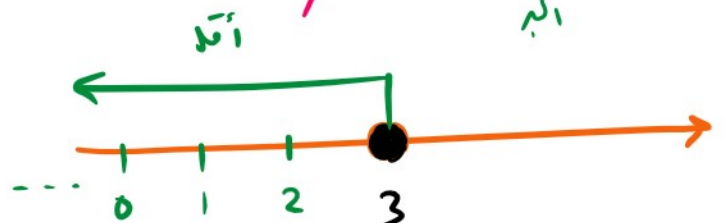
(Inequality متباينة)

$$3(2) - 7 \stackrel{?}{\leq} 5 - 2$$

$$6 - 7 \stackrel{?}{\leq} 3$$

$$-1 \leq 3$$

✓



$$s.s = \{y : y \leq 3\}$$

✓ 3

$$S.S = \{x : x = \dots\}$$

$$= (-\infty, 3]$$

⑧ $1 - 2x > 9$

Inequality
مباينة

$$\frac{-2x}{-2} > \frac{8}{-2}$$

$$x < -4$$

$$S.S = \{x : x < -4\}$$

$$= (-\infty, -4)$$

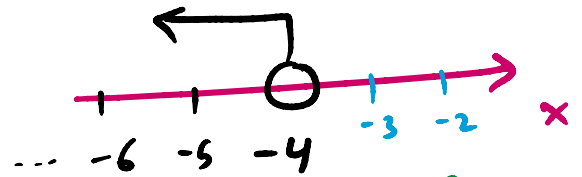
لنأخذ
 $x = -5$

(الجزء) المتعة لا يتم سالب

$$\frac{-3x}{-3} < \frac{6}{-3}$$

$$x > -2$$

مباينة



$$\Rightarrow 1 - 2(-5) > 9$$

$$1 + 10 > 9$$

$$11 > 9$$

⑨ $\frac{-2x}{5} \leq -30$

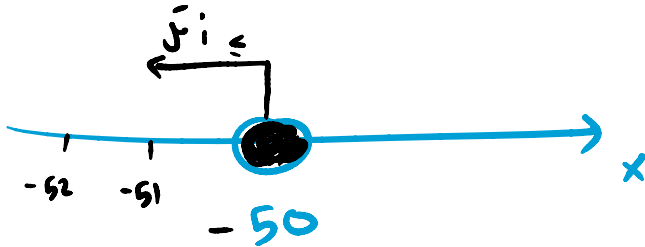
مباينة

$$\frac{-2x}{5} + \frac{x \cdot 5}{5} \leq -30$$

$$\frac{-2x}{5} + \frac{5x}{5} \leq -30 \Rightarrow \frac{-2x + 5x}{5} \leq -30$$

$$-\frac{1}{5} + \frac{2}{5} \leq -30 \Rightarrow \frac{1}{5}$$

$$5 \left(\frac{3x}{5} \leq -30 \right)$$



$$\begin{aligned} S.S. &= \{x : x \leq -50\} \\ &= (-\infty, -50] \end{aligned}$$

$$\cancel{5} \cdot \frac{3x}{\cancel{5}} \leq 5 \cdot (-30)$$

$$\frac{3x}{3} \leq \frac{-150}{3}$$

$$x \leq -50$$

$$\frac{\cancel{3}x}{\cancel{5}} \leq \frac{-30}{\frac{3}{5}} \div$$

$$x \leq -30 \cdot \frac{5}{3}$$

$$x \leq \frac{-150}{3}$$

$$x \leq -50$$

$$\textcircled{10} \quad \frac{3x}{2x+10} = \frac{1}{1} + \frac{1}{x+5}$$

$$\frac{3x}{2x+10} = \frac{x+5}{x+5} + \frac{1}{x+5}$$

$$\text{cloud} = \square$$



$$\text{cloud} \rightarrow \square$$

$$\frac{3x}{2x+10} = \frac{x+5}{x+5} + \frac{1}{x+5}$$

$$= \frac{x+5+1}{x+5}$$

$$\frac{3x}{2x+10} = \frac{x+6}{x+5} \cdot \frac{2}{2}$$

$$\Rightarrow \frac{3x}{2x+10} = \frac{2x+12}{2x+10}$$

$$3x(2x+10) = (2x+12)(2x+10) \Rightarrow \begin{array}{r} 3x = 2x + 12 \\ -2x \quad -2x \end{array}$$

$$\text{S.S.} \leftarrow \boxed{x = 12}$$

$$\frac{3(12)}{2(12)+10} \stackrel{?}{=} 1 + \frac{1}{12+5}$$

$$\dots \frac{18}{17} = \frac{18}{17}$$

$$\text{S.S.} = \{12\}$$