

2.2 SOLVING GENERAL LINEAR EQNS.

LINEAR EQUATION

$$ax + b = 0$$

a, b are real numbers

x is a variable

NATURAL / WHOLE NUMBERS \mathbb{N}
 0, 1, 2, 3 - counting numbers

INTEGERS \mathbb{Z}
 \mathbb{N} PLUS NEGATIVES - 0, 1, -1, 2, -2, 3, -3

RATIONAL NUMBERS \mathbb{Q}
 ALL FRACTIONS (PLUS \mathbb{Z})
 ANY NUMBER THAT CAN BE WRITTEN
 IN THE FORM $\frac{a}{b}$

IRRATIONAL NUMBERS
 ANY NUMBERS THAT ARE NOT IN \mathbb{Q}

REAL NUMBERS \mathbb{R}
 ALL RATIONAL & IRRATIONAL NUMBERS

COMPLEX NUMBERS \mathbb{C}
 $a + bi$

Ex. 1 p. 94

$$\begin{array}{r} 3r - 5 = 0 \\ +5 \quad +5 \\ \hline \end{array}$$

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

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

$$\cancel{3} \left(\frac{5}{\cancel{3}} \right) - 5 = 0$$

$$5 - 5 = 0$$

$$0 = 0 \quad \checkmark$$

Ex. 2 p. 95

$$-\frac{2}{3}x + 8 = 0$$
$$\begin{array}{r} -8 \\ \hline -8 \end{array}$$

$$-\frac{3}{2} \left(-\frac{2}{3}x \right) = (-8) \left(-\frac{3}{2} \right)$$

$$x = 12$$

$$ax + b = cx + d$$

Ex. 3 p. 96

$$\begin{array}{r} 3w - 8 = 7w \\ -3w \quad -3w \\ \hline \end{array}$$

$$\begin{array}{r} -8 = 4w \\ 4 \quad 4 \\ \hline \end{array}$$

$$w = -2$$

Ex. 4 p. 96

$$\begin{array}{r} \frac{1}{2}b - 8 = 12 \\ + 8 \quad + 8 \\ \hline \end{array}$$

$$\cancel{2} \left(\frac{1}{2}b \right) = (20) \cancel{2}$$

$$b = 40$$

Ex. 5 p. 97

$$2m - 4 = 4m - 10$$

$$\begin{array}{r} -2m \quad -2m \\ \hline \end{array}$$

$$-4 = 2m - 10$$

$$\begin{array}{r} +10 \quad +10 \\ \hline \end{array}$$

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

$$m = 3$$

EQUATIONS WITH PARENTHESESEx. 6 p. 98

$$2(q-3) + 5q = 8(q-1)$$

$$2q - 6 + 5q = 8q - 8$$

$$\begin{array}{r} 7q - 6 = 8q - 8 \\ -7q \quad -7q \\ \hline \end{array} \quad q = 2$$

$$\begin{array}{r} -6 = 7 - 8 \\ +8 \quad +8 \\ \hline \end{array}$$

2.3 MORE EQUATIONS

Ex.1 P.102

$$6 \left[\frac{y}{2} - 1 = \frac{y}{3} + 1 \right]$$

$$\begin{array}{r} 3y - 6 = 2y + 6 \\ -2y + 6 \quad -2y + 6 \\ \hline y = 12 \end{array}$$

Ex.2 P.103

$$\left[0.3p + 8.04 = 12.6 \right] 100$$

$$\begin{array}{r} .30p + 8.04 = 12.60 \\ - 8.04 \quad - 8.04 \\ \hline \end{array}$$

$$\begin{array}{r} .30p = 4.56 \\ \hline .30 \end{array}$$

$$p = 15.2$$

Ex. 3 p-103

$$\frac{4x+8}{[0.5x + 0.4(x+20) = 13.4] \cdot 10}$$

$$5x + 4(x+20) = 134$$

$$5x + 4x + 80 = 134$$

$$\begin{array}{r} 9x + 80 = 134 \\ -80 \quad -80 \\ \hline 9x = 54 \end{array}$$

$$9x = 54$$

$$\frac{9x}{9} = \frac{54}{9}$$

$$x = 6$$

IDENTITY: EQUATION THAT IS TRUE FOR ALL \mathbb{R}
(INFINITELY MANY SOLUTIONS)
"ALL REAL NUMBERS"

INCONSISTENT EQUATION: NOT TRUE FOR
ANY VALUE OF THE VARIABLE
"NO SOLUTION"

CONDITIONAL EQUATION: HAS AT LEAST ONE
(BUT NOT INFINITELY MANY) REAL SOLUTION

$x =$

Ex. 5
P. 105

$$\begin{array}{r|l}
 7 - 5(x-6) + 4 & = 3 - 2(x-5) - 3x + 28 \\
 7 - 5x + 30 + 4 & = 3 - 2x + 10 - 3x + 28 \\
 -5x + 41 & = -5x + 41 \\
 \underline{-41} & \quad \quad \quad \underline{-41} \\
 -5x & = -5x
 \end{array}$$

ALL REAL NUMBERS

Ex. 6
P. 106

$$2 - 3(x-4) \neq 4(x-7) - 7x$$

$$2 - 3x + 12 \neq 4x - 28 - 7x$$

$$\cancel{-3x} + 14 \neq \cancel{-3x} - 28$$

$$\cancel{+3x}$$

14

$$\neq \cancel{+3x}$$

- 28

NO SOLUTION

Ex. 7
P. 107

$$x - 0.06x = 399.50$$

$$\frac{\cancel{0.94}x}{0.94} = \frac{399.50}{0.94}$$

$$x = 425$$

$$\begin{array}{r} 1.00x \\ - .06x \\ \hline .94x \end{array}$$

$$\begin{array}{r} 4.25 \\ .94 \overline{) 399.50} \\ \underline{376} \\ 235 \\ \underline{188} \\ 470 \\ \underline{470} \end{array}$$

Ex. 7
P. 99

$$\left[0.05m + 2.95 = 4.80 \right] 100$$

$$5m + 295 = 480$$
$$\begin{array}{r} - 295 \\ \hline \end{array}$$

$$\frac{5m}{5} = \frac{185}{5}$$

$$m = 37 \text{ minutes}$$