

Topic 1 // worksheet A

1) A) $\frac{6}{7} \rightarrow \boxed{\frac{7}{6}}$ B) $3 \rightarrow \boxed{\frac{1}{3}}$ C) $-\frac{8}{5} \rightarrow \boxed{-\frac{5}{8}}$ D) $-2\frac{1}{2} \xrightarrow{-\frac{6}{2}} \boxed{-\frac{2}{5}}$

2) A) $-3\frac{1}{2} \rightarrow \boxed{3\frac{1}{2}}$ B) $5 \rightarrow \boxed{-5}$ C) $\frac{1}{2} \rightarrow \boxed{-\frac{1}{2}}$

3) A) $6(2c+3) = \boxed{12c+18}$ B) $3(6y-2) = \boxed{18y-6}$

C) $-4(7-8x) = \boxed{-28+32x}$ D) $(3n-9)2 = \boxed{6n-18}$

E) $a(b+5) = \boxed{ab+5a}$ F) $-3(2a+b) = \boxed{-6a-3b}$

4) A) $-9 \cdot 4 = \boxed{-36}$

B) $5 + 3\frac{1}{2} = \boxed{8\frac{1}{2}}$

C) $8 \div -4 = \boxed{-2}$

D) $-4 \div 8 = \boxed{-\frac{1}{2}}$

E) $-8 - 5 = \boxed{-13}$

F) $5 - -8 = \boxed{13}$

5) A) $4(-3)^2 - (-3) + 3$

$4(9) + 3 + 3$

$36 + 3 + 3$

$\boxed{42}$

B) $2(3)^2 + (3 + +1)$

$2(9) + (4)$

$18 + 4$

$\boxed{22}$

C) $(2 - 5n) \div n^2$

$(2 - 5(2)) \div 2^2$

$(2 - 10) \div 4$

$-8 \div 4$

$\boxed{-2}$

D) $8(\frac{1}{4}) - 3(-1)^2$

$2 - 3(1)$

$2 - 3$

$\boxed{-1}$

6) A) $-1 < x < 4$



B) $x > 3$ or $x \leq -2$



7) A)
$$\frac{P}{\pi} = \frac{\pi T}{\pi}$$

$$\boxed{T = \frac{P}{\pi}}$$

B)
$$5n + 2k = 8$$

$$\quad \quad \quad -2k \quad -2k$$

$$\frac{5n}{5} = \frac{8-2k}{5}$$

$$\boxed{n = \frac{8-2k}{5}}$$

C)
$$A = \frac{1}{2} Bh \quad (2)$$

$$\frac{2A}{h} = \frac{Bh}{h}$$

$$\boxed{B = \frac{2A}{h}}$$

D)
$$\frac{A}{5} = \frac{5(c-b)}{5}$$

$$\frac{A}{5} = c-b$$

$$\frac{A}{5} + b = c$$

$$\boxed{c = \frac{A}{5} + b}$$

E)
$$ay - 3y = n$$

$$y(a-3) = n$$

$$\frac{y(a-3)}{a-3} = \frac{n}{a-3}$$

$$\boxed{y = \frac{n}{a-3}}$$

F)
$$c^2x + 7x = T$$

$$x(c^2+7) = T$$

$$\frac{x(c^2+7)}{c^2+7} = \frac{T}{c^2+7}$$

$$\boxed{x = \frac{T}{c^2+7}}$$

G)
$$L = Pn^3 + P$$

$$L = P(n^3+1)$$

$$\frac{L}{n^3+1} = \frac{P(n^3+1)}{n^3+1}$$

$$\boxed{P = \frac{L}{n^3+1}}$$

H)
$$\frac{3}{2}A = \frac{2}{3}(m+c) \quad (\frac{3}{2})$$

$$\frac{3}{2}A = m+c$$

$$\quad \quad \quad -c \quad -c$$

$$\boxed{m = \frac{3}{2}A - c}$$

8)
$$5(x-3) + 8 = -1$$

$$\quad \quad \quad -8 \quad -8$$

$$\frac{5(x-3)}{5} = \frac{-9}{5}$$

$$x-3 = \frac{-9}{5} + 3$$

$$\quad \quad \quad +3 \quad \quad \quad +3$$

$$x = \frac{-9}{5} + \frac{15}{5}$$

$$\boxed{x = \frac{6}{5}}$$

B)
$$8x - (2x-5) = 3x+4$$

$$8x - 2x + 5 = 3x+4$$

$$6x + 5 = 3x+4$$

$$\underline{-3x} \quad \underline{-5} \quad \underline{-3x} \quad \underline{-5}$$

$$\frac{3x}{3} = \frac{-1}{3} \rightarrow \boxed{x = -\frac{1}{3}}$$

C)
$$\frac{3}{4}n + \frac{1}{6}n = 4 \quad (12)$$

$$9n + 2n = 48$$

$$\frac{11n}{11} = \frac{48}{11}$$

$$\boxed{n = \frac{48}{11}}$$

D)
$$-3(2-2y) + (3y-1) = 2(4-2y)$$

$$-6 + 6y + 3y - 1 = 8 - 4y$$

$$\frac{9y - 7}{+4y} = \frac{8 - 4y}{+4y}$$

$$\frac{13y - 11}{13} = \frac{8 - 4y}{13}$$

$$\boxed{y = \frac{15}{13}}$$

$$9) \quad A) \quad 4c - 3 < 9$$

$$\quad \quad \quad \begin{array}{r} +3 \quad +3 \\ \hline 4c < 12 \\ \hline \frac{4c}{4} < \frac{12}{4} \\ \hline \boxed{c < 3} \end{array}$$

$$C) \quad 5n + 8 > 3n + 2$$

$$\quad \quad \quad \begin{array}{r} -3n \quad -8 \quad -3n \quad -8 \\ \hline 2n > -6 \\ \hline \frac{2n}{2} > \frac{-6}{2} \\ \hline \boxed{n > -3} \end{array}$$

$$E) \quad 2 + (1-x) > 4(2x-3)$$

$$\quad \quad \quad 2 + 1 - x > 8x - 12$$

$$\quad \quad \quad \begin{array}{r} 3 - x > 8x - 12 \\ -3 \quad -8x \quad -8x \quad -3 \\ \hline -9x > -15 \\ \hline \frac{-9x}{-9} > \frac{-15}{-9} \\ \hline \boxed{x < \frac{5}{3}} \end{array}$$

$$B) \quad -8y + 2(y-3) > 12$$

$$\quad \quad \quad -8y + 2y - 6 > 12$$

$$\quad \quad \quad \begin{array}{r} +6 \quad +6 \\ \hline -6y > 18 \\ \hline \frac{-6y}{-6} > \frac{18}{-6} \rightarrow \boxed{y < -3} \end{array}$$

$$D) \quad -y - (3y+7) \leq 2(y+1)$$

$$\quad \quad \quad -y - 3y - 7 \leq 2y + 2$$

$$\quad \quad \quad -4y - 7 \leq 2y + 2$$

$$\quad \quad \quad \begin{array}{r} -2y \quad +7 \quad -2y \quad +7 \\ \hline -6y \leq 9 \\ \hline \frac{-6y}{-6} \leq \frac{9}{-6} \rightarrow \boxed{y \geq -\frac{3}{2}} \end{array}$$

$$F) \quad -\frac{1}{8}y + 2 \leq -5$$

$$\quad \quad \quad \begin{array}{r} -2 \quad -2 \\ \hline (-8) -\frac{1}{8}y \leq -7 \quad (-8) \\ \hline \boxed{y \geq 56} \end{array}$$

$$10) A) |3x+2| = 10$$

$$\begin{array}{r} \leftarrow \\ 3x+2=10 \\ \underline{-2} \quad \underline{-2} \end{array}$$

$$\frac{3x}{3} = \frac{8}{3}$$

$$\boxed{x = \frac{8}{3}}$$

$$\begin{array}{r} \rightarrow \\ 3x+2=-10 \\ \underline{-2} \quad \underline{-2} \end{array}$$

$$\frac{3x}{3} = \frac{-12}{3}$$

$$\boxed{x = -4}$$

$$B) \left| \frac{1}{2}x - 4 \right| = 2$$

$$\begin{array}{r} \leftarrow \\ \frac{1}{2}x - 4 = 2 \\ \underline{+4} \quad \underline{+4} \end{array}$$

$$(2) \frac{1}{2}x = 6$$

$$\boxed{x = 12}$$

$$\begin{array}{r} \rightarrow \\ \frac{1}{2}x - 4 = -2 \\ \underline{+4} \quad \underline{+4} \end{array}$$

$$(2) \frac{1}{2}x = 2$$

$$\boxed{x = 4}$$

$$C) \frac{3|-2x+3|}{3} = \frac{6}{3}$$

$$|-2x+3| = 2$$

$$\begin{array}{r} \leftarrow \\ -2x+3=2 \\ \underline{-3} \quad \underline{-3} \end{array}$$

$$\frac{-2x}{-2} = \frac{-1}{-2}$$

$$\boxed{x = \frac{1}{2}}$$

$$\begin{array}{r} \rightarrow \\ -2x+3=-2 \\ \underline{-3} \quad \underline{-3} \end{array}$$

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

$$\boxed{x = \frac{5}{2}}$$

$$D) 5|x-4|-1 = 9$$

$$\begin{array}{r} \underline{+1} \quad \underline{+1} \\ \frac{5|x-4|}{5} = \frac{10}{5} \end{array}$$

$$|x-4| = 2$$

$$\begin{array}{r} \leftarrow \\ x-4=2 \\ \underline{+4} \quad \underline{+4} \end{array}$$

$$\boxed{x = 6}$$

$$\begin{array}{r} \rightarrow \\ x-4=-2 \\ \underline{+4} \quad \underline{+4} \end{array}$$

$$\boxed{x = 2}$$

$$E) |3x+5| \leq 1$$

$$\begin{array}{r} \leftarrow \\ 3x+5 \leq 1 \\ \underline{-5} \quad \underline{-5} \end{array}$$

$$\frac{3x}{3} \leq \frac{-4}{3}$$

$$\boxed{x \leq -\frac{4}{3}}$$

$$\begin{array}{r} \rightarrow \\ 3x+5 \geq -1 \\ \underline{-5} \quad \underline{-5} \end{array}$$

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

$$\boxed{x \geq -2}$$

$$F) |6-3x| > 6$$

$$\begin{array}{r} \leftarrow \\ 6-3x > 6 \\ \underline{-6} \quad \underline{-6} \end{array}$$

$$\frac{-3x}{-3} > \frac{0}{-3}$$

$$\boxed{x < 0}$$

$$\begin{array}{r} \rightarrow \\ 6-3x < -6 \\ \underline{-6} \quad \underline{-6} \end{array}$$

$$\frac{-3x}{-3} < \frac{-12}{-3}$$

$$\boxed{x > 4}$$

$$G) \frac{3|2x-4|}{3} < \frac{9}{3}$$

$$|2x-4| < 3$$

$$\begin{array}{l} \swarrow \\ 2x-4 < 3 \\ \quad +4 \quad +4 \\ \hline 2x < 7 \\ \frac{2x}{2} < \frac{7}{2} \\ \boxed{x < \frac{7}{2}} \end{array} \quad \begin{array}{l} \searrow \\ 2x-4 > -3 \\ \quad +4 \quad +4 \\ \hline 2x > 1 \\ \frac{2x}{2} > \frac{1}{2} \\ \boxed{x > \frac{1}{2}} \end{array}$$

$$H) 2|6+2x|-4 \geq 8$$

$$\frac{2|6+2x|}{2} \geq \frac{12}{2}$$

$$|6+2x| \geq 6$$

$$\begin{array}{l} \swarrow \\ 6+2x \geq 6 \\ \quad -6 \quad -6 \\ \hline 2x \geq 0 \\ \frac{2x}{2} \geq \frac{0}{2} \\ \boxed{x \geq 0} \end{array} \quad \begin{array}{l} \searrow \\ 6+2x \leq -6 \\ \quad -6 \quad -6 \\ \hline 2x \leq -12 \\ \frac{2x}{2} \leq \frac{-12}{2} \\ \boxed{x \leq -6} \end{array}$$

$$I) 5-2|x-3| = -3$$

$$\frac{-5}{-5} \quad \frac{-5}{-5}$$

$$\frac{-2|x-3|}{-2} = \frac{-8}{-2}$$

$$|x-3| = 4$$

$$\begin{array}{l} \swarrow \\ x-3 = 4 \\ \quad +3 \quad +3 \\ \hline \boxed{x = 7} \end{array} \quad \begin{array}{l} \searrow \\ x-3 = -4 \\ \quad +3 \quad +3 \\ \hline \boxed{x = -1} \end{array}$$

$$J) 3+2|x+1| = 5$$

$$\frac{-3}{-3} \quad \frac{-3}{-3}$$

$$\frac{2|x+1|}{2} = \frac{2}{2}$$

$$|x+1| = 1$$

$$\begin{array}{l} \swarrow \\ x+1 = 1 \\ \quad -1 \quad -1 \\ \hline \boxed{x = 0} \end{array} \quad \begin{array}{l} \searrow \\ x+1 = -1 \\ \quad -1 \quad -1 \\ \hline \boxed{x = -2} \end{array}$$

$$K) 2 \frac{|x-5|}{2} < 3 \cdot 2$$

$$|x-5| < 6$$

$$\begin{array}{l} \swarrow \\ x-5 < 6 \\ \quad +5 \quad +5 \\ \hline \boxed{x < 11} \end{array} \quad \begin{array}{l} \searrow \\ x-5 > -6 \\ \quad +5 \quad +5 \\ \hline \boxed{x > -1} \end{array}$$

$$L) 6 \frac{|x+2|}{6} \geq 1 \cdot 6$$

$$|x+2| \geq 6$$

$$\begin{array}{l} \swarrow \\ x+2 \geq 6 \\ \quad -2 \quad -2 \\ \hline \boxed{x \geq 4} \end{array} \quad \begin{array}{l} \searrow \\ x+2 \leq -6 \\ \quad -2 \quad -2 \\ \hline \boxed{x \leq -8} \end{array}$$

$$4) \left| \frac{2x+7}{5} \right| \leq 3$$

$$\swarrow$$
$$(5) \frac{2x+7}{5} \leq 3 \quad (:5)$$

$$2x+7 \leq 15$$
$$\underline{-7} \quad \underline{-7}$$

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

$$\boxed{x \leq 4}$$

$$\searrow$$
$$(5) \frac{2x+7}{5} \geq -3 \quad (:5)$$

$$2x+7 \geq -15$$
$$\underline{-7} \quad \underline{-7}$$

$$\frac{2x}{2} \geq \frac{-22}{2}$$

$$\boxed{x \geq -11}$$

$$2) \left| \frac{4x-4}{3} \right| > 8$$

$$(3) \frac{4x-4}{3} > 8 \quad (:3)$$

$$4x-4 > 24$$
$$\underline{+4} \quad \underline{+4}$$

$$\frac{4x}{4} > \frac{28}{4}$$

$$\boxed{x > 7}$$

$$\swarrow$$
$$(3) \frac{4x-4}{3} < -8 \quad (:3)$$

$$4x-4 < -24$$
$$\underline{+4} \quad \underline{+4}$$

$$\frac{4x}{4} < \frac{-20}{4}$$

$$\boxed{x < -5}$$