1 Solve all 6 equations. Show all work. For #3 and 6, justify each step using math properties.

1. $-3(x - 4) = -9(x - 1)$

2. $8x - 2(x + 3) = 4x + 2$

3. $\frac{-2x + 1}{2} + 6 = \frac{3x}{2} - 10$

4. $12x - 4(\frac{1}{2}x - 5) = \frac{1}{3}(6x - 15)$

5. $\frac{7(x - 1)}{4} - \frac{3}{4} = -8x + \frac{3}{4}$

6. $-4(2x - 9) + 6(-x + 1) = -8x - 5(3x - \frac{6}{5})$

2 Determine if the equation has one solution, no solution, or infinite solutions. Show your work.

1. $-2(x - 3) + 5 = -6(x + 1) + 4x$

2. $\frac{3x + 1}{2} + 6 = \frac{1}{2}(3x - 4) + \frac{17}{2}$

3. $20x - 2(x + 10) = -(5 - 2x)$

4. $\frac{3}{5}(x - 12) = -4(x + 9) + 1$

5. $-7(x - 1) = -15x + 8(x + 2)$

6. $\frac{8(x - 3)}{2} + 5x = 9(x - 1) - 3$

3 Convert between degrees Fahrenheit and degrees Celsius using the literal equation given. If necessary, round the answer to the nearest hundredth.

> Before completing #1-6, solve the equation for F.

$$C = \frac{5}{9}(F - 32)$$

1. 72°F

2. -11°F

3. 102.6°F

4. 25°C

5. 42°C

6. -3.4°C

4 Convert each equation from standard form to slope-intercept form.

1. $4x + 6y = 48$

2. $3x - 5y = 25$

3. $-4x + 9y = 45$

4. $6x - 2y = -52$

5. $-x - 8y = 96$

6. $12x + 28y = -84$

5 Convert each equation from slope-intercept form to standard form.

1. $y = 5x + 8$

2. $y = -4x + 2$

3. $y = \frac{2}{3}x - 6$

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

5. $y = -5x - 13$

6. $y = \frac{3}{4}x + 10$

6 Solve each equation for the variable indicated.

1. The formula for the area of a triangle is $A = \frac{1}{2}bh$. Solve the equation for h.

2. The formula for the area of a trapezoid is $A = \frac{1}{2}(b_1 + b_2)h$. Solve the equation for b_1.

3. The formula for the volume of a cylinder is $V = \pi r^2 h$. Solve the equation for h.

4. The formula for the volume of a pyramid is $V = \frac{1}{3}lwh$. Solve the equation for w.

5. The Ideal Gas Law is $pV = nRT$. Solve the equation for T.

6. Solve the literal equation $Z = \frac{4X}{Y^2} + 3W$ for X.

□ Solve all 6 equations. Show all work. For #3 & 6, justify each step

1. $-3(x-4) = -9(x-1)$

$-3x + 12 = -9x + 9$

$\underline{+9x \qquad\quad +9x}$

$6x + 12 = 9$

$\underline{-12 \quad -12}$

$\dfrac{6x}{6} = \dfrac{-3}{6}$

$x = -\dfrac{1}{2}$ or -0.5

2. $8x - 2(x+3) = 4x + 2$

$8x - 2x - 6 = 4x + 2$

$6x - 6 = 4x + 2$

$\underline{-4x \qquad\quad -4x}$

$2x - 6 = 2$

$\underline{+6 \qquad +6}$

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

$x = 4$

3. $\dfrac{2}{1}\left(\dfrac{-2x+1}{2} + 6\right) = \left(\dfrac{3x}{2} - 10\right)\dfrac{2}{1}$

$-2x(+1 + 12) = 3x - 20$

$-2x + 13 = 3x - 20$

$\underline{+2x \qquad\quad +2x}$

$13 = 5x - 20$

$\underline{+20 \qquad\quad +20}$

$\dfrac{33}{5} = \dfrac{5x}{5}$

$\boxed{\dfrac{33}{5} = x}$

multiplication ppty of equality
distributive property
associative ppty of addition

addition ppty of equality

addition ppty of equality
division ppty of equality

4. $12x - 4(\tfrac{1}{2}x - 5) = \tfrac{1}{3}(6x - 15)$

$12x - 2x + 20 = 2x - 5$

$10x + 20 = 2x - 5$

$\underline{-2x \qquad\quad -2x}$

$8x + 20 = -5$

$8x = -25$

$x = \dfrac{-25}{8}$

5. $7(x-1) = -15x + 8(x+2)$

$7x - 7 = -15x + 8x + 16$

$7x - 7 = -7x + 16$

$\underline{+7x \qquad +7x}$

$14x - 7 = 16$

$14x = 23$

$x = \dfrac{23}{14}$

6. $-4(2x-9) +6(-x+1) = -8x -5(3x-\frac{6}{5})$

$-8x +36 -6x +6 = -8x -15x +6$ distributive ppty

$-8x -6x +36 +6 = -8x -15x +6$ commutative ppty

$(-8x -6x) + (36+6) = (-8x -15x) +6$ associative property of addition

$-14x +42 = -23x +6$

$\underline{+23x \qquad\qquad +23x}$ addition property of equality

$9x +42 = 6$

$\underline{-42 \quad -42}$ subtraction ppty of equality

$\frac{9x}{9} = \frac{-36}{9}$ division ppty of quality

$x = -4$

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2. Determine if the equation has 1 solution, no solutions, or infinite solutions.

1. $-2(x-3) +5 = -6(x+1) +4x$

$-2x +6 +5 = -6x -6 +4x$

$-2x +11 = -2x -6$

no solutions

2. $2\left(\frac{3x+1}{2} +6\right) = \left[\frac{1}{2}(3x-4) + \frac{17}{2}\right]2$

$3x+1 +12 = 3x -4 +17$

$3x +13 = 3x +13$

infinite solutions

3. $20x -2(x+10) = -(5-2x)$

$20x -2x -20 = -5 +2x$

$18x -20 = -5 +2x$

one solution

4. $5\left[\frac{3}{5}(x-12)\right] = \left[-4(x+9)+1\right]5$

$3(x-12) = -20(x+9) +5$

$3x -36 = -20x -180 +5$

one solution

5. $-7(x-1) = -15x +8(x+2)$

$-7x +7 = -15x +8x +16$

$-7x +7 = -7x +16$

no solutions

6. $\frac{8(x-3)}{2} + 5x = 9(x-1) -3$

$4x -12 +5x = 9x -9 -3$

$9x -12 = 9x -12$

infinite solutions

3. Convert between degrees Fahrenheit and degrees Celsius.

$$C = \tfrac{5}{9}(F - 32) \rightarrow \left[C = \tfrac{5}{9}(F-32)\right]\tfrac{9}{5}$$

$$\tfrac{9}{5}C = F - 32$$

$$F = \tfrac{9}{5}C + 32 \leftarrow \underset{\tfrac{9}{5}C + 32 = F}{\underline{ +32 \qquad +32}}$$

① $C = \tfrac{5}{9}(72 - 32)$
  $C = 22.2°$

② $C = \tfrac{5}{9}(-11 - 32)$
  $C = 23.9°$

③ $C = \tfrac{5}{9}(102.6 - 32)$
  $C = 39.2°$

④ $F = \tfrac{9}{5}(25) + 32$
  $F = 77°$

⑤ $F = \tfrac{9}{5}(42) + 32$
  $F = 107.6°$

⑥ $F = \tfrac{9}{5}(-3.4) + 32$
  $F = 25.9$

4. Convert from standard form to slope-intercept form.

① $4x + 6y = 48$
  $\underline{-4x \qquad\quad -4x}$
  $6y = -4x + 48$
  $y = -\tfrac{2}{3}x + 7$

② $3x - 5y = 25$
  $\underline{-3x \qquad\quad -3x}$
  $-5y = -3x + 25$
  $y = \tfrac{3}{5}x - 5$

③ $-4x + 9y = 45$
  $\underline{+4x \qquad\quad +4x}$
  $9y = 4x + 45$
  $y = \tfrac{4}{9}x + 5$

④ $6x - 2y = -52$
  $\underline{-6x \qquad\qquad -6x}$
  $-2y = -6x - 52$
  $y = 3x + 26$

⑤ $-x - 8y = 96$
  $\underline{+x \qquad\quad +x}$
  $-8y = x + 96$
  $y = -\tfrac{1}{8}x - 12$

⑥ $12x + 28y = -84$
  $\underline{-12x \qquad\qquad -12x}$
  $28y = -12x - 84$
  $y = -\tfrac{3}{7}x - 3$

5

① $y = 5x + 8$
$\underline{-5x \quad -5x}$
$-5x + y = 8$

② $y = -4x + 2$
$\underline{+4x \quad +4x}$
$4x + y = 2$

③ $\left(y = \frac{2}{3}x - 6\right)3$
$3y = 2x - 18$
$\underline{-2x \quad -2x}$
$-2x + 3y = -18$

④ $\left(y = \frac{-1}{2}x - 3\right)2$
$2y = -x - 6$
$\underline{+x \qquad +x}$
$x + 2y = -6$

⑤ $y = -5x - 13$
$\underline{+5x \quad +5x}$
$5x + y = -13$

⑥ $\left(y = \frac{3}{4}x + 10\right)4$
$4y = 3x + 40$
$\underline{-3x \quad -3x}$
$-3x + 4y = 40$

6

① $\left(A = \frac{1}{2}bh\right)2$

$\dfrac{2A}{b} = \dfrac{bh}{b}$

$\boxed{\dfrac{2A}{b} = h}$

② $\left(A = \frac{1}{2}(b_1 + b_2)h\right)2$

$\dfrac{2A}{h} = \dfrac{(b_1 + b_2)h}{h}$

$\dfrac{2A}{h} = b_1 + b_2$

$\underline{\quad -b_2 \qquad\qquad -b_2 \quad}$

$\boxed{\dfrac{2A}{h} - b_2 = b_1}$

③ $\dfrac{V}{\pi r^2} = \dfrac{\pi r^2 h}{\pi r^2}$

$\boxed{\dfrac{V}{\pi r^2} = h}$

④ $\left(V = \frac{1}{3}lwh\right)3$

$\dfrac{3V}{l \cdot h} = \dfrac{l \cdot w \cdot h}{l \cdot h}$

$\boxed{\dfrac{3V}{lh} = w}$

⑤ $\dfrac{pV}{nR} = \dfrac{nRT}{nR}$

$\boxed{\dfrac{pV}{nR} = T}$

⑥ $Z = \dfrac{4X}{Y^2} + 3W$

$\dfrac{-3W \qquad\qquad -3W}{}$

$Y^2\left(Z - 3W\right) = \left(\dfrac{4X}{Y^2}\right) Y^2$

$\dfrac{Y^2\left(Z - 3W\right)}{4} = \dfrac{4X}{4}$

$\boxed{\dfrac{Y^2\left(Z - 3W\right)}{4} = X}$