Solve each equation.

30) $2x - 37 = 7x - 3(1 - 4x)$

$2x - 37 = 7x - 3 + 12x$

$2x - 37 = 19x - 3$

$-34 = 17x$

$\boxed{-2 = x}$

31) $8(n - 6) + 8 = 8n - 43$

$8n - 48 + 8 = 8n - 43$

$8n + 40 = 8n - 43$

$ -8n -8n$

$40 = -43$

$\boxed{\text{NO SOLUTION}}$

32) $-6(3 - r) = -18 + 6r$

$-18 + 6r = -18 + 6r$

$ -6r -6r$

$-18 = -18$

$\boxed{\begin{array}{c}\text{INFINITE}\\\text{SOLUTIONS}\end{array}}$

33) $2(-1 - 8x) + 3x = -3x - 2$

$-2 - 16x + 3x = -3x - 2$

$-2 - 13x = -3x - 2$

$ +13x +13x$

$-2 = 10x - 2$

$+2 +2$

$\dfrac{0}{10} = \dfrac{10x}{10}$

$\boxed{0 = x}$

Solve each equation by taking square roots.

34) $5 - 8x^2 = -507$

$-8x^2 = -512$

$x^2 = 64$

$x = \pm\sqrt{64}$

$\boxed{x = \pm 8}$

35) $4n^2 + 3 = 151$

$4n^2 = 148$

$n^2 = 37$

$\boxed{n = \pm\sqrt{37}}$

Solve each equation by factoring.

36) $n^2 - 3n - 14 = -4$

$ +4 +4$

$n^2 - 3n - 10 = 0 \qquad \overset{\oplus}{-3} \quad \overset{\circledast}{-10}$

$(n - 5)(n + 2) = 0$

$n - 5 = 0 \qquad n + 2 = 0$

$\boxed{n = 5} \qquad \boxed{n = -2}$

37) $r^2 + 7r + 6 = 0 \qquad \overset{\oplus}{7} \quad \overset{\circledast}{6}$

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

$r + 1 = 0 \qquad r + 6 = 0$

$\boxed{r = -1} \qquad \boxed{r = -6}$

38) $n^2 - n - 56 = 0$ ⊕ -1 ⊛ -56

$(n-8)(n+7) = 0$

$n-8=0$ $n+7=0$

$\boxed{n=8}$ $\boxed{n=-7}$

39) $x^2 - 4x - 22 = -2 - 5x$
$ +5x +2 +2 +5x$

$x^2 + x - 20 = 0$ ⊕ 1 ⊛ -20

$(x+5)(x-4) = 0$

$x+5=0$ $x-4=0$

$\boxed{x=-5}$ $\boxed{x=4}$

40) $25a^2 - 4 = 0$ ⊕ 0 ⊛ -100

⋆ $25a^2 + 0a - 4 = 0$

$(25a^2 + 10a) + (-10a - 4) = 0$

$5a(5a+2) + -2(5+2) = 0$

$(5a-2)(5a+2) = 0$

$5a-2=0$ $5a+2=0$

$5a=2$ $5a=-2$

$\boxed{a=2/5}$ $\boxed{a=-2/5}$

41) $6v^2 + 11v + 3 = 0$ ⊕ 11 ⊛ 18

$(6v^2 + 9v) + (2v + 3) = 0$

$3v(2v+3) + 1(2v+3) = 0$

$(3v+1)(2v+3) = 0$

$3v+1=0$ $2v+3=0$

$3v=-1$ $2v=-3$

$\boxed{v=\frac{-1}{3}}$ $\boxed{v=\frac{-3}{2}}$

42) $7a^2 - 25a + 18 = 6$
$ -6 -6$

$7a^2 - 25a + 12 = 0$ ⊕ -25 ⊛ 84

$(7a^2 - 4a) + (-21a + 12) = 0$

$a(7a + -4) + -3(7a + -4) = 0$

$(a + -3)(7a + -4) = 0$

$a + -3 = 0$ $7a + -4 = 0$

$\boxed{a=3}$ $7a = 4$

$\boxed{a = \frac{4}{7}}$

43) $7m^2 + 6m = 0$ ⊕ 6 ⊛ 0

⋆ $7m^2 + 6m + 0 = 0$

$(7m^2 + 6m) + (0m + 0) = 0$

$m(7m + 6) = 0$

$\boxed{m=0}$ $7m + 6 = 0$

$7m = -6$

$\boxed{m = \frac{-6}{7}}$

-6-

Solve each equation with the quadratic formula.

44) $3m^2 - 5m - 102 = 10$

$$3m^2 - 5m - 112 = 0$$

$a:3 \quad b:-5 \quad c:-112$

$$x = \frac{-(-5) \pm \sqrt{(-5)^2 - (4 \cdot 3 \cdot -112)}}{2 \cdot 3}$$

$$x = \frac{5 \pm \sqrt{25 - -1344}}{6}$$

$$x = \frac{5 \pm \sqrt{1369}}{6}$$

$$x = \frac{5 \pm 37}{6}$$

① $x = \frac{5+37}{6}$

$x = \frac{42}{6}$

$x = \boxed{7}$

② $x = \frac{5-37}{6}$

$x = \frac{-32}{6}$

$\boxed{x = -5.\overline{3}}$

45) $9r^2 - 12r = 2r^2 - 12r + 14$

$-2r^2 \quad +12r \quad -14$

$$7r^2 + 0r - 14 = 0$$

$a:7 \quad b:0 \quad c:-14$

$$x = \frac{-0 \pm \sqrt{0^2 - (4 \cdot 7 \cdot -14)}}{2 \cdot 7}$$

$$x = \frac{0 \pm \sqrt{0 - -392}}{14}$$

$$x = \frac{0 \pm \sqrt{392}}{14}$$

$$x = \frac{0 \pm \sqrt{196 \cdot 2}}{14}$$

$$x = \frac{\pm 14\sqrt{2}}{14} = \frac{\pm\sqrt{2}}{1} = \boxed{\pm\sqrt{2}}$$

Solve each equation.

46) $|3x - 6| = 12$

① $3x - 6 = 12$
$3x = 18$
$\boxed{x = 6}$

② $3x - 6 = -12$
$3x = -6$
$\boxed{x = -2}$

47) $|-7 - 2p| + 6 = 21$
$\qquad -6 \quad -6$

$|-7 - 2p| = 15$

① $-7 - 2p = 15$
$-2p = 22$
$\boxed{p = -11}$

② $-7 - 2p = -15$
$-2p = -8$
$\boxed{p = 4}$

48) $\frac{2}{2} + 8|3 - 9x| = 26$

$-2 \qquad -2$

$\frac{8|3-9x|}{8} = \frac{24}{8}$

$|3-9x| = 3$

① $3-9x=3$

$-9x = 0$

$\boxed{x = 0}$

② $3-9x=-3$

$-9x = -6$

$\boxed{x = \frac{6}{9} = \frac{2}{3}}$

Solve each inequality and graph its solution.

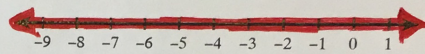49) $-15 + x < 3(7x - 5)$

$-15 + x < 3(7x-5)$

$-15 + x < 21x - 15$

$+15 \qquad\qquad +15$
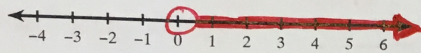
$\frac{x}{-x} < \frac{21x}{-x}$

$\frac{0}{20} < \frac{20x}{20}$

$\boxed{0 < x}$

50) $2(8 - 4b) \le 16 - 8b$

$2(8-4b) \le 16 - 8b$

$16 - 8b \le 16 - 8b$

$-16 \qquad\quad -16$

$-8b \le -8b$

$+8b \qquad +8b$

$\boxed{0 \le 0}$ TRUE

$\boxed{\text{INFINITE SOLUTIONS}}$

51) $4(x - 7) > -28 + 4x$
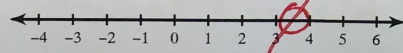
$4(x-7) > -28 + 4x$

$4x - 28 > -28 + 4x$

$-4x \qquad\qquad -4x$

$-28 > -28$ FALSE

$\boxed{\text{NO SOLUTIONS}}$

52) $-5 + 5x \ge 2(-2 + 5x) - 4x$
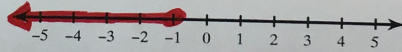
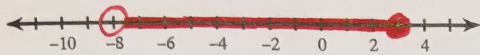$-5 + 5x \ge 2(-2 + 5x) - 4x$

$-5 + 5x \ge -4 + 10x - 4x$

$-5 + 5x \ge -4 + 6x$

$-5x \qquad\qquad -5x$

$-5 \ge -4 + x$

$+4 \qquad +4$

$\boxed{-1 \ge x}$

Solve each compound inequality and graph its solution.

53) $-61 < 3 + 8b \le 27$

$$-61 < 3 + 8b \le 27$$
$$-3 \quad -3 \qquad -3$$

$$\frac{-64}{8} < \frac{8b}{8} \le \frac{24}{8}$$

$$\boxed{-8 < b \le 3}$$

54) $6n - 7 \ge 47$ or $10 - 8n > 50$
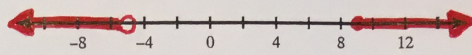
$$6n - 7 \ge 47 \qquad\qquad 10 - 8n > 50$$
$$6n \ge 54 \qquad\qquad\qquad -8n > 40$$

$$\boxed{n \ge 9} \quad \text{or} \quad \boxed{n < -5}$$

Solve each inequality.

55) $\left| -3n + 5 \right| > 4$

① $-3n + 5 > 4$

$-3n > -1$

$\boxed{n < \frac{1}{3}}$

② $-3n + 5 < -4$

$-3n < -9$

$\boxed{n > 3}$

56) $\dfrac{4\left|3x - 9\right|}{4} \ge \dfrac{84}{4}$

$\left|3x - 9\right| \ge 21$

① $3x - 9 \ge 21$

$3x \ge 30$

$\boxed{x \ge 10}$

② $3x - 9 \le -21$

$3x \le -12$

$\boxed{x \le -4}$

57) $-2\left|6 - 6n\right| + 4 \le -20$
$\qquad\qquad\qquad -4 \quad -4$

$$\dfrac{-2\left|6 - 6n\right|}{-2} \le \dfrac{-24}{-2}$$

$$\left|6 - 6n\right| \ge 12$$

① $6 - 6n \ge 12$

$-6n \ge 6$

$\boxed{n \le -1}$

② $6 - 6n \le -12$

$-6n \le -18$

$\boxed{n \ge 3}$