

1 $-12x - 6 - 3x + 12 = -15x + 1 \Rightarrow 6 = 1$
 Contradiction, \emptyset

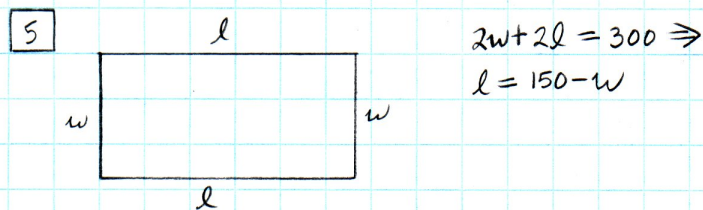
2 $f = \frac{AB(p+1)}{24}$

3

	rate	time	dist.
→	$r+16$	$\frac{2}{3}$	$\frac{2}{3}(r+16)$
←	r	1	r

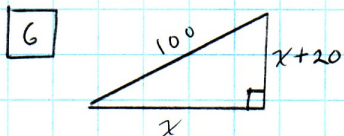
$r = \frac{2}{3}(r+16) \Rightarrow \frac{1}{3}r = \frac{32}{3} \Rightarrow r = 32$
 Distance = $r = 32$ miles.

4 $0.115x + 0.12(90,000 - x) = 10,525 \Rightarrow$
 $-0.005x = -275 \Rightarrow x = 55,000$
 $\$55K$ at 11.5% & $\$35K$ at 12%



Area = 5000 $\Rightarrow lw = 5000 \Rightarrow w(150 - w) = 5000$
 $\Rightarrow -w^2 + 150w = 5000 \Rightarrow w^2 - 150w + 5000 = 0$
 $\Rightarrow (w - 100)(w - 50) = 0 \Rightarrow w = 50, 100.$

If $w = 50$, then $l = 150 - 50 = 100$
 If $w = 100$, then $l = 150 - 100 = 50$
 Either way, dimensions are 50 m x 100 m



$x^2 + (x+20)^2 = 100^2 \Rightarrow 2x^2 + 40x - 9600 = 0 \Rightarrow$
 $x^2 + 20x - 4800 = 0 \Rightarrow (x+80)(x-60) = 0 \Rightarrow$
 $x = 60 \Rightarrow x+20 = 80$ ft ✓

7a $-1 + 22i$

7b $-23 - 11i$

7c $i^4(19) + 3 = i^3 = -i$

8 $3x^2 - 4x + 1 = 0 \Rightarrow (3x - 1)(x - 1) = 0 \Rightarrow$
 $x = \frac{1}{3}, 1$

9 $3x^2 + 2x = 5 \Rightarrow x^2 + \frac{2}{3}x = \frac{5}{3} \Rightarrow$
 $x^2 + \frac{2}{3}x + \frac{1}{9} = \frac{5}{3} + \frac{1}{9} \Rightarrow (x + \frac{1}{3})^2 = \frac{16}{9} \Rightarrow$
 $x + \frac{1}{3} = \pm \frac{4}{3} \Rightarrow x = -\frac{1}{3} \pm \frac{4}{3} = -\frac{5}{3}, 1$

10a $-x(x-1) - (x+1) = -2 \Rightarrow$
 $-x^2 + x - x - 1 = -2 \Rightarrow x^2 = 1 \Rightarrow x = \pm 1$
 Both extraneous, \emptyset .

10b $\sqrt{2x} = \sqrt{3x+12} - 2 \Rightarrow$
 $2x = (3x+12) - 4\sqrt{3x+12} + 4 \Rightarrow$
 $4\sqrt{3x+12} = x+16 \Rightarrow 16(3x+12) = x^2 + 32x + 256$
 $x^2 - 16x + 64 = 0 \Rightarrow x = 8$

10c $(2x-1)^2 = x \Rightarrow 4x^2 - 5x + 1 = 0 \Rightarrow$
 $(4x-1)(x-1) = 0 \Rightarrow x = \frac{1}{4}, 1$

11a $x > -3 \rightarrow (-3, \infty)$,

11b $-1 < 8x \leq 32 \Rightarrow -\frac{1}{8} < x \leq 4$
 $(-\frac{1}{8}, 4]$,

12a $3x^2 + x - 4 \leq 0 \Rightarrow (3x+4)(x-1) \leq 0$
 $3x+4 \leq 0$ & $x-1 \geq 0$ or $3x+4 \geq 0$ & $x-1 \leq 0$
 $x \leq -\frac{4}{3}$ & $x \geq 1$ or $x \geq -\frac{4}{3}$ & $x \leq 1$
 \emptyset or $[-\frac{4}{3}, 1]$ ✓

12b $x(16-x^2) > 0 \Rightarrow x(4-x)(4+x) > 0$

+++ : $x > 0$ & $x < 4$ & $x > -4 \Rightarrow$
 $x > 0$ & $x < 4 \Rightarrow (0, 4)$ ✓

+-- : $x > 0$ & $x > 4$ & $x < -4 \Rightarrow \emptyset$

-+- : $x < 0$ & $x < 4$ & $x < -4 \Rightarrow$
 $x < -4 \Rightarrow (-\infty, -4)$ ✓

--+ : \emptyset

Solution set: $(-\infty, -4) \cup (0, 4)$

$$\boxed{12c} \quad \frac{3}{x-2} - 1 \leq 0 \Rightarrow \frac{3}{x-2} - \frac{x-2}{x-2} \leq 0 \Rightarrow \frac{5-x}{x-2} \leq 0 \Rightarrow \text{Two cases...}$$

$$\frac{+}{-}: 5-x \geq 0 \ \& \ x-2 < 0 \Rightarrow x \leq 5 \ \& \ x < 2 \Rightarrow (-\infty, 2)$$

$$\frac{-}{+}: 5-x \leq 0 \ \& \ x-2 > 0 \Rightarrow x \geq 5 \ \& \ x > 2 \Rightarrow [5, \infty)$$

$$\text{Solution Set: } (-\infty, 2) \cup [5, \infty)$$

$$\boxed{12d} \quad |2x-9| < 5 \Rightarrow -5 < 2x-9 < 5 \Rightarrow 4 < 2x < 14 \Rightarrow 2 < x < 7 \\ (2, 7)$$

$$\boxed{13} \quad |11-4x| = 8 \Rightarrow 11-4x = -8 \ \text{or} \ 11-4x = 8 \Rightarrow x = \frac{19}{4} \ \text{or} \ x = \frac{3}{4} \\ \left\{ \frac{3}{4}, \frac{19}{4} \right\}$$