

83) A woman cycles 8 mi/h faster than she runs.
 Every morning she cycles for 4 mi and runs 2.5 mi.
 for total of 1 hour. How fast does she run?

Let $x =$ the ~~rate~~^{speed}/min. that she runs.
 $t =$ time (min.).

8 mi/h

$= \frac{8}{60}$ mi/min. faster.

$$xt = 2.5 \text{ mi. (run).} = t = \frac{2.5}{x}$$

~~$$(x + \frac{8}{60})(60 - t) = 4 \text{ mi. (cycling)}$$~~

$$(60x + 8)(60 - t) = 240 \text{ mi.}$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-9 \pm \sqrt{81 - 7200}}{72}$$

$$= (60x + 8)(60 - \frac{2.5}{x}) = 240$$

$$= 3600x + 150 + 480 - \frac{20}{x} = 240 + 150 - 480$$

$$\frac{3600x^2 - 20}{x} = -90(x) \Rightarrow 3600x^2 + 90x - 20 = 0$$

$$= \cancel{10}(360x^2 + 9x - 2) = 0$$

$$x \approx 0.06$$

$$\approx 3.78 \text{ mi}$$

$$\frac{0x^2 - 20}{x}$$

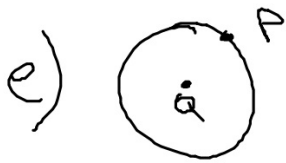
$$\frac{3600x^2 - 20}{x}$$

99, 100

$$b) d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

$$c) m = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$d) \text{Slope-int: } y = mx + b$$



$$b7) \quad \frac{x+1}{x-1} \cdot \frac{3x}{3x-6} = \frac{3x}{x(x-2)}$$

$$= (x)(x-1) = (x+1)(x-2)$$

$$= \cancel{x^2} - \cancel{x} = \cancel{x^2} - \cancel{x} - 2$$

$$\therefore 0 = -2$$

No sol.

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85) Abbie paints twice as fast as Beth (d=r)
 || || three times as fast as Cathie.
 It takes them 60 min. to paint the whole room together.
 How long will it take if Abbie was a loner?

S = Abbie's speed,

$$s(60) = \frac{600}{11} \% \div 60 \quad x + \frac{1}{2}x + \frac{1}{3}x = 100$$

$$s = \frac{600}{11} \cdot \frac{1}{60}$$

$$s = \frac{10}{11} \% \text{ per min.}$$

$$\frac{6x + 3x + 2x}{11} = 100 (b)$$

$$11x = 600$$

$$x = \frac{600}{11} \%$$

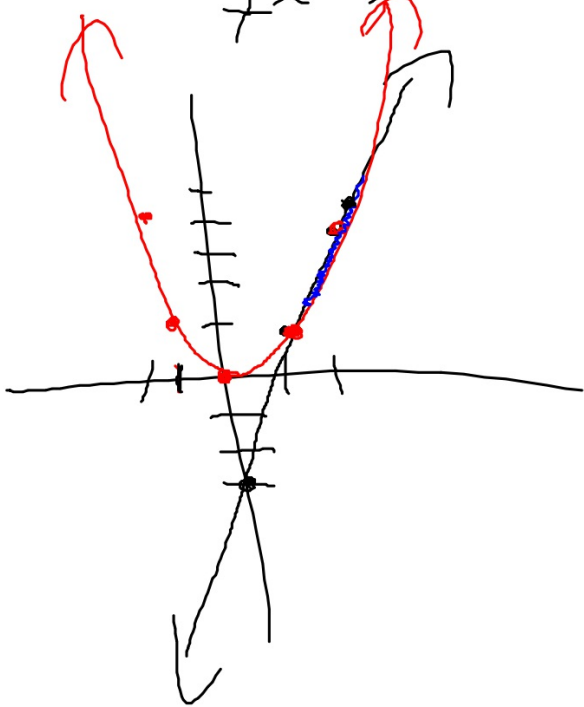
$$\cancel{110} t = 100 (11)$$

$$10t = 1100$$

$$t = 110 \text{ min.}$$

A - x %
 B - $\frac{1}{2}x$ %
 C - $\frac{1}{3}x$ %

97) Solve graphically.
 $4x - 3 = x^2$



x	x
-1	1
0	0
1	1

7) Solve the inequality

$$\frac{x-4}{x^2-4} \leq 0$$

$$x-4 \leq 0 \Rightarrow x \leq 4$$

$$x^2-4 \leq 0$$

$$\sqrt{x^2} \leq \sqrt{4}$$

$$\cancel{x \leq \pm 2} \quad \begin{array}{l} x < -2 \\ x > 2 \end{array}$$

$$x^2-4=0$$

$$x^2=4$$

$$x = \pm 2$$

① $x \leq 4$
 $x > 2, x < -2$

② $x \geq 4$
 $x < 2, x > -2$
or
 $-2 < x < 2$

81), Owner sells. raisins for \$3.20/lb
nuts for \$2.40/lb

Wants 50 lb mix for \$2.72/lb
How much of each?

* r = # of lbs of raisins

$50 - r = n$ = # of lbs of nuts

$$3.2r + 2.4(50 - r) = 2.72(50)$$

$$3.2r + 120 - 2.4r = 136$$

$$0.8r = 16$$

$$r = 20 \text{ lb}$$

$$n = 30 \text{ lb.}$$

83) A woman cycles 8 mi/h faster than she runs.
 Every morning she cycles for 4 mi and runs 2.5 mi. for total of 1 hour. How fast does she run?
 $t = \text{time (min), she runs}$
 $X = \text{Speed in which Abbie runs.}$

8 mi/h.

$$= \frac{8}{60} \text{ mi/min.} \quad X t = 2.5$$

$$= \frac{2}{15} \text{ mi/min.} \quad (X+8)(60-t) = 4$$

43) Factor.

$$\begin{aligned} & x^{-1/2} - 2x^{1/2} + x^{3/2} \\ &= \frac{1}{x^{1/2}} - \frac{2x^{1/2 \cdot x^{1/2}}}{1 \cdot x^{1/2}} + \frac{x^{3/2 \cdot x^{1/2}}}{1 \cdot x^{1/2}} \\ &= \frac{1 - 2x^{1/2+1/2} + x^{3/2+1/2}}{x^{1/2}} \end{aligned}$$

$$\begin{aligned} & \begin{array}{ccc} & -2 & \\ -1 & \times & -1 \\ & 1 & \end{array} \quad \cdot \quad \boxed{\begin{array}{l} x^{-a} \\ = \frac{1}{x^a} \end{array}} \\ & \frac{x^2 - 2x + 1}{x^{1/2}} = \frac{(x-1)(x-1)}{x^{1/2}} \\ & = \boxed{\frac{(x-1)^2}{x^{1/2}}} \end{aligned}$$

41) $x^6 - 1$ (Factor).

pg. 76 of cubes
sum of cubes,
diff of cubes,

$$= (x^3)^2 - 1 = (x^3 + 1)(x^3 - 1)$$

$$= (x+1)(x^2-x+1)(x-1)(x^2+x+1)$$

$$\begin{matrix} x^2 - \\ (x+1) \end{matrix}$$

35) $x^2 + 3x - 10$

$$(x+5)(x-2)$$

$$\begin{array}{r} -10 \\ 5 \times 3 \\ -2 \end{array}$$

155 35) Find $f(a), f(a+h), \frac{f(a+h)-f(a)}{h}$, $h \neq 0$

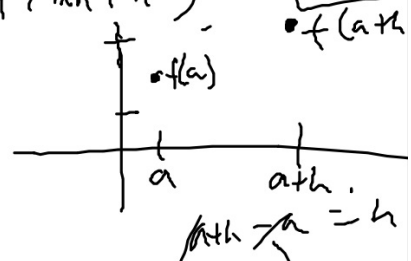
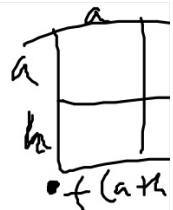
$$f(x) = 3 - 5x + 4x^2$$

~~$$f(a) = 3 - 5a + 4a^2$$~~

$$f(a+h) = 3 - 5(a+h) + 4(a+h)^2$$

$$= 3 - 5a - 5h + 4a^2 + 8ah + 4h^2$$

$$4(a^2 + 2ah + h^2)$$



$$\frac{(a+h)-f(a)}{h} = \frac{3 - 5a - 5h + 4a^2 + 8ah + 4h^2 - (3 - 5a + 4a^2)}{h}$$

$$y_2 - y_1 \text{ rise} = \frac{\cancel{3} - \cancel{5a} - 5h + \cancel{4a^2} + 8ah + 4h^2 - \cancel{3} + \cancel{5a} - \cancel{4a^2}}{h}$$

$$x_2 - x_1 \text{ run} = \frac{-5 + 8a + 4h}{h} = \boxed{-5 + 8a + 4h}$$

51) Find the domain \rightarrow all possible inputs (x values),

$$g(x) = \frac{\sqrt{2+x}}{3-x}$$

$$37) f(x) = 2x$$
$$(-\infty, \infty)$$

$$3-x=0$$

$$-x = -3$$

$$x = 3 \text{ out}$$

$$2+x < 0$$

$$x < -2 \text{ out}$$

$$\therefore x \geq -2, x \neq 3$$

$$[-2, 3) \cup (3, \infty)$$

43) $f(x) = \frac{x+2}{x^2-1}$ Find domain

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

$x \neq 1, -1$

$d: (-\infty, -1) \cup (-1, 1) \cup (1, \infty)$

