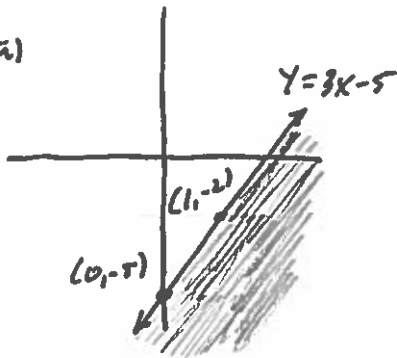
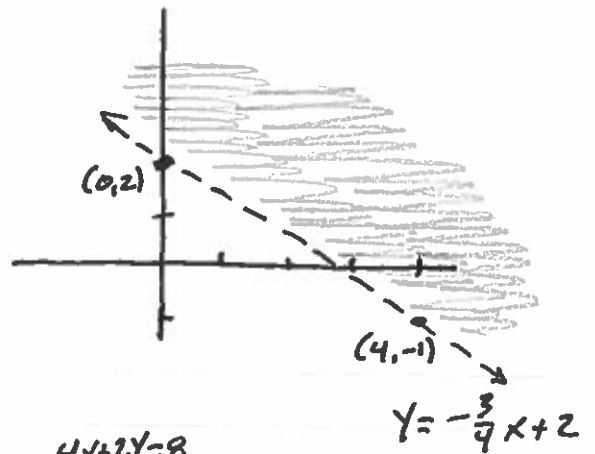


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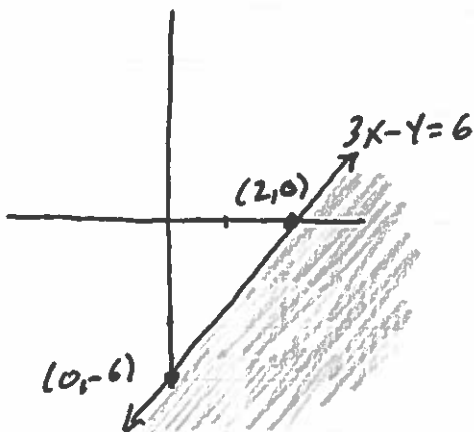
1. a)



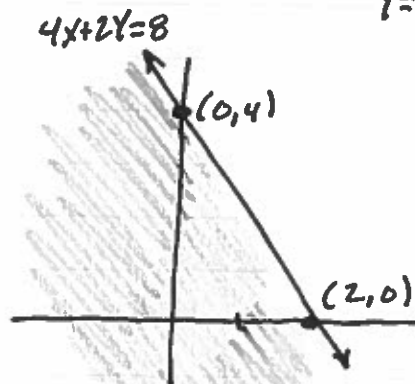
b)



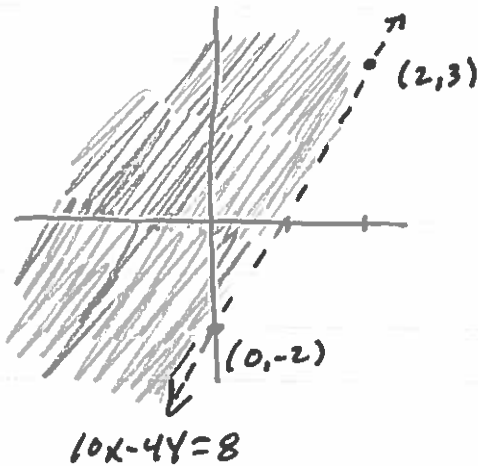
c)



d)



e) $10x - 4y < 8$
 $-4y < -10x + 8$
 $y > \frac{5}{2}x - 2$



2a) $(-2, -1)$ $(0, 3)$ → line $y = 2x + 3$
 Slope $\frac{4}{2}$ inequality $y \geq 2x + 3$

b) $(0, -1)$ $(4, 0)$ → line $y = \frac{1}{4}x - 1$
 Slope $\frac{1}{4}$ inequality $y > \frac{1}{4}x - 1$

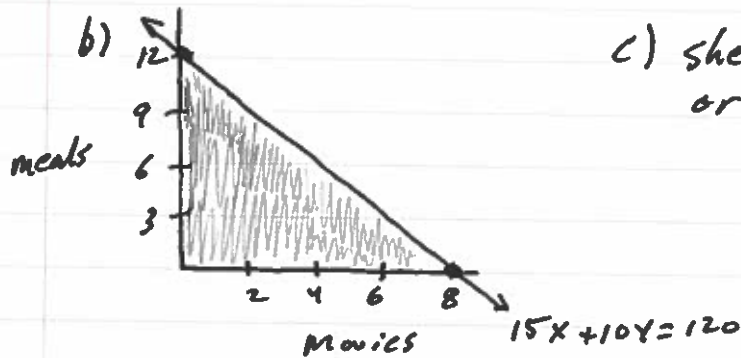
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2 c) $(0, 2)$ $(1, -1)$ \rightarrow equation $y = -3x + 2$
 slope $-\frac{3}{1}$ inequality $y < -3x + 2$

d) $(0, 2)$ $(4, -1)$ \rightarrow equation $y = -\frac{3}{4}x + 2$
 slope $-\frac{3}{4}$ inequality $y \leq -\frac{3}{4}x + 2$

3. skip (same as #1)

4. a) movies x $15x + 10y \leq 120$ $x \geq 0$
 meals y $y \geq 0$

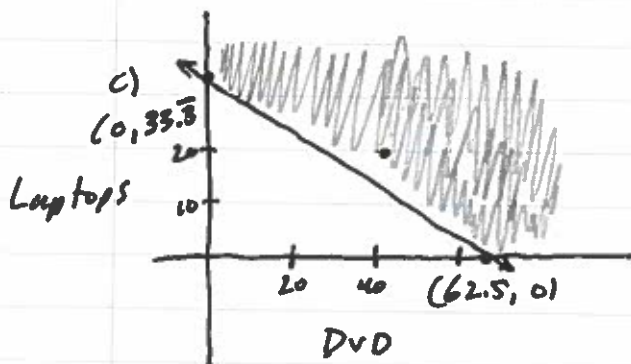


c) she can afford anything on or below the line

- 0 movies 12 meals
- 8 movies 0 meals
- 2 movies 9 meals
- ⋮

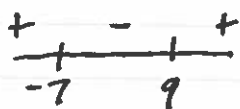
5 a) Laptop $.05(600) = \$30$
 DVD $.08(200) = \$16$

b) $16D + 30L \geq 1000$
 $D \geq 0$
 $L \geq 0$



c) any combination on/above the line will earn her \$1000 or more
 ie: 40 DVD, 20 Laptop

6 a) $x^2 - 2x - 63 > 0$
 $(x-9)(x+7) > 0$
 $x = 9$ $x = -7$



$x < -7$ OR $x > 9$

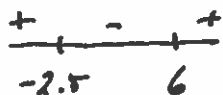
$(-\infty, -7) \cup (9, \infty)$

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6b) $2x^2 - 7x - 30 \geq 0$

$(2x + 5)(x - 6)$

$x = -2.5 \quad x = 6$



$x \leq -2.5 \text{ OR } x \geq 6$

$(-\infty, -2.5] \cup [6, \infty)$

c) $x^2 + 8x - 48 < 0$

$(x + 12)(x - 4) < 0$

$x = -12 \quad x = 4$



$-12 < x < 4$

$(-12, 4)$

d) $x^2 - 6x + 4 \geq 0$

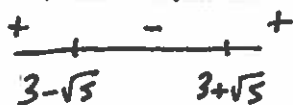
$x^2 - 6x = -4$

$x^2 - 6x + 9 = 5$

$(x - 3)^2 = 5$

$x - 3 = \pm\sqrt{5}$

$x = 3 \pm \sqrt{5}$



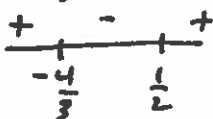
$x \leq 3 - \sqrt{5} \text{ OR } x \geq 3 + \sqrt{5}$

$(-\infty, 3 - \sqrt{5}] \cup [3 + \sqrt{5}, \infty)$

7a) $6x^2 + 5x - 4 \leq 0$

$(3x + 4)(2x - 1)$

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



$-\frac{4}{3} \leq x \leq \frac{1}{2}$

$[-\frac{4}{3}, \frac{1}{2}]$

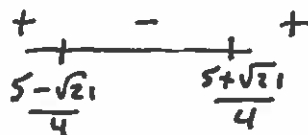
b) $4x^2 - 10x + 1 < 0$

$x = \frac{10 \pm \sqrt{100 - 16}}{8}$

$x = \frac{10 \pm \sqrt{84}}{8}$

$x = \frac{10 \pm 2\sqrt{21}}{8}$

$x = \frac{5 \pm \sqrt{21}}{4}$



$\frac{5 - \sqrt{21}}{4} < x < \frac{5 + \sqrt{21}}{4}$

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7c) $x^2 \leq 4x + 32$

$x^2 - 4x - 32 \leq 0$

$(x-8)(x+4) \leq 0$

$x=8 \quad x=-4$



$-4 \leq x \leq 8$

$[-4, 8]$

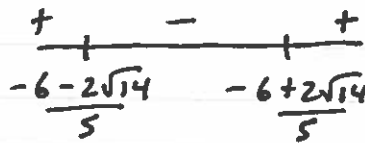
d) $5x^2 + 12x - 4 \geq 0$

$x = \frac{-12 \pm \sqrt{144 + 80}}{10}$

$x = \frac{-12 \pm \sqrt{224}}{10}$

$x = \frac{-12 \pm 4\sqrt{14}}{10}$

$x = \frac{-6 \pm 2\sqrt{14}}{5}$



$x \leq \frac{-6 - 2\sqrt{14}}{5} \text{ or } x \geq \frac{-6 + 2\sqrt{14}}{5}$

8 a) $-\frac{3}{4}x^2 + 3x - 2 \geq 0$

$-3x^2 + 12x - 8 \geq 0$

$3x^2 - 12x + 8 \leq 0$

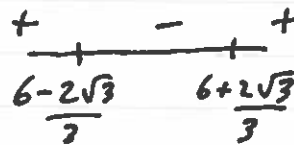
$x = \frac{12 \pm \sqrt{144 - 96}}{6}$

$x = \frac{12 \pm \sqrt{48}}{6}$

$x = \frac{12 \pm 4\sqrt{3}}{6}$

$x = \frac{6 \pm 2\sqrt{3}}{3}$

$\frac{6 - 2\sqrt{3}}{3} \leq x \leq \frac{6 + 2\sqrt{3}}{3}$

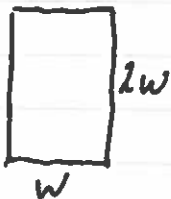


b) The path should start $\frac{6 - 2\sqrt{3}}{3}$ from the source and end $\frac{6 + 2\sqrt{3}}{3}$ away.

(.85 m)

(3.15 m)

9.

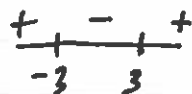


$2w^2 \leq 18$

$w^2 \leq 9$

$w^2 - 9 \leq 0$

$(w+3)(w-3) \leq 0$



$-3 \leq w \leq 3$

but $w \geq 0$

$\therefore 0 \leq w \leq 3$

Max: 3 wide
6 long

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10 a) $0.007v^2 + 0.22v \leq 100$

$$Y_1 = 0.007x^2 + 0.22x$$

$$Y_2 = 100$$

calc intersect

$$x = 104.8 \quad 104.8 \text{ km/h}$$

b) $0.007v^2 + 0.22v \leq 50$

$$Y_1 = 0.007x^2 + 0.22x$$

$$Y_2 = 50$$

calc intersect

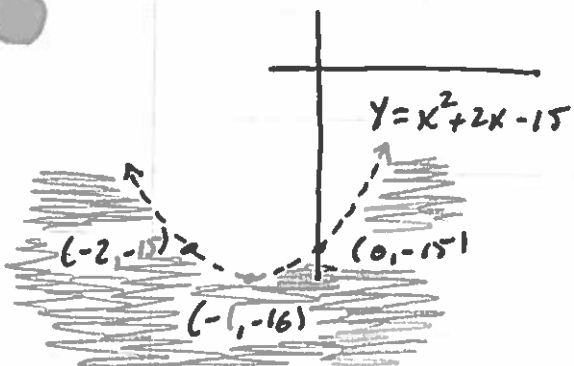
$$x = 70.2$$

$$70.2 \text{ km/h}$$

not half because it is not linear.

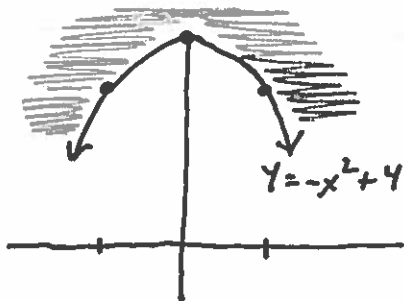
11 a) $y \leq \frac{1}{2}(x+3)^2 - 4$ b) $y > 2(x-3)^2$

12 a) vertex $x = -\frac{2}{2} = -1$ $x = -1$ $y = -16$ $(-1, -16)$ $(0, -15)$ $(-2, -15)$



b) $y \geq -x^2 + 4$ vertex $(0, 4)$ $(1, 3)$

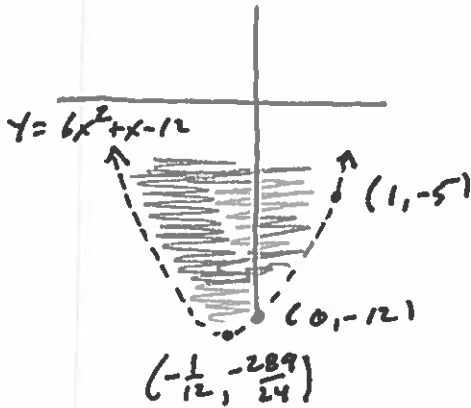
$$(-1, 3)$$



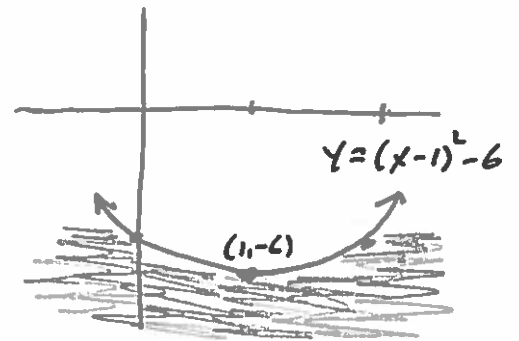
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12 c) $y > 6x^2 + x - 12$

vertex $-\frac{1}{12}$ $(-\frac{1}{12}, -\frac{289}{24})$
 ≈ -12.04



d) vertex $(1, -6)$ $(2, -5)$
 $(0, -5)$



13 a) vertex $(0, 3)$ $(2, 7)$

$$y = a(x-0)^2 + 3$$

$$7 = a(2-0)^2 + 3$$

$$4 = 4a$$

$$a = 1$$

equation $y = x^2 + 3$ inequality $y < x^2 + 3$

b) vertex $(-4, 2)$ $(-2, -2)$

$$y = a(x+4)^2 + 2$$

$$-2 = a(-2+4)^2 + 2$$

$$-4 = 4a$$

$$a = -1$$

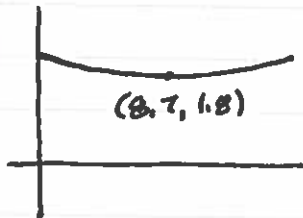
equation $y = -(x+4)^2 + 2$ inequality $y \leq -(x+4)^2 + 2$

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$$14a) Y \leq 0.003t^2 - 0.052t + 1.986$$

$$0 \leq t \leq 20$$

$$Y \geq 0$$



Window
 $0 \leq x \leq 20$
 $-1 \leq y \leq 3$

b) $0.003t^2 - 0.052t + 1.986 \leq 2$
 $0.003t^2 - 0.052t - 0.014 \leq 0$

$$Y_1 = 0.003x^2 - 0.052x - 0.014$$

$$Y_2 = 0$$

calc intersect

$$x = 17.6 \quad x = -0.3$$

\therefore 1975 to 1992

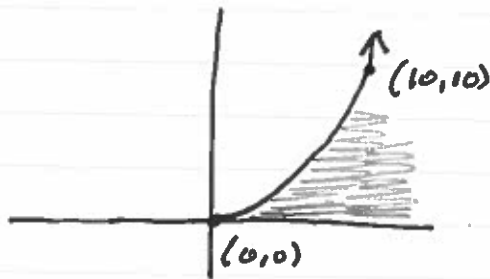
(at most \therefore round down)

15a) $V^2 \geq 10r$

$$r \leq \frac{1}{10}V^2$$

$$r \geq 0$$

$$V \geq 0$$



b) $V^2 \geq 10(16)$

$$V^2 = 160$$

$$V^2 \geq 160$$

$$V^2 \geq \sqrt{160}$$

$$V^2 - 160 \geq 0$$

$$V = \pm 4\sqrt{10}$$

$$\begin{array}{c} + \quad - \quad + \\ \hline -4\sqrt{10} \quad 4\sqrt{10} \end{array}$$

$$V \geq 4\sqrt{10}$$

$$V > 12.65$$

16. $20 = \frac{1}{20}x^2 - 4x + 90$

$$0 = \frac{1}{20}x^2 - 4x + 70$$

$$0 = x^2 - 80x + 1400$$

$$x = \frac{80 \pm \sqrt{800}}{2}$$

$$= \frac{80 \pm 20\sqrt{2}}{2}$$

$$= 40 \pm 10\sqrt{2}$$

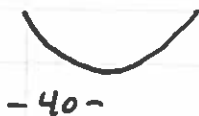
a) $20 \leq \frac{1}{20}x^2 - 4x + 90$

b) $0 \leq \frac{1}{20}x^2 - 4x + 70$

$$\begin{array}{c} + \quad - \quad + \\ \hline 40 - 10\sqrt{2} \quad 40 + 10\sqrt{2} \end{array}$$

$$0 \leq x \leq 40 - 10\sqrt{2} \text{ OR } 40 + 10\sqrt{2} \leq x \leq 80$$

$$0 \leq x < 25.9 \text{ OR } 54.1 \leq x \leq 80$$



$-\frac{b}{2a} = \frac{4}{1/10} = 40$ vertex at 40

\therefore width is 80