Asst. 7 Solutions
4.1 #2
4.2 #1,4,5,...

4.1/ 2. Since she probably won't have to buy another visa, we'll guess she'll spend money at the same rate as she has been for the last 4 days. She spent \$72 in 4 days, which comes to \$18 a day. So for 3 more, she'll need $3 \cdot 18 = \$54$.

3. We could guess if people come in at the same rate as before that he might miss 3 people since 6 came in the last half hour, and 15 minutes is half of a half hour. If the time were around noon, though, we'd expect more people to start coming in in a given amount of time. Therefore, we could not really predict the amount of people he'd miss from the rate they were coming in before. I.e: the graph would not be linear in this region.

4.2/ 1. a) A has coordinates $(0, f(0))$, $B: (b, f(b))$, $C: (c, f(c))$, $D: (d, f(d))$, $E: (e, f(e))$.

b) L_1 connects B & D & is horizontal. Horizontal lines have slope 0.

c) L_1 has equation $y = mx + b'$. $m = \text{slope} = 0$. B is on the line and has coordinates $(b, f(b))$, so $b' = f(b)$. D is also on the line, so we could equivalently write $b' = f(d)$. Thus $y = f(b) = f(d)$ is the equation of L_1.

d) The length of the segment from B to $(b, 0)$ has a horizontal component of 0 & vertical component $f(b)$. So the length is just $f(b)$.

e) The distance from B to D is $(d-b)$ horizontally, and since there is no vertical difference ($f(b) = f(d)$, see a), b)) the length is just $(b-d)$.

f) L_2 connects A & C. $A: (0, f(0))$, $C: (c, f(c))$. Slope $= \frac{\text{rise}}{\text{run}}$ $= \frac{f(c) - f(0)}{c - 0} = (f(c) - f(0))/c$.

g) L_2 has equation $y = mx + b$. $m = (f(c) - f(0))/c$. A is on L_2 so when $x = 0$, $y = f(0)$. Plugging this in: $f(0) = m \cdot 0 + b$ gives us that $b = f(0)$. So the equation is: $y = [(f(c) - f(0))/c]\, x + f(0)$

1. h) L_3 is vertical and goes through $(d, f(d))$. It's equation must then be $x = d$.
i) Slope $= \frac{\text{rise}}{\text{run}}$. For a vertical line, the rise is infinite for 0 run. We call this <u>undefined</u>.

4. Find the equation: slope $= -\frac{1}{2}$, point $(-2,-3)$ on the line.
For a line, $y = mx + b$. $m = \text{slope} = -\frac{1}{2}$, so $y = -\frac{1}{2}x + b$.
Our point tells us when $x = -2$, $y = -3$, so $-3 = -\frac{1}{2}(-2) + b$, so $b = -4$. Thus our equation is $\boxed{y = -\frac{1}{2}x - 4}$

5. Slope π, point $(3,5)$: $y = mx + b$, $m = \pi$.
Plug in a point: $5 = \pi \cdot 3 + b$. So $b = 5 - 3\pi$.
Equation: $y = \pi x + (5 - 3\pi)$

8. point $(\sqrt{3}, \sqrt{2})$, parallel to $3x - 4y = 7$: Parallel lines have the same slope, so to find the slope of $3x - 4y = 7$, we need to solve for y: $-4y = -3x + 7$, so $y = \frac{3}{4}x + \frac{-7}{4}$. This has slope $\frac{3}{4}$.
So $m = \frac{3}{4}$. $y = \frac{3}{4}x + b$. Solving for a point: $\sqrt{2} = \frac{3}{4}\sqrt{3} + b$.
So $b = \sqrt{2} - \frac{3}{4}\sqrt{3}$. Thus $\boxed{y = \frac{3}{4}x + (\sqrt{2} - \frac{3}{4}\sqrt{3})}$.

9. origin, perpendicular to $3x - 4y = 7$. Perpendicular lines have slopes which are negative reciprocals of one another. The slope in this equation is $\frac{3}{4}$, so our slope (m) is $-\frac{4}{3}$.
$y = -\frac{4}{3}x + b$. Plug in $(0,0)$, and we see $b = 0$
So $\boxed{y = -\frac{4}{3}x}$

18. We have a base cost of C dollars, and added to it is an additional cost of (T dollars/file) times x files.
That is: $\boxed{f(x) = C + Tx}$