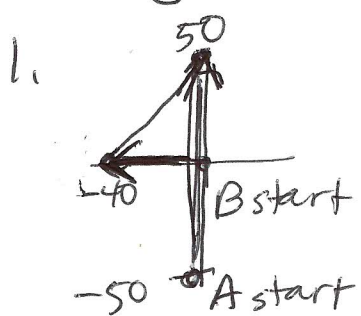


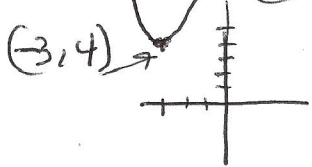
A. Long Problems



1. a) 9 am (start) $B(0, 0)$ $A(0, -50)$
 11 am $B(-40, 0)$ $A(0, +50)$

b) $d = \sqrt{40^2 + 50^2} = \sqrt{1600 + 2500}$
 $= \sqrt{4100} =$ miles

2. a) $f(x) = (x+3)^2 + 4$



Domain: $(-\infty, \infty)$
 Range: $[4, \infty)$
 inc: $(-3, \infty)$
 dec: $(-\infty, -3)$

b) $g(x) = -|2x|$



Domain: $(-\infty, \infty)$
 Range: $(-\infty, 0]$
 inc: $(-\infty, 0)$
 dec: $(0, \infty)$

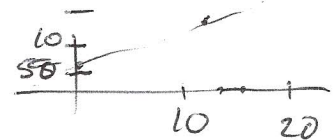
3. a) let $x =$ years after 2000
 $y =$ # of restaurants $(0, 55)$ and $(15, 205)$

b) $m = \frac{205 - 55}{15 - 0} = \frac{150}{15} = 10 \Rightarrow$ gain 10 restaurants/year

$y - 55 = 10(x - 0) \Rightarrow y = 10x + 55$

c) $x = 10; y = (10)(10) + 55 = 155$

d) $x = 20; y = 10(20) + 55 = 255$



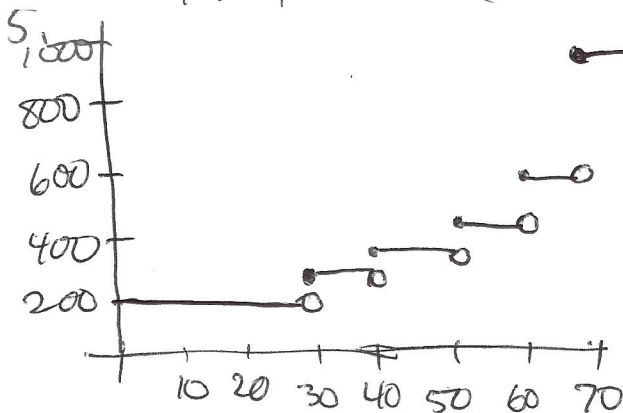
4. a) $x^2 + 7x + 20 = 0$

$(x+3)(x+4) = 0 \Rightarrow x = -3, -4$



$f(x) > 0$ on intervals

$(-\infty, -4) \cup (-3, \infty)$



b) \$500

c) \$1000

C. Medium Problems

1. standard form $(x-h)^2 + (y-k)^2 = r^2$

Center $(3, 1)$ what is radius?

r = distance between $(3, 1)$ and $(0, 5)$

$$d = \sqrt{(0-3)^2 + (5-1)^2} = \sqrt{9+16} = \sqrt{25} = 5$$

$$(x-3)^2 + (y-1)^2 = 25$$

2. $f(x) = x^2 + 2x$

$x=0$; $f(x) = 0^2 + 2(0) = 0$

$x=1$; $f(1) = 1^2 + 2(1) = 3$

$x=2$; $f(2) = 2^2 + 2(2) = 8$

a) $\Delta y / \Delta x$ from $x=0$ to 1 : $\frac{3-0}{1-0} = 3$

b) $\Delta y / \Delta x$ from $x=1$ to 2 : $\frac{8-3}{2-1} = 5$

c) Non-linear (parabola), so the slope is continuously changing

3. L = load, w = width (choose your own variables)

$$L = kw$$

a) $120 = k(2)$; $k=60$

$$L = 60w$$

b) $L = 60(3) = 180$ lb

4. $f(x) = x^2 - 2x + 7 = 0$

can't factor, use quadratic eq.

$$\frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(7)}}{2(1)} = \frac{2 \pm \sqrt{4-28}}{2}$$

$$= \frac{2}{2} \pm \frac{\sqrt{28}}{2} = 1 \pm i \frac{\sqrt{28}}{2} = 1 \pm i\sqrt{7}$$