Test 1 Key

① $t-3 \geq 0$ $\quad 4t-16=0$ $\quad D=\{t \mid t \geq 3, t \neq 4\}$

$t \geq 3$ $\quad t=\frac{16}{4}=4$ $\quad$ or $[3,4) \cup (4,\infty)$

② $$\frac{3(x+h)^2-2(x+h)+4-(3x^2-2x+4)}{h}$$

$$= \frac{3(x^2+2xh+h^2)-2x-2h+4-3x^2+2x-4}{h}$$

$$= \frac{6xh+3h^2-2h}{h} = 6x+3h-2$$

⑥ a) $[-3,\infty)$

b) $(0,4), (2,0)$

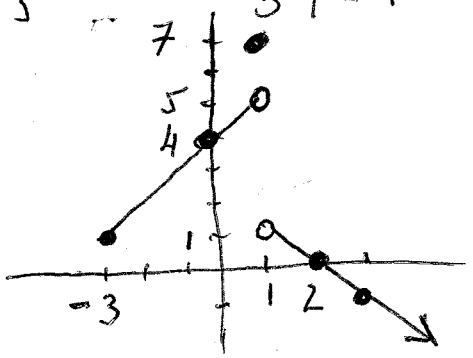
d) $(-\infty,5) \cup \{7\}$

Sorry, out of place ☹

c)

x	$y=x+4$
-3	1
0	4
1	5

x	$y=-x+2$
1	1
2	0
3	-1



③ $h(-x) = \frac{2(-x)^3}{6(-x)^2-2}$

$= \frac{-2x^3}{6x^2-2} = -h(x)$

$h(x)$ is odd

④ $\frac{h(5)-h(-1)}{5-(-1)} = \frac{111-9}{6} = 17$

⑤ a) increase: $[-8,-2]$
$[0,2], [5,\infty)$

decrease: $(-\infty,-8]$
$[-2,0], [2,5]$

b) abs. min $(-8,-4)$

local min: $(-8,-4), (0,0)$
$(5,0)$

local max: $(-2,6), (2,10)$

(7) a) x-intercept: $(-16, 0)$

$x - 0^2 = -16$

$x = -16$

y-intercept $(0, \pm 4)$

$0 - y^2 = -16$

$y^2 = 16$

$y = \pm 4$

b) For x-axis:

$x - (-y)^2 = -16$

$x - y^2 = -16$ same

So symmetric w.r.t. x-axis

For y-axis:

$-x - y^2 = -16$

$x + y^2 = 16$ not same

So not symmetric w.r.t. y-axis

For origin:

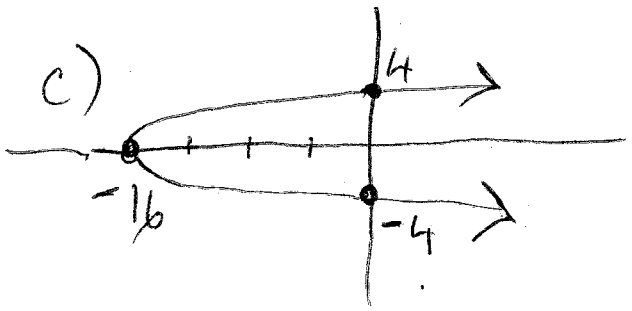
$-x - (-y)^2 = -16$

$-x - y^2 = -16$

$x + y^2 = 16$

not symm; w.r.t. origin

c)



(8) x A

a) $(100000, 50000)$

$(200000, 80000)$

$m = \frac{80000 - 50000}{200000 - 100000}$

$= \frac{30000}{100000} = \frac{3}{10}$

$A - 50000 = \frac{3}{10}(x - 100000)$

$= \frac{3}{10}x - 30000$

$A = \frac{3}{10}x + 20000$

b) $A = \frac{3}{10}(500000) + 20000$

$= 170000$

c) slope $= \frac{3}{10} = 0.30$ \$

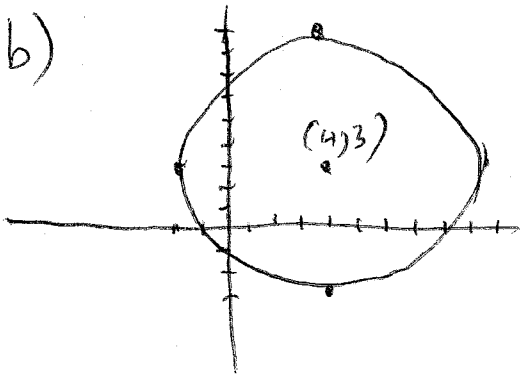
\$0.30 advertisement needed to sell 1 box.

(9) $x^2 - 8x + 16 + y^2 - 6y + 9 = 11 + 16 + 9$

a) $(x-4)^2 + (y-3)^2 = 36$

$C = (4, 3)$ $r = 6$

b)



c) x-int:

$(x-4)^2 + (0-3)^2 = 36$

$(x-4)^2 = 36 - 9 = 27$

$x - 4 = \pm\sqrt{27} = \pm 3\sqrt{3}$

$x = 4 \pm 3\sqrt{3}$ $(4 \pm 3\sqrt{3}, 0)$

y-int:

$(0-4)^2 + (y-3)^2 = 36$

$(y-3)^2 = 36 - 16 = 20$

$y - 3 = \pm 2\sqrt{5}$ $(0, 3 \pm 2\sqrt{5})$

(10) a) $(f-g)(x) = (3x-1)-(5x+6)$

$= -2x-7$

$(f-g)(2) = -2(2)-7 = -11$

b) $(3x-1)(5x+6) = 15x^2+18x-5x-6$

$= 15x^2+13x-6$

c) $5x+6=0$

$x = -6/5$

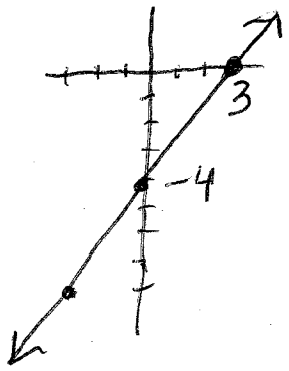
$D = \{x \mid x \neq -\frac{6}{5}\} = (-\infty, -\frac{6}{5}) \cup (-\frac{6}{5}, \infty)$

(11) $4x-12 = 3y$

$y = \frac{4}{3}x-4$

$m = \frac{4}{3}$ $(0,-4)$

x	y
-3	-8
0	-4
3	0



(12) a) $f(-1) = 3(-1)^2-(-1)-2$

$= 3+1-2 = 2$

yes, the point $(-1,2)$ is on the graph

b) $f(2) = 3(2)^2-2-2 = 12-2-2 = 8$. The point $(2,8)$ is on the graph

c) $3x^2-x-2 = -2$

$3x^2-x = 0$

$x(3x-1)$

$x=0 \quad x=1/3$

The points $(0,-2)$, $(\frac{1}{3},-2)$ are on the graph.

d) $(-\infty, \infty)$

e) $3x^2-x-2=0$

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

f) $(0,-2)$

g) $-2/3, 1$

(13) $d = \sqrt{(32-25)^2+(15-10)^2}$

$= \sqrt{7^2+5^2} = \sqrt{49+25} = \sqrt{74}$

$M = \left(\frac{25+32}{2}, \frac{10+15}{2}\right) = \left(\frac{57}{2}, \frac{25}{2}\right)$

(14) a) $x = 200$

For up to 300 minutes, the cost is 34.99$

b) $.25(400) - 40.01$

$= 59.99$$