MATH 160 Session #9 – Some In-Class Group Work

Part 1. Use no calculators on this part.

a. Suppose $f(x) = 50 - 4x$ for $-10 \le x \le 10$.

i. For what value of x will f(x) achieve its maximum value? What is that maximum value?

$x = -10$

$f(-10) = 90$

ii. For what value of x will f(x) achieve its minimum value? What is that minimum value?

$x = 10$

$f(10) = 10$

b. Suppose $g(x) = 268 + 16x - 4x^2$ for $0 \le x \le 10$.

(maximum point)

i. For what value of x will f(x) achieve its maximum value? What is that maximum value?

$x = \frac{-16}{2(-4)} = 2$

$f(2) = 268 + 32 - 16 = 284$

ii. For what value of x will f(x) achieve its minimum value? What is that minimum value?

$x = 10$

$f(10) = 28$

$f(0) = 268$, $f(10) = 28$

c. Suppose h is a linear function and h(2) = 10 and h(5) = 25. Write an explicit functional rule for h.

x	$h(x)$	$\Delta h(x)$
2	10	
5	25	15

$\Delta x = 3$

$\text{Slope} = \frac{\Delta h(x)}{\Delta x} = \frac{15}{3} = 5$

$h(x) = 5x$

d. The graph of the function k is a parabola that opens down with its vertex at (5,18). That graph crosses the x-axis where x = 2 and again where x = 8. Write an explicit functional rule for h.

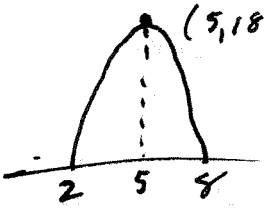
x	$h(x)$
+2	0
5	18
8	0

$h(x) = a(x-5)^2 + 18$

Choose a so that

$h(2) = 0 = a(2-5)^2 + 18$

$0 = 9a + 18 \Rightarrow a = -2$



$h(x) = -2(x-5)^2 + 18$

$h(x) = -2x^2 + 20x - 32$

Part 2. You may use calculators on this part.

a. $1000 is placed in an account that pays interest at the rate of 6% per annum compounded at the end of each year. Let t = the number of years since the $1000 was deposited, and let A(t) = the value of the account in dollars after t years. Assume that after the initial deposit no further deposits or withdrawals are made.