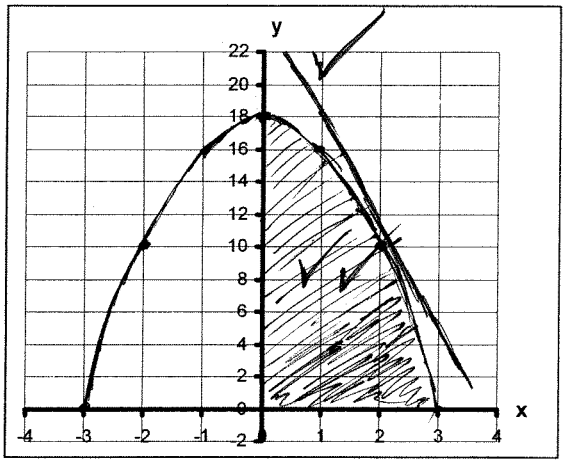
MATH 160 Name_____

Final Examination Form A Spring 2004

Part I. (15 points.) No notes and no calculator. 30 minute time limit.

1. Carefully sketch the graph of $f(x) = 18 - 2x^2$ for $-3 \le x \le 3$.



x	f(x)
-3	0
-2	10
-1	16
0	18
1	16
2	10
3	0

Figure 1

2. Show how to determine the equation of the line tangent to the graph of $f(x) = 18 - 2x^2$ at the point (2, 10). Sketch the graph of this line on the graph in Figure 1 above.

$f'(x) = -4x$

$f'(2) = -8$ ⇒ slope of tangent is -8

$y = -8x + 26$ ← intercept of tangent

10 ↑ 2 ↑

So, the tangent has equation $y = -8x + 26$

3. Show how to evaluate $\int_0^3 (18 - 2x^2)\,dx$. Shade in the region in Figure 1 whose area is given by the value of this integral.

$$\int_0^3 (18 - 2x^2)\,dx = 18x - \frac{2}{3}x^3 \Big|_0^3 = 18(3) - \frac{2}{3}(3)^3$$

$$= 54 - 18 = 36$$