Name:

Student ID #:

Instructions:

1. Make sure you have 8 pages (not including this cover page).

2. No books or notes. Only non–programmable, non–graphing calcultors.

3. You must show your work! No credit will be given for answers without sufficient work. Partial credit will only be given for work shown. You must justify your answers.

4. Put your answers in the boxes provided. These will be considered your final answers.

5. You have 1 hour to complete the exam. Good Luck!!!

Page	Max Possible	Points
1	14	
2	16	
3	14	
4	14	
5	10	
6	10	
7	12	
8	10	
Total	100	

I. Multiple choice questions.
Note: You must show your work and circle the correct answer to receive full credit.

(7 pts)   1. Given $g(x) = \dfrac{6 - 3x}{2x - 5}$, which of the following statements are true?

I. The vertical asymptote is $x = 2$

II. The horizontal asymptote is $y = -\frac{3}{2}$

III. The x–intercept is $(2, 0)$

IV. The y–intercept is $(0, \frac{5}{2})$

A. I and II only

B. I and IV only

C. II and III only

D. III only

E. II, III and IV only
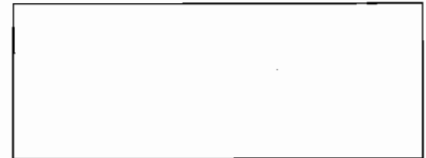
(7 pts)   2. The graph of $f(x) = \dfrac{1}{1 + x^2}$ looks most like:

A.

B.

C.

D.

E.

1

II. This part of the exam consists of eight problems. Show all your work to be eligible for partial credit.
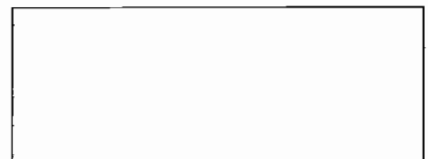
(8 pts)   1) Find the critical points of

$$g(t) = \frac{200}{t} + 2t - 50$$

(8 pts)   2) Find the inflection points of

$$f(x) = 8x^2 - x^4$$

(14 pts)   3. Let $f(x) = -2x^3 + 6x^2 + 1$

    (7 pts)   (a) Find the intervals where f is increasing and the intervals where f is decreasing.

    (7 pts)   (b) Find the intervals where f is concave upward and the intervals where f is concave down.

(10 pts)   8. The concentration C of a certain drug t hours after injection into muscle tissue is given by

$$C(t) = \frac{2t}{16 + t^3}.$$

When is the concentration greatest?

Answers.

I. 1. C

2. A

II.

1. $t = 10$, $t = -10$

2. $\left(\pm \dfrac{2}{\sqrt{3}}, \dfrac{80}{9} \right)$

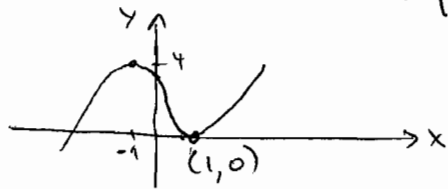3 (a) Incr. on $(0, 2)$; decr. on $(-\infty, 0)$, $(2, \infty)$

(b) concave up on $(-\infty, 1)$, concave down on $(1, \infty)$

4. (a) relative max @ $(-2, -8)$
relative min @ $(2, 8$

5. abs. max @ $\left(2, \dfrac{1}{4} \right)$
abs. min @ $\left(8, \dfrac{2}{17} \right)$

6.

7. $1.65 \times 3.3 \times 1.83$

8. After 2 hours