Pre-Calculus Spring Final Exam Review 2016

Free Response Part

Time: 2 hours **Date: May, 2016**

Exam Ends at 10:00 am

AP Style Grading system: therefore show key details;

Name:_____

Make sure to get to school early so that you can start your test at 7:00 am, that way you will have more than two hours

Question 1

For the given function:

$$Create\ your\ own\ fourth\ power\ function$$

1.1 Plot the graph of $f(x)$ for the close interval [,] on the given grid paper. {2}

1.2 For what interval is f(x) increasing on the open interval (,)? {1}

1.3 Using limits, determine: $\lim_{x \to k} f(x)$ {6}

1.4 Determine $\frac{df(x)}{dx}$ {3}

1.5 Plot the graph of $f'(x)$ for the close interval [,] on the given grid paper. {2}

1.6 For which value of x does the f(x) have a point of inflection on the open interval -8< x < 10? {3}

1.7 For what interval is f(x) increasing and concave up on the open interval (,)? {1}

1.8 What are the coordinates of the vertex (or vertices) {2}

Total 20 Points

Question 2

Consider the function below:

2 $g(x) = quadraticfunction$

2.1 Plot the graph of $g(x)$ on the closed interval {2}

Compute the area enclosed by the positive x-axis, $g(x)$, and x = 7, using the three methods below:

2.2 by partitioning [1,7] into five subintervals of equal length and choosing **left end-point** for each rectangular sub-interval. {4}

2.3 by partitioning [1,7] into five subintervals of equal length and choosing **Right end-point** for each rectangular sub-interval. {4}

2.4 by using integral notation (show work, use calculator only to check your answer) {5}

Total 15 points

3 Question 3 No Calculator

$$f(x) = [g(x)][h(x)]$$

$$if\ g(x) = e^{25x^4-5x} \qquad and \quad h(x) = 3x^5 - 6x^3 - 2x$$

3.1 Find $f'(x), and\ leave\ answer\ in\ simplified\ form\ by\ pulling\ the\ common\ factor$ {7}

3.2 Evaluate $f'(-5), and\ leave\ answer\ \ with$ "e"

{3}

Total 10 points

4 Question 4 No Calculator

$Study\ page\ 949$: Problems 81, and Problems 8 to 12.

$Page\ 947\ solve\ problems\ 31\ to\ 42$

Page 947 Solve Problem 67 without using a calculator, Also find the point(s) of inflection if there is any.

Total 10 points

5 Question 5 (No calculator)

5.1 Write the partial fraction decomposition of:

Create your own fraction study page 789

{10}

Total 10 points

6 Question 6 (No Calculator)

6.1 For the determinant A = $\begin{matrix} 12 & -4 & -3 \\ 15 & 13 & 10 \\ 2 & -6 & 4 \end{matrix}$ find the **minor determinant** M_{12}?

{5}

Total 5 points

7 Question 7 (No Calculator)

Use the vectors below to answer question 7

$\mathbf{u} = -2\mathbf{i} + 13\mathbf{j} + 7\mathbf{k} \qquad \mathbf{v} = -5\mathbf{i} - 6\mathbf{j} + 2\mathbf{k} \qquad \mathbf{w} = 3\mathbf{i} - 7\mathbf{j} - 8\mathbf{k}$

Evaluate each expression:

7.1 $\mathbf{u} \times \mathbf{w}$ {5}

7.2 $\mathbf{w} \cdot (\mathbf{u} \times \mathbf{v})$ {5}

Total 10 points

8 Question 8 (No Calculator)

8.1 Transform the equation 5xy = 12 from rectangular coordinates to polar coordinates. Simplify your answer using double angles and leave answer in sine function. {6}

8.2 Plot the point P with polar coordinates $(-3\ , \frac{5\pi}{6})$ and find other polar coordinate (r, θ) for the same point P for which $r > 0,\ and\ 0 \leq \theta \leq 2\pi$. {4}

Total 10 points

9 Question 9 (No Calculator)

9.1 Study POW and HOW 32 to 35 {8}

9.2 For what value(s) of x is the $f(x) = x^6 - 8\,x^5 + 12$ equal to 12. {2}

Total 10 points

10 Question 10 (No Calculator)

10.1 Study POW and HOW 32 to 35 {6}

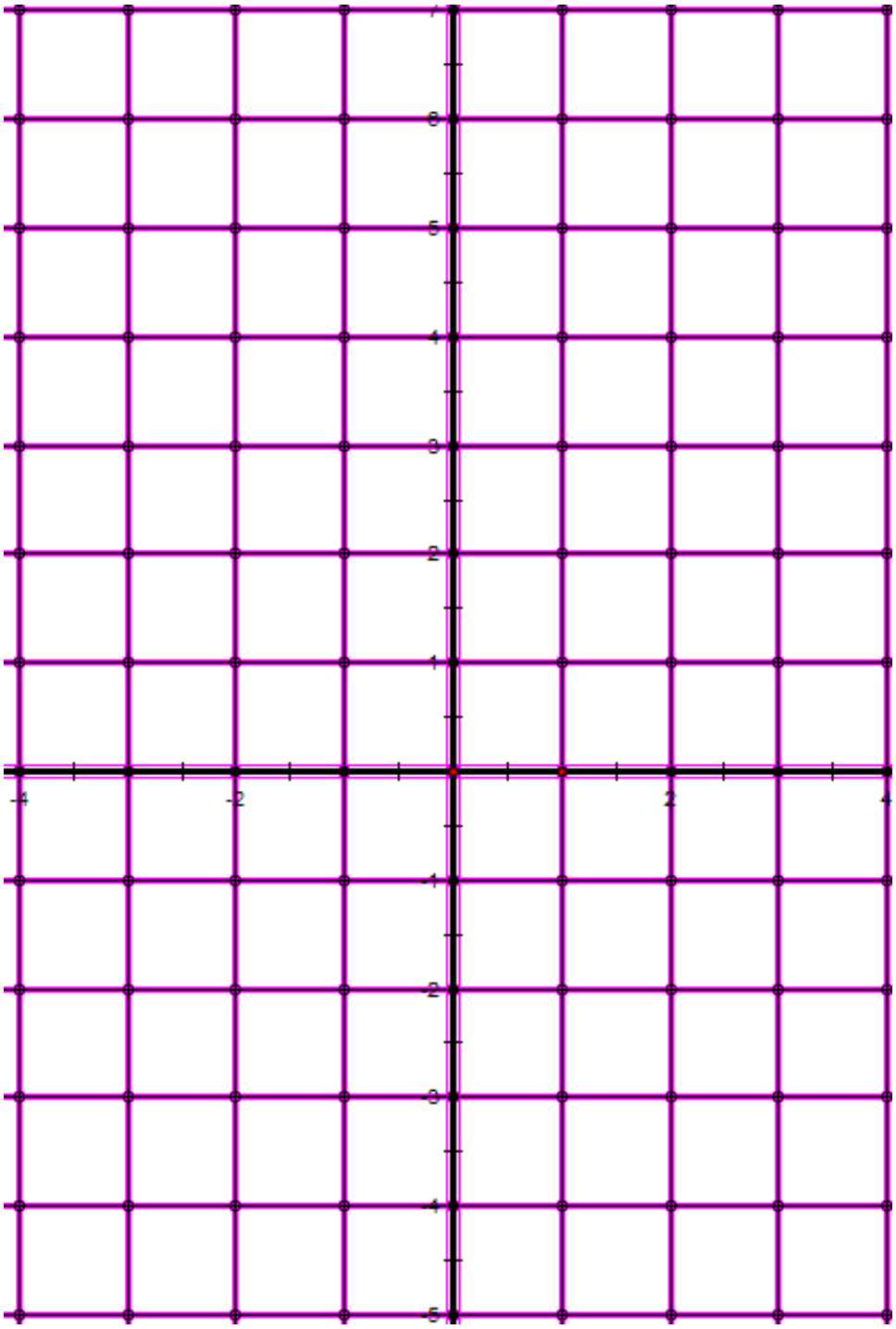
10.2 Study POW and HOW 32 to 35 {4}

Total 10 points

Total TEST Points = 110

Grid Paper

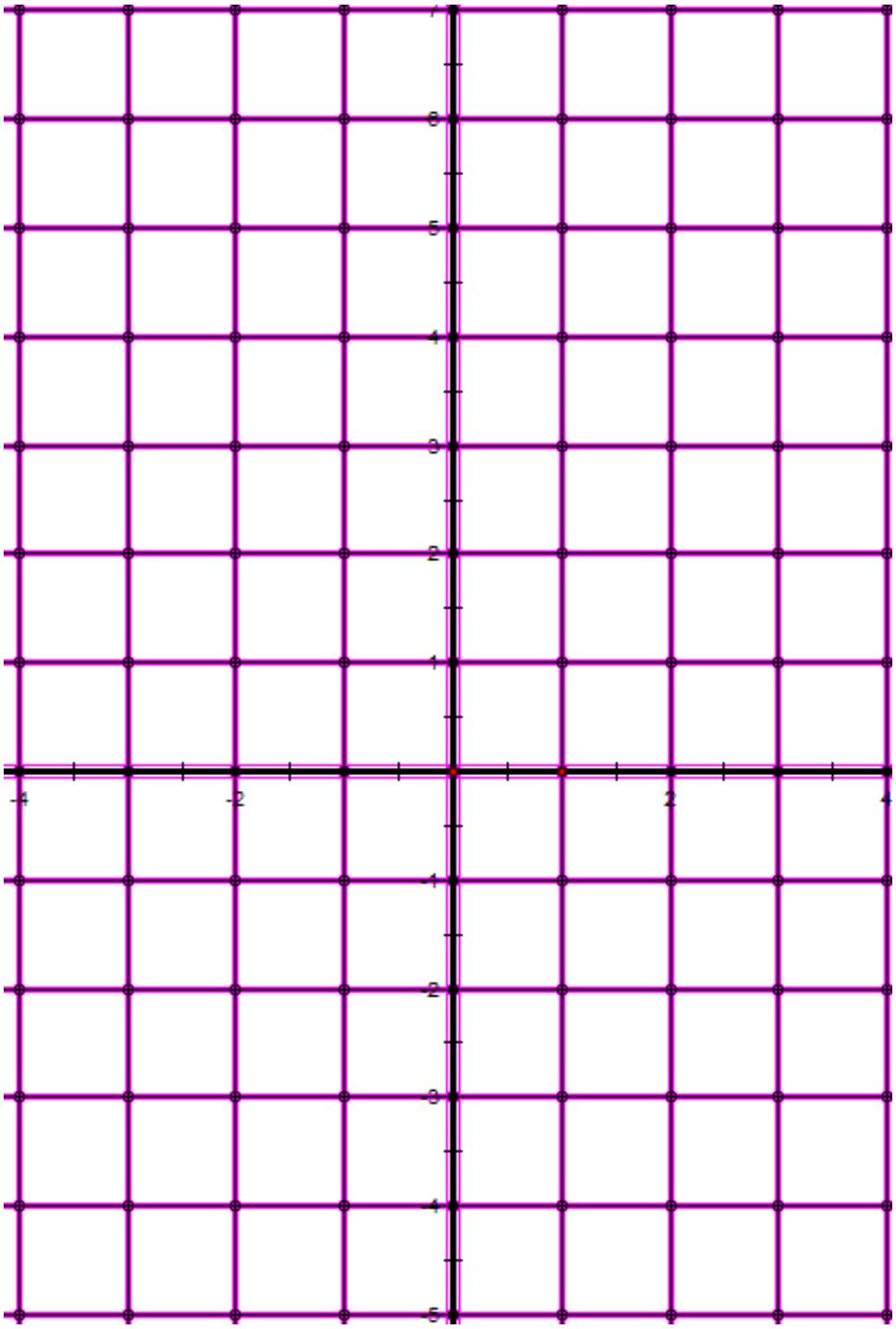
Question:1.1 Name:_____



Grid Paper

Question: 1.5

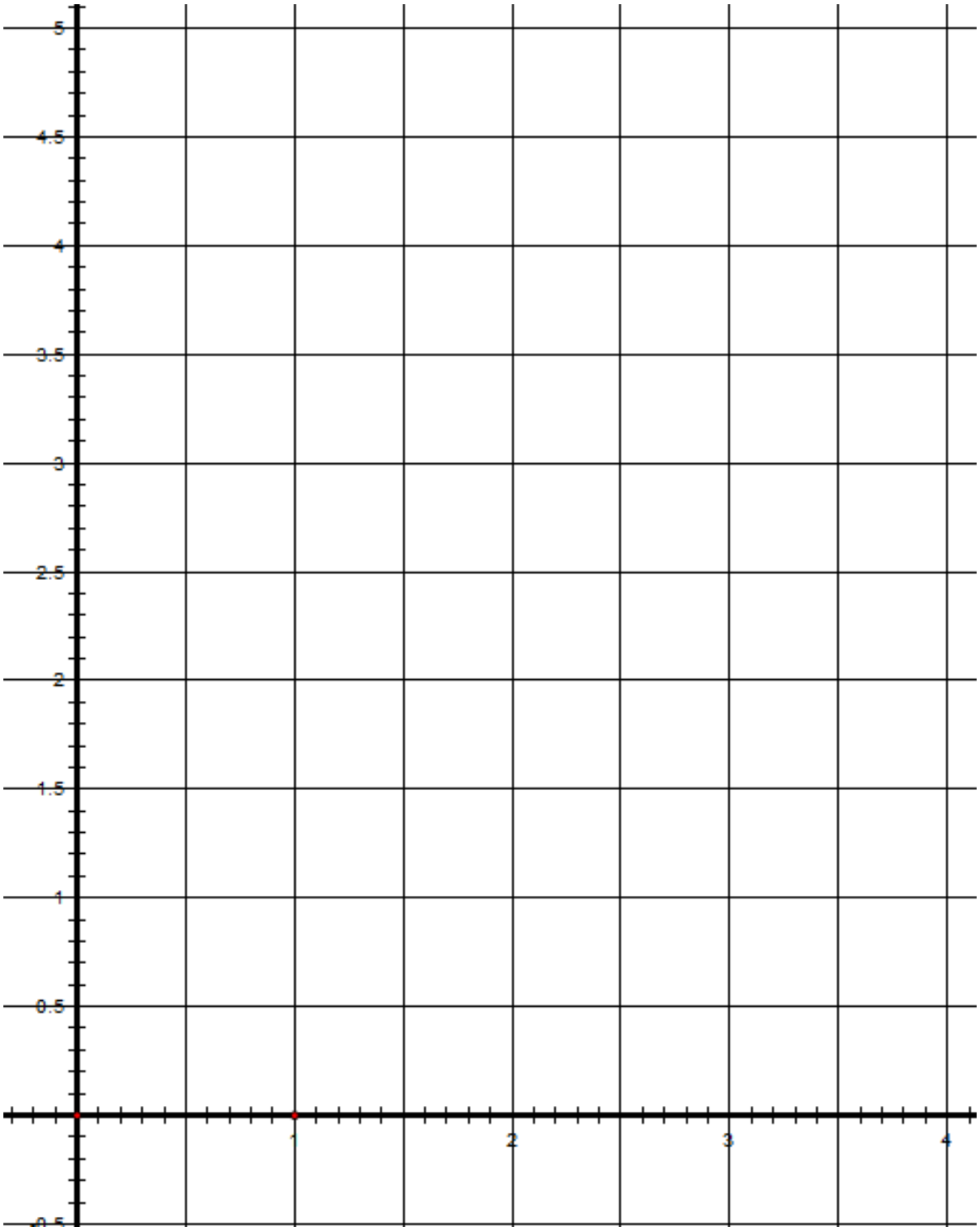
Name:_____



Grid Paper

Question: 2.1

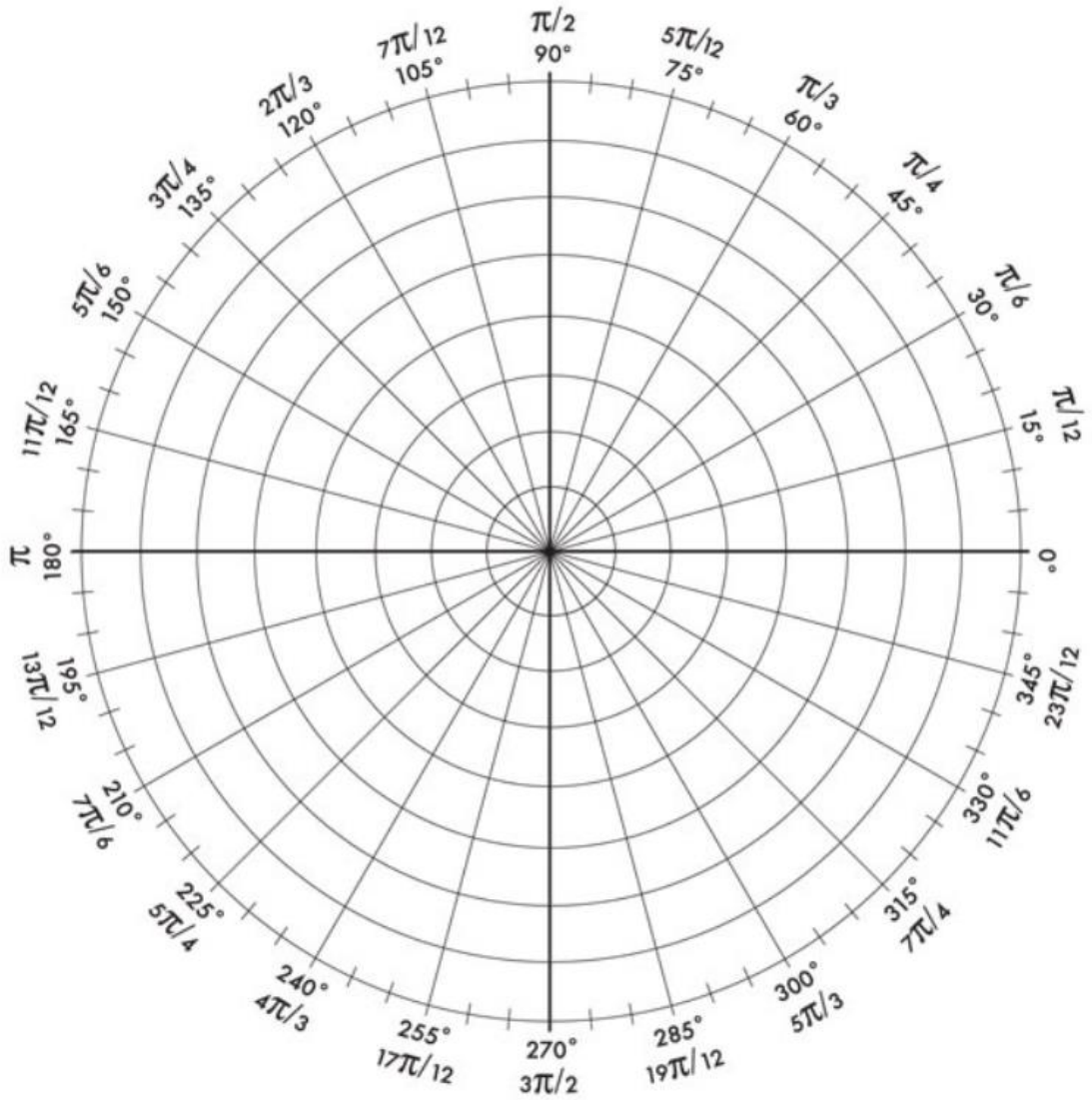
Name:_____



Grid Paper

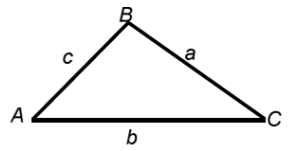
Question: 8.2

Name:_____



Precalculus Reference Sheet

Trigonometry



Law of Sines

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

Law of Cosines

$$a^2 = b^2 + c^2 - 2bc\cos A$$
$$b^2 = a^2 + c^2 - 2ac\cos B$$
$$c^2 = a^2 + b^2 - 2ab\cos C$$

Double –Angle Formulas

$$\sin(2\theta) = 2\sin\theta\cos\theta$$
$$\cos(2\theta) = \cos^2\theta - \sin^2\theta$$
$$= 1 - 2\sin^2\theta$$
$$= 2\cos^2\theta - 1$$
$$\tan(2\theta) = \frac{2\tan\theta}{1-\tan^2\theta}$$

Sum and Differences

$$\sin(\alpha \pm \beta) = \sin\alpha\cos\beta \pm \cos\alpha\sin\beta$$
$$\cos(\alpha \pm \beta) = \cos\alpha\cos\beta \mp \sin\alpha\sin\beta$$
$$\tan(\alpha \pm \beta) = \frac{\tan\alpha \pm \tan\beta}{1 \mp \tan\alpha\tan\beta}$$

Half-Angle Formulas

$$\sin\frac{\theta}{2} = \pm\sqrt{\frac{1-\cos\theta}{2}}$$
$$\cos\frac{\theta}{2} = \pm\sqrt{\frac{1+\cos\theta}{2}}$$
$$\tan\frac{\theta}{2} = \pm\sqrt{\frac{1-\cos\theta}{1+\cos\theta}}$$
$$= \frac{1-\cos\theta}{\sin\theta}$$
$$= \frac{\sin\theta}{1+\cos\theta}$$

Pythagorean Identity

$$\sin^2\theta + \cos^2\theta = 1$$

DERIVATIVE DEFINITION

$$\frac{d}{dx}(f(x)) = f'(x) = \lim_{h\to 0}\frac{f(x+h) - f(x)}{h}$$

PRODUCT RULE

$$(f(x)g(x))' = f(x)'g(x) + f(x)g(x)'$$

CHAIN RULE AND OTHER EXAMPLES

$$\frac{d}{dx}([f(x)]^n) = n[f(x)]^{n-1}f'(x)$$

$$\frac{d}{dx}(e^{f(x)}) = f'(x)e^{f(x)}$$

$$\frac{d}{dx}(\ln[f(x)]) = \frac{f'(x)}{f(x)}$$

POWER RULE

$$\frac{d}{dx}(x^n) = nx^{n-1}$$

DEFINITE INTEGRAL DEFINITION

$$\int_a^b f(x)dx = \lim_{n\to\infty}\sum_{k=1}^{n} f(x_k)\Delta x$$

where $\Delta x = \frac{b-a}{n}$ and $x_k = a + k\Delta x$

FUNDAMENTAL THEOREM OF CALCULUS

$$\int_a^b f(x)dx = [F(x)]_a^b = F(b) - F(a)$$

where f is continuous on $[a,b]$ and $F' = f$

COMMON INTEGRALS

$$\int k\,dx = kx + C$$

$$\int x^n\,dx = \frac{1}{n+1}x^{n+1} + C, n \neq -1$$

$$\int x^{-1}\,dx = \int\frac{1}{x}\,dx = \ln|x| + C$$

$$\int\frac{1}{ax+b}\,dx = \frac{1}{a}\ln|ax+b| + C$$

Pre-Calculus Spring Final Exam 2015

Free Response Part

Student Points Distribution: each point is worth 1%.

Name: _____ Pd:_____

Question	Possible points	Points earned
1	20	
2	15	
3	10	
4	10	
5	10	
6	5	
7	10	
8	10	
9	10	
10	10	
Total	110	