

MA 1312/1012

Polytechnic University
EXAM 1 (A)

DECEMBER 6, 2004

EXAM 1: _____

EXAM 2: _____

GRADE: _____

Print Name:

Signature:

ID #:

Instructor/Section:

Directions: You have **90 minutes** to answer the following questions. ***You must show all your work*** as neatly and clearly as possible and indicate the final answer clearly. You may use only a TI-30 calculator.

If you are feeling ill you should inform the proctor. The proctor will note your name, Poly ID, and accept any written statement(s) that you may wish to make regarding your illness.

Problem	Possible	Points
1	10	
2	10	
3	10	
4	10	
5	15	
6	15	
7	15	
8	15	
Total	100	

YOUR SIGNATURE:

For Problems (1)–(3), circle the correct choice. No explanation is required.

(1) (a) (Page 8, Problem 21, Regents, 1998) The domain of $f(x) = \frac{1}{\sqrt{4-x^2}}$ is

(i) $\{x \mid x \leq 2\}$.

(ii) $\{x \mid -2 \leq x \leq 2\}$.

(iii) $\{x \mid x < -2 \text{ or } x > 2\}$.

(iv) $\{x \mid |x| < 2\}$.

(v) All real numbers.

(b) (Page 35, Problem 13; Regents 2001) If $f(x) = 2\sin(3x) + C$, then the maximum value of $f(x)$ is

(i) C .

(ii) $C + 2$.

(iii) $C + 3$.

(iv) $C + 6$.

(v) $C - 3$.

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- (2) (a) (Page 35, Problem 29; Regents, 2001) A wedge-shaped piece is cut from a circular pizza. The radius of the pizza is 6 inches. The rounded edge of the crust of the piece measures 4.2 inches. To the *nearest tenth*, the angle of the pointed end of the piece of pizza, in radians, is

- (i) 0.7
- (ii) 7.0
- (iii) 1.4
- (iv) 25.2
- (v) 4.1

- (b) (Page 23, Problem 26; Regents, 2003)

If $f(x) = \frac{5}{x^2 + 1}$ and $g(x) = 3x$, then $g(f(2)) =$

- (i) -3 .
- (ii) $\frac{5}{37}$.
- (iii) 3 .
- (iv) 5 .
- (v) $\frac{37}{5}$.

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(3) (a) (Page 27, Problem 7) If $4 \cdot 3^x = 12 \cdot 5^x$, then $x =$

(i) $\frac{\log(5) - \log(3)}{\log(4) - \log(12)}$.

(ii) $\frac{-\log(3)}{\log(5) - \log(3)}$.

(iii) $\frac{\log(12)}{\log(60)}$.

(iv) $\frac{1}{\log(5)}$.

(v) None of the above.

(b) (Page 27, Problems 2–16; Regents, 2001) If $\log 5 = a$, then $\log(250)$ can be expressed as

(i) $50a$.

(ii) $10 + 2a$.

(iii) $2a + 1$.

(iv) $25a$.

(v) None of the above.

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(4) (Page 52, Problems 1–43) Determine whether each of the following statements is TRUE or FALSE. You do not have to explain.

(a) The function $y = \frac{x^2 - 16}{x + 4}$ has a vertical asymptote at $x = -4$.

(b) If y is a linear function of x , then the ratio $\frac{y}{x}$ is constant for all points on the graph at which $x \neq 0$.

(c) The graph of a rational function can never cross a vertical asymptote.

(d) If the degree of a polynomial $p(x)$ is even, then $p(x)$ is an even function.

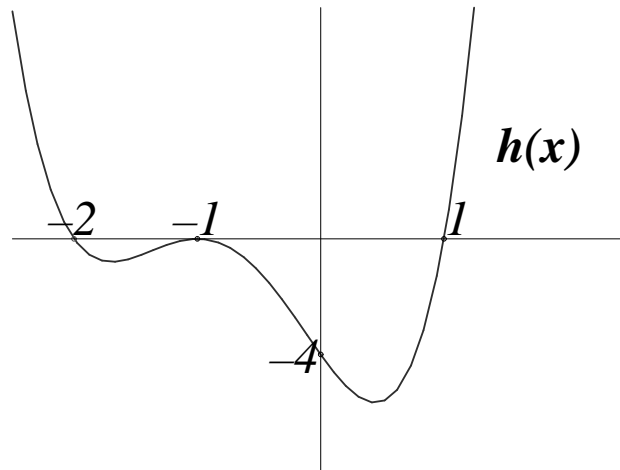
(e) If $y = Ab^x$ and increasing x by 1 increases y by a factor of 3, then increasing x by 2 increases y by a factor of 9.

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- (5) (Page 16, Problem 36) In the early 1960s, radioactive strontium-90 was released during atmospheric testing of nuclear weapons and got into the bones of people alive at the time. If the half-life of strontium-90 is 29 years, what fraction of the strontium-90 absorbed in 1960 remained in people's bones in 2000? Show all your work.

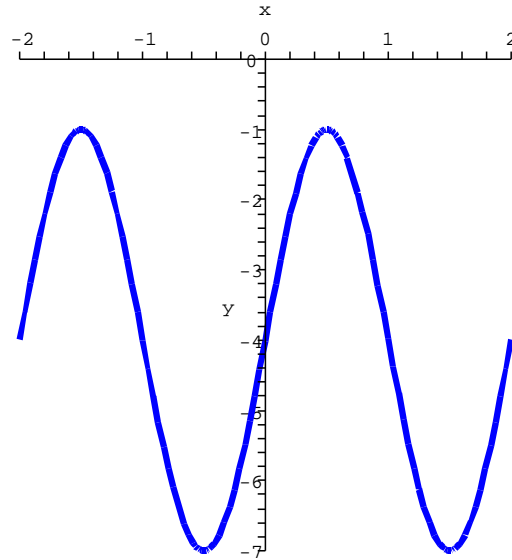
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- (6) (Page 42, Problems 10–13) Find one possible formula for the polynomial function graphed below. You must show work to receive credit.



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- (7) (Page 35, Problems 17–26; Regents, 2000) Find a possible formula for the sinusoidal function graphed below. You must show work to receive credit.



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(8) (Sample Exam, Properties of logarithms) Solve for x :

$$\log_4(x + 2) + \log_4(x - 4) = 2.$$