

Salt Lake Community College
MATH 1050 Final Exam Form B
Fall Semester 2008

Name: _____ Instructor: _____

Student ID: _____ ID Verification: _____ Section Number: _____

This exam has three parts: Part I -- Ten Multiple choice questions
Part II -- Ten open ended questions - You **must show** all your work.
Part III -- Choose five out of ten open ended questions - You **must show**
your work and indicate which five problems are to be graded.
You are **NOT allowed** to use **books** or **notes**.

Part I

Questions 1 - 10 Multiple Choice

Answer all TEN questions and circle the most correct answer.

- 1) Determine whether the infinite geometric series converges or diverges. If it converges, find its sum.

$$4 - \frac{4}{3} + \frac{4}{9} - \frac{4}{27} + \dots$$

A) Converges; 3

B) Converges; $\frac{8}{3}$

C) Converges; $-\frac{4}{3}$

D) Diverges

- 2) Find the amount that results from \$12,000 invested at 7% compounded quarterly after a period of 3 years.

A) \$14,523.12

B) \$14,777.27

C) \$14,700.52

D) \$2777.27

- 3) Write the equation that results if the square root function is shifted 7 units to the right.

A) $y = \sqrt{x} + 7$

B) $y = \sqrt{x} - 7$

C) $y = \sqrt{x + 7}$

D) $y = \sqrt{x - 7}$

- 4) A projectile is thrown upward so that its distance above the ground after t seconds is $h = -11t^2 + 462t$. After how many seconds does it reach its maximum height?
 A) 31.5 sec B) 21.0 sec C) 10.0 sec D) 42.0 sec

- 5) Form a polynomial whose zeros and degree are given. Zeros: 2, multiplicity 2; -2, multiplicity 2; degree 4
 A) $f(x) = x^4 - 4x^3 + 8x^2 - 8x + 16$ B) $f(x) = x^4 - 8x^2 + 16$
 C) $f(x) = x^4 + 8x^2 + 16$ D) $f(x) = x^4 + 4x^3 - 8x^2 + 8x - 16$

- 6) Give the equation of the oblique asymptote of $g(x) = \frac{x^2 + 7x - 2}{x - 2}$
 A) $y = x + 9$ B) $y = x - 2$ C) $y = 1$ D) $y = x - 9$

- 7) Perform the indicated operations and simplify.

Let $A = \begin{bmatrix} 0 & -1 \\ 2 & 0 \\ 6 & 2 \end{bmatrix}$, $B = \begin{bmatrix} -2 & 0 \\ 1 & 1 \\ 6 & 2 \end{bmatrix}$, and $C = \begin{bmatrix} -6 & 1 & 2 \\ 0 & -6 & -1 \end{bmatrix}$. Find $C(A - B)$.

- A) $\begin{bmatrix} 14 & 6 \\ 6 & -6 \end{bmatrix}$ B) $\begin{bmatrix} 6 & -6 \\ 14 & 6 \end{bmatrix}$ C) $\begin{bmatrix} -11 & 5 \\ -6 & 6 \end{bmatrix}$ D) $\begin{bmatrix} -22 & 6 \\ 7 & 4 \end{bmatrix}$

- 8) Evaluate $(f \circ g)(4)$ using the values given in the table.

x	1	5	8	12
$f(x)$	-2	8	2	13

x	-5	-2	1	4
$g(x)$	1	-5	5	8

- A) 8 B) 2 C) 5 D) Undefined

- 9) Find the vertex and axis of symmetry of the graph of $f(x) = -7x^2 - 14x - 3$.
 A) (2, -59) ; $x = 2$ B) (-2, -17) ; $x = -2$
 C) (-1, 4) ; $x = -1$ D) (-1, -3) ; $x = -1$

10) Find the domain of $f(x) = \sqrt{10 - x}$

A) $\{x|x \neq \sqrt{10}\}$

B) $\{x|x \neq 10\}$

C) $\{x|x \leq \sqrt{10}\}$

D) $\{x|x \leq 10\}$

Part II

Question 11 - 20 Open Ended

Answer all TEN questions. To receive full credit, you must show all your work . It must be neat and well organized. Clearly indicate your final answer.

11) Solve the system using the inverse matrix method.

$$\begin{cases} x + 2y + 3z = -7 \\ x + y + z = 10 \\ 2x + 2y + z = 11 \end{cases}$$

The inverse of $\begin{bmatrix} 1 & 2 & 3 \\ 1 & 1 & 1 \\ 2 & 2 & 1 \end{bmatrix}$ is $\begin{bmatrix} -1 & 4 & -1 \\ 1 & -5 & 2 \\ 0 & 2 & -1 \end{bmatrix}$.

12) Solve $\log_3 x + \log_3(x - 24) = 4$.

13) Write the partial fraction decomposition of $\frac{10x + 2}{(x - 1)(x^2 + x + 1)}$.

14) Find the inverse function of $f(x) = \frac{3x - 2}{x + 5}$. State the domain and range of **f** and **f⁻¹**.

Domain of f:

Range of f:

$f^{-1}(x) =$

Domain of f^{-1} :

Range of f^{-1} :

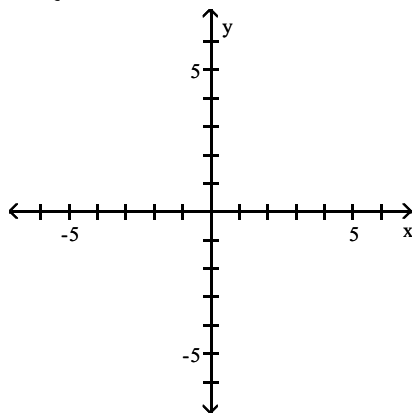
15) For the polynomial, $f(x) = \frac{1}{5}x^2(x^2 - 3)(x - 3)$, list each real zero and its multiplicity.

Determine whether the graph crosses or touches the x-axis at each x-intercept.

Zero	Multiplicity	Touch or Cross

16) Graph the function. Label at least three points on the graph of f.

$$f(x) = \begin{cases} -x + 3 & \text{if } x < 2 \\ 2x - 3 & \text{if } x \geq 2 \end{cases}$$

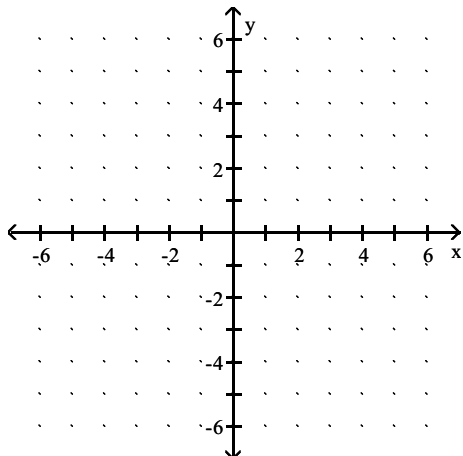


17) Find the center, foci, and vertices of the ellipse. Draw the graph.

$$\frac{(x + 2)^2}{16} + \frac{(y - 2)^2}{9} = 1$$

Center: _____

Foci: _____ Vertices: _____



18) Find the inverse of the matrix by hand. **Do not** use your calculator. Show your work.

$$\begin{bmatrix} 5 & 3 \\ 3 & 2 \end{bmatrix}$$

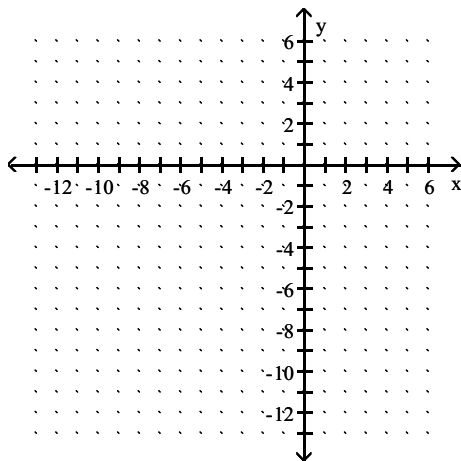
19) Use the given zero to find the remaining zeros of the function.

$$f(x) = x^3 - 2x^2 - 11x + 52; \text{ zero: } -4$$

20) Find the **domain** of the rational function. Draw the **graph**. **Label** all the intercepts and asymptotes.

$$R(x) = \frac{-3x^2}{x^2 + 4x - 45}$$

Domain: _____



Part III

Questions 21 - 30 Self Select

Choose FIVE of the next TEN question to complete. To receive full credit, you must show all your work . It must be neat and well organized. Clearly indicate your final answer. CROSS OUT the problems that you do not wish to be graded.

21) Use the graph of f to do the following:

Find the intervals on which it is increasing, decreasing, or constant.

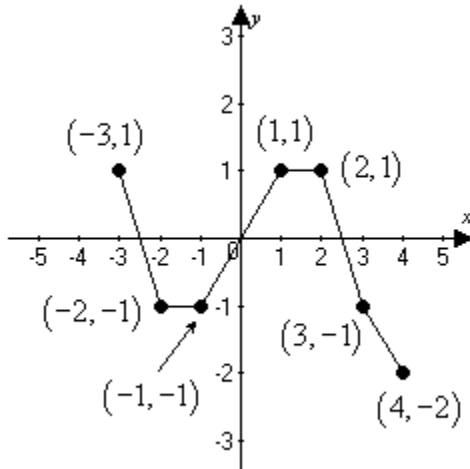
Increasing _____

Decreasing _____

Constant _____

Find $f(2)$.

Find x when $f(x) = -2$.

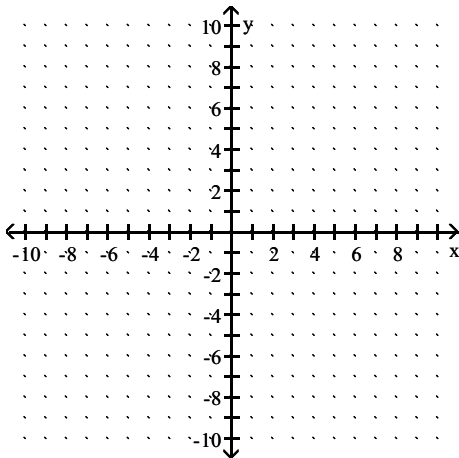


22) Express as a single logarithm.

$$4 \log_6 4 + \frac{1}{4} \log_6 (x - 3) - \frac{1}{2} \log_6 x$$

23) The half-life of silicon-32 is 710 years. If 70 grams is present now, how much will be present in 400 years? (Round your answer to three decimal places.)

24) Find an **equation** for the hyperbola with vertices at $(0, \pm 6)$ and one of its asymptotes the line $y = \frac{3}{2}x$. Draw the **graph**.



25) Solve $\frac{(x - 4)^2}{x^2 - 36} > 0$. Express the solution using interval notation.

26) A reflecting telescope contains a mirror shaped like a paraboloid of revolution. If the mirror is 16 inches across at its opening and is 16 inches deep, where will the light be concentrated?

27) Find the sum. $\sum_{n=1}^{50} (4n + 2)$

28) Find the domain of the composite function $f \circ g$ given $f(x) = \sqrt{x - 2}$ and $g(x) = \frac{2}{x - 10}$.

29) Solve $x^3 - 5x^2 + 5x = 1$. Give exact values.

30) Solve the exponential equation. (Round your answer to three decimal places.)

$$4^{(1+2x)} = 17$$