

TMATYC - Precalculus Test – 2012

Instructions for the Answer Sheet

DO NOT BEGIN UNTIL YOU ARE TOLD TO DO SO

To the student:

Complete **all** information on answer sheet. Carefully answer the eligibility questions. You will be disqualified if you take an incorrect test. If you are unsure of your eligibility status, ask your test monitor **NOW**, before starting the test. No questions may be asked once the test begins.

You have one hour to take this test. You are allowed to use a non-symbolic calculator (such as the TI-83, TI-84, or TI-86). Calculators that perform symbolic manipulations are **not** allowed (these include the TI-89, TI-92, or TI-Nspire). Blank scratch paper is allowed. No books, notes, or any other electronic devices are allowed. Please refrain from using any cell phone during the test. Such devices should be muted or put on silent mode.

There are 25 questions on the test. Each question is worth 4 points for a correct answer, but 1 point will be subtracted for each incorrect answer. There is no penalty for unanswered questions.

You are not expected to answer every question in the time allowed. If you are having difficulty with a question, skip it and, if time permits, return to it after you finish the others.

Place the letter for your choice of the correct response on the answer sheet under the column entitled "Student's Response". **Write your letters in block capital form (i.e. write as A, B, C, or D).**

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Answer Sheet

Name: _____ School: _____

Address: _____

Current Math Class: _____

Math Teacher: _____

	Student's Response	Scorer
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Email: _____

Phone: _____

Have you received a two-year or higher college degree? Yes No

Have you ever been enrolled in a college-level calculus class? Yes No

For Scorer:

Number Correct = _____

Number Incorrect = _____

Number Blank = _____

Num Correct \times 4 = _____

– Num Incorrect = _____

Score on Test = _____

TMATYC - Precalculus Test – 2012

- Given $f(x) = -x^2 - x + 2$, find $f(2x + 1)$.
A. $-4x^2 - 6x$ B. $-4x^2 - 6x + 1$ C. $-4x^2 - 2x$ D. $-4x^2 + 2x + 1$
- Write an equation of the line that contains the points $(-2, 1)$ and $(4, -2)$ in slope-intercept form.
A. $y = \frac{1}{2}x - 1$ B. $y = -\frac{1}{2}x - 1$ C. $y = -\frac{1}{2}x$ D. $y = \frac{1}{2}x$
- Given $f(x) = 3x - 2$ and $g(x) = x + 1$, find $(fg)(x)$.
A. $3x + 1$ B. $3x^2 + x - 2$ C. $3x^2 - x - 2$ D. $3x - 1$
- Solve for x : $2 \ln(x + 1) = \ln(x^2 - 1) + \ln(5)$.
A. No solution B. $\left\{-1, \frac{3}{2}\right\}$ C. $\{-1\}$ D. $\left\{\frac{3}{2}\right\}$
- Write an equation $g(x)$ of $f(x) = x^2$ that has been shifted 2 units right, reflected about the x -axis, and 1 unit down.
A. $g(x) = -(x + 2)^2 + 1$ B. $g(x) = -(x - 2)^2 - 1$
C. $g(x) = (-x + 2)^2 + 1$ D. $g(x) = (-x - 2)^2 - 1$
- Write the quadratic function in the form $y = a(x - h)^2 + k$ given $y = x^2 - 16x + 70$.
A. $y = (x + 8)^2 + 6$ B. $y = (x - 8)^2 - 6$
C. $y = (x - 8)^2 + 6$ D. $y = (x + 8)^2 - 6$
- Find the inverse of the function $f(x) = \frac{2x+1}{3x-1}$.
A. f is not one-to-one B. $\frac{2x+1}{3x-1}$
C. $\frac{x+1}{3x-2}$ D. $\frac{3x-1}{2x+1}$

8. Solve for x : $e^{2x-1} = 4$.

- A. $\left\{\frac{\ln(4)+1}{2}\right\}$ B. No solution C. $\left\{\frac{\ln(4)-1}{2}\right\}$ D. $\left\{\frac{5}{2}\right\}$

9. Given $f(x) = \frac{3}{x+1}$ and $g(x) = \frac{2}{x}$, find $(f \circ g)(x)$.

- A. $\frac{3}{x(2+x)}$ B. $\frac{6}{x(x+1)}$ C. $\frac{3x}{x+1}$ D. $\frac{3x}{2+x}$

10. You have 92 yards of fencing to enclose a rectangle area. Find the dimensions of the rectangle that maximize the enclosed area.

- A. $l = 23, w = 25$ B. $l = 23, w = 24$
C. Cannot be determined D. $l = 23, w = 23$

11. Given $\csc\theta = -4$ and $\tan\theta > 0$ find $\cos\theta$.

- A. $\cos\theta = \frac{\sqrt{17}}{4}$ B. $\cos\theta = -\frac{1}{4}$ C. $\cos\theta = -\frac{\sqrt{15}}{4}$ D. $\cos\theta = -\frac{4\sqrt{15}}{15}$

12. Solve for x : $\log_2 x = 3 - \log_2(x + 7)$.

- A. No solution B. $\{-8, 1\}$ C. $\{1\}$ D. $\{-8\}$

13. Find the horizontal asymptote of the function $f(x) = \frac{2x^4+3x^3-2x^2+x-1}{5x^4-2x^2-1}$, if it exists.

- A. $y = \frac{2}{5}$ B. None C. $y = 0$ D. $y = 4$

14. Using identities $\frac{\sin(x)}{\cos(x)+1} + \frac{\cos(x)-1}{\sin(x)}$ is equivalent to:

- A. $\frac{\cos(x)-1}{\sin(x)}$ B. 1 C. 0 D. $\frac{-1}{[\sin(x)][\cos(x)+1]}$

15. Solve the rational inequality: $\frac{1}{z-1} > 0$.

- A. No solution B. $(1, \infty)$ C. $[1, \infty)$ D. $(-\infty, \infty)$

16. Find all solutions for the equation $2\sin\theta = \sqrt{3}$.
- A. $\{\theta \mid \theta = \frac{\pi}{6} + 2kn, \theta = \frac{5\pi}{6} + 2kn\}$ B. $\{\theta \mid \theta = \frac{\pi}{6} + kn, \theta = \frac{5\pi}{6} + kn\}$
- C. $\{\theta \mid \theta = \frac{\pi}{3} + kn, \theta = \frac{5\pi}{3} + kn\}$ D. $\{\theta \mid \theta = \frac{\pi}{3} + 2kn, \theta = \frac{2\pi}{3} + 2kn\}$
17. The radius of the circle $x^2 + y^2 - 2x + 4y - 4 = 0$ is
- A. 3 B. 9 C. 4 D. 2
18. Find the domain of the function $f(x) = \frac{\sqrt{x+2}}{x^2-4}$. Express the answer in interval notation.
- A. All real numbers B. $(-2, 2) \cup (2, \infty)$
- C. $(-\infty, -2) \cup (-2, 2) \cup (2, \infty)$ D. $(-2, 2] \cup [2, \infty)$
19. Write the equation of a sine function with the following characteristics:
- Amplitude = 4 Period = 3π Phase Shift = $\frac{\pi}{3}$
- A. $y = 4 \sin\left(3\pi x - \frac{\pi}{3}\right)$ B. $y = 4 \sin\left(3x + \frac{\pi}{3}\right)$
- C. $y = 4 \sin\left(\frac{2}{3}x - \frac{2}{9}\pi\right)$ D. $y = 4 \sin\left(\frac{2\pi x}{3} + \frac{2\pi}{9}\right)$
20. Find the x-intercept(s), if any exist, for $y = x^3 - 9x$.
- A. None B. $(-3, 0)$, $(0, 0)$, and $(3, 0)$
- C. $(0, 0)$ and $(3, 0)$ D. $(-3, 0)$ and $(3, 0)$
21. An item on sale with a 15% discount is \$21.96. What is the original price of the item?
- A. \$25.25 B. \$25.26 C. \$25.84 D. \$25.81
22. Find the slant (oblique) asymptote of the function $f(x) = \frac{x^2-x-2}{x-1}$, if it exists.
- A. $y = x$ B. Does not exist C. $y = x - 2$ D. $y = x + 2$

