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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TMATYC - Precalculus Test – 2012 Answer Sheet

Name:			School:
Address:			
Current Math Class:			Math Teacher:
	Student's Response	Scorer	
1		200101	Email:
2			Phone:
3			
4			Have you received a two-year or higher
5			college degree? Yes No
6			Have you ever been enrolled in a college-
7			level calculus class? Yes No
8			For Scorer:
9			TOT GOOTET.
10			Number Correct =
11			Number Correct =
12			Number Incorrect =
13			Number Blank =
14			
15			Num Correct × 4 =
16			<pre>- Num Incorrect =</pre>
17			
18			Score on Test =
19			
20			
21			
22			
23			
24			
25			

TMATYC - Precalculus Test - 2012

1. Given
$$f(x) = -x^2 - x + 2$$
, find $f(2x + 1)$.

A.
$$-4x^2 - 6x$$

B.
$$-4x^2 - 6x + 1$$

C.
$$-4x^2 - 2x$$

A.
$$-4x^2 - 6x$$
 B. $-4x^2 - 6x + 1$ C. $-4x^2 - 2x$ D. $-4x^2 + 2x + 1$

A.
$$y = \frac{1}{2}x - 1$$

A.
$$y = \frac{1}{2}x - 1$$
 B. $y = -\frac{1}{2}x - 1$ C. $y = -\frac{1}{2}x$ D. $y = \frac{1}{2}x$

C.
$$y = -\frac{1}{2}x$$

D.
$$y = \frac{1}{2}x$$

3. Given
$$f(x) = 3x - 2$$
 and $g(x) = x + 1$, find $(fg)(x)$.

A.
$$3x + 1$$

B.
$$3x^2 + x - 2$$

B.
$$3x^2 + x - 2$$
 C. $3x^2 - x - 2$ D. $3x - 1$

D.
$$3x - 1$$

4. Solve for x:
$$2 \ln(x + 1) = \ln(x^2 - 1) + \ln(5)$$
.

A. No solution B.
$$\left\{-1, \frac{3}{2}\right\}$$

B.
$$\left\{-1, \frac{3}{2}\right\}$$

C.
$$\{-1\}$$
 D. $\{\frac{3}{2}\}$

D.
$$\{\frac{3}{2}\}$$

5. 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.
$$g(x) = (-x - 2)^2 - 1$$

6. 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.
$$y = (x + 8)^2 - 6$$

7. Find the inverse of the function
$$f(x) = \frac{2x+1}{3x-1}$$
.

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. $\left\{\frac{5}{2}\right\}$

D.
$$\{\frac{5}{2}\}$$

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

A.
$$\frac{3}{x(2+x)}$$

B.
$$\frac{6}{x(x+1)}$$

C.
$$\frac{3x}{x+1}$$

D.
$$\frac{3x}{2+x}$$

A.
$$l = 23, w = 25$$

B.
$$l = 23, w = 24$$

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.
$$cos\theta = -\frac{\sqrt{15}}{4}$$

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

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.
$$y = \frac{2}{5}$$

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.
$$\frac{\cos(x)-1}{\sin(x)}$$

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

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

B.
$$(1, \infty)$$

D.
$$(-\infty, \infty)$$

- Find all solutions for the equation $2\sin\theta = \sqrt{3}$. 16.
 - A. $\left\{\theta \middle| \theta = \frac{\pi}{6} + 2kn, \quad \theta = \frac{5\pi}{6} + 2kn\right\}$ B. $\left\{\theta \middle| \theta = \frac{\pi}{6} + kn, \quad \theta = \frac{5\pi}{6} + kn\right\}$

 - C. $\left\{\theta \middle| \theta = \frac{\pi}{3} + kn, \quad \theta = \frac{5\pi}{3} + kn\right\}$ D. $\left\{\theta \middle| \theta = \frac{\pi}{3} + 2kn, \quad \theta = \frac{2\pi}{3} + 2kn\right\}$
- The radius of the circle $x^2 + y^2 2x + 4y 4 = 0$ is 17.
 - A. 3

B. 9

C. 4

- D. 2
- Find the domain of the function $f(x) = \frac{\sqrt{x+2}}{x^2-4}$. Express the answer in interval notation. 18.
 - 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.
$$y = 4 \sin \left(\frac{2\pi x}{3} + \frac{2\pi}{9} \right)$$

- Find the x-intercept(s), if any exist, for $y = x^3 9x$. 20.
 - 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
- Find the slant (oblique) asymptote of the function $f(x) = \frac{x^2 x 2}{x 1}$, if it exists. 22.
 - A. y = x
- B. Does not exist
- C. y = x 2 D. y = x + 2

23. The graph of a polynomial with degree greater than 2 is increasing on $(-\infty, a)$, decreasing on (a,b), and increasing on (b, ∞) . This means that f(a) must be a(n)

A. Absolute maximum

B. Cannot be determined

C. Absolute minimum

D. Relative maximum

24. Solve for x: $16^{x-1} = 8^{x+2}$.

A. No Solution

B. {4}

C. {10}

D. {1}

25. Solve the triangle. Assume sides a, b, c, are opposite angles A, B, C, respectively. Round answers to two decimal places, if necessary.

a = 7 feet b = 9 feet $B = 49^{\circ}$

A. One triangle: $A = 76.01^{\circ}$ $C = 54.99^{\circ}$ c = 7.60 feet

B. Two triangles: $A_1 = 76.01^{\circ}$ $C_1 = 54.99^{\circ}$ $c_1 = 7.60$ feet and $A_2 = 103.99^{\circ}$ $C_2 = 27.01^{\circ}$ $c_2 = 12.14$ feet

C. One triangle: $A = 35.94^{\circ}$ $C = 95.06^{\circ}$ c = 11.88 feet

D. No triangle