

Date: _____
Start _____
End _____

Math 1650
SAMPLE Gateway Test
SAMPLE

Name: _____
Student ID#: _____
Instructor: _____

No partial credit.

No calculators allowed.

Time Limit: 45 minutes.

1. What is $\tan(2\pi/3)$?

- (a) 1 (b) $-\sqrt{3}$ (c) $-\frac{1}{\sqrt{3}}$ (d) $-\frac{1}{2}$ (e) $\frac{\sqrt{3}}{2}$

2. If $t^2 = \ln(1+x) - \ln(1-x)$, what is x in terms of t ?

- (a) $x = \frac{e^{t^2} - 1}{1 + e^{t^2}}$ (b) $\frac{e^{t^2}}{2}$ (c) $x = \sqrt{1 - e^{t^2}}$ (d) $x = \frac{t^2 - 1}{1 + t^2}$ (e) $x = -\frac{t^2}{2 \ln}$

3. What are all solutions of the equation: $\sin^2 x + 2 \sin x = 5/4$?

- (a) $\pi/3 + \pi n$ (b) $\pi/6 + 2\pi n, 5\pi/6 + 2\pi n$ (c) $\pi/4 + 2\pi n, -\pi/4 + 2\pi n$ (d) $0 + \pi n, \pi/2 + \pi n$
(e) $-5\pi/6 + 2\pi n$

4. If $f(x) = \sqrt{4x^2 + 8}$, $x \geq 0$, what is $f^{-1}(x)$?

- (a) $\frac{1}{\sqrt{4x^2 + 8}}$ (b) $(\frac{x^2}{4} - 8)^2$ (c) $\frac{1}{2}\sqrt{x^2 - 8}$ (d) $\frac{x - \sqrt{8}}{2}$ (e) $\frac{1}{4}\sqrt{x - 8}$

5. $\sin(2 \cos^{-1} x)$ is equivalent to

- (a) $2\sqrt{1 - x^2}$ (b) $\frac{2}{x}$ (c) $\frac{\sqrt{1 - x^2}}{x}$ (d) $\frac{\sqrt{1 - x^2}}{x^2}$ (e) $2x\sqrt{1 - x^2}$

6. If $f(x) = \frac{1 + \sin x}{2 - \sin x}$, $-\frac{\pi}{2} \leq x \leq \frac{\pi}{2}$, what is $f^{-1}(x)$?

- (a) $\sin^{-1}\left(\frac{2x-1}{2x+1}\right)$ (b) $\sin^{-1}\left(\frac{1+x}{2-x}\right)$ (c) $\frac{2 \sin^{-1} x - 1}{\sin^{-1} x + 1}$ (d) $\sin^{-1}\left(\frac{2x-1}{x+1}\right)$
(e) $\csc\left(\frac{2x-1}{x+1}\right)$

7. Which of the following is equivalent to $\frac{4a}{\frac{2}{b} + \frac{1}{2}}$

- (a) $\frac{4ab}{4+b}$ (b) $\frac{8ab^2}{(4+b)^2}$ (c) $\frac{2ab}{1+b}$ (d) $\frac{8ab}{4+b}$ (e) $4ab$

8. $\sqrt{12}\sqrt{\frac{y}{4}} =$

- (a) $\frac{3}{4}\sqrt{y}$ (b) $\sqrt{3y}$ (c) $3\sqrt{y}$ (d) $\sqrt{3y}$ (e) $\sqrt{6y}$

9. What is the domain of $f(x) = 2 - \ln(x^2 - 9)$?

- (a) $\{x : -3 < x < 3\}$ (b) $\{x : -3 \leq x \leq 3\}$ (c) $\{x : x < -3 \text{ or } x > 3\}$
(d) $\{x : x \leq -3 \text{ or } x \geq 3\}$ (e) $\{x : x > 0\}$

10. Which of the following is equivalent to $\frac{x^2 - 2x - 24}{x^2 - 11x + 30}$?

- (a) $\frac{x-6}{x-5}$ (b) $\frac{x-6}{x+4}$ (c) $\frac{x+4}{x-5}$ (d) $\frac{x-12}{x-11}$ (e) $\frac{x-2}{x-11}$

11. The slope of the line having equation $4 = -2x + 3y$ is

- (a) $\frac{2}{3}$ (b) $\frac{1}{2}$ (c) $\frac{3}{2}$ (d) $-\frac{2}{3}$ (e) $\frac{3}{4}$

12. A water tank is initially $\frac{3}{5}$ full. After adding 5 gallons of water, it is $\frac{2}{3}$ full. What is the capacity of the tank in gallons?

- (a) 15 (b) $\frac{14}{3}$ (c) $\frac{5}{3}$ (d) 75 (e) 30