

NAME:

MATH 103 Gateway Exam, version (a)

31 October 2008

100 points

**Instructions:**

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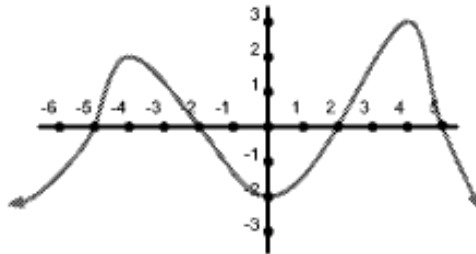
CORRECT
INCORRECT

**Question 1.** Select all intervals for which  $|4y - 11| < 9$  is true.

- $(-1/2, 5)$
- $(-\infty, -1/2)$
- $(-\infty, 1/2)$
- $(5, \infty)$
- $(1/2, 5)$

CORRECT
INCORRECT

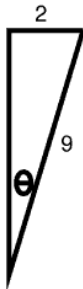
**Question 2.** Given the graph of  $y = f(x)$  below, select all intervals on which the function is decreasing.



- $(-4, 0)$
- $(-\infty, -5)$
- $(-2, 2)$
- $(4, \infty)$
- $(-5, 0)$

CORRECT
INCORRECT

**Question 3.** What are  $\cos \theta$ ,  $\sin \theta$ , and  $\cot \theta$ ?



ANSWER

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CORRECT
INCORRECT

**Question 4.** Find the equation for the secant line of  $y = 3^x$  from  $(0, 1)$  to  $(2, 9)$ .

ANSWER

--

CORRECT
INCORRECT

**Question 5.** Solve the equation  $F = m \frac{V - V_0}{t}$  for  $t$ .

(a) None of the others

(b)  $\frac{F}{m(V - V_0)}$

(c)  $\frac{Fm}{V - V_0}$

(d)  $\frac{V - V_0}{Fm}$

(e)  $\frac{m(V - V_0)}{F}$

CORRECT
INCORRECT

**Question 6.** What is  $\tan(-2\pi/3)$ ?

(a)  $-\sqrt{3}/3$

(b)  $\sqrt{3}$

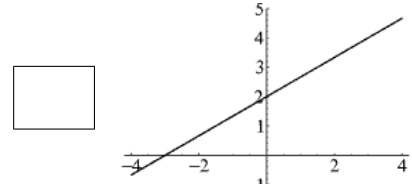
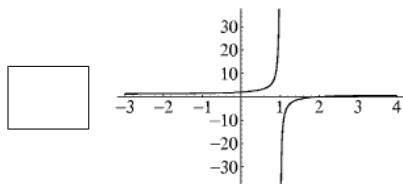
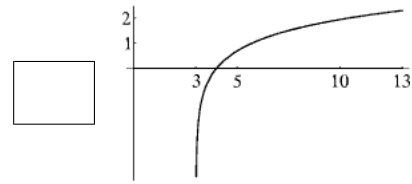
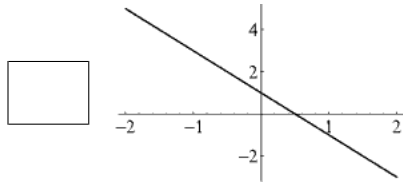
(c)  $\sqrt{3}/3$

(d) None of these

(e)  $-\sqrt{3}$

CORRECT
INCORRECT

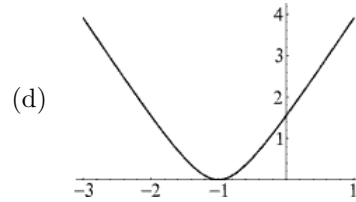
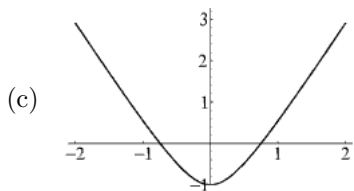
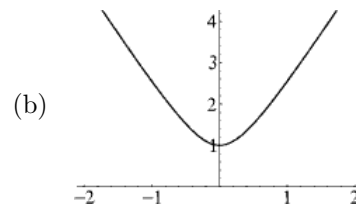
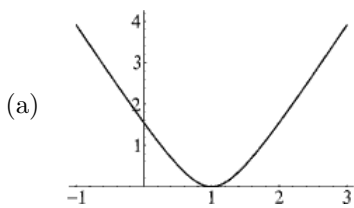
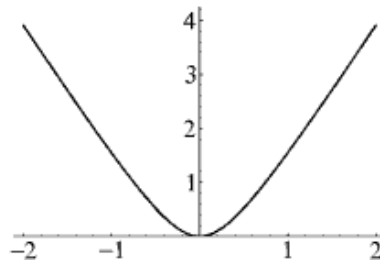
**Question 7.** Match the following graphs with their formulas.



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

CORRECT
INCORRECT

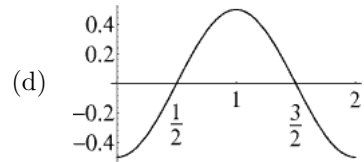
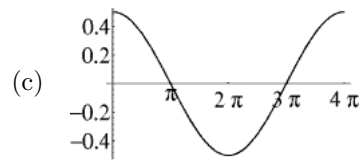
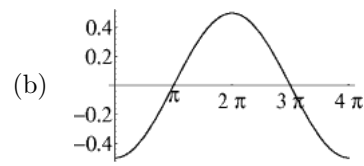
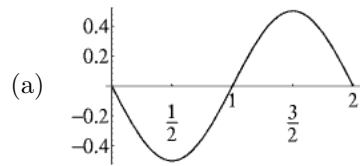
**Question 8.** Given the graph of  $y = f(x)$  below, select the graph of  $y = f(x - 1)$ .



(e) None of the others

CORRECT
INCORRECT

**Question 9.** Which of the following graphs best represents  $y = -\frac{1}{2} \cos(\pi x)$ ?



CORRECT
INCORRECT

**Question 10.** Find the solution(s) to the equation  $\log(x + 5) + \log(x + 2) = \log(14x)$ .

ANSWER

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MATH 103 Gateway Exam, version (b)

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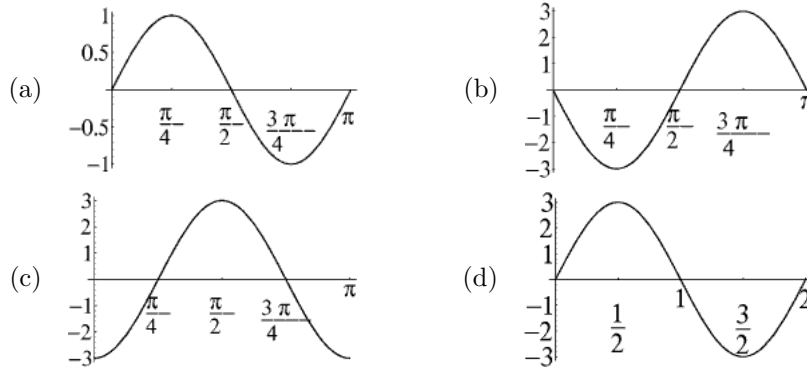
CORRECT
INCORRECT

**Question 1.** Solve the equation  $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$  for  $R$ .

- (a)  $R_1 + R_2$
- (b)  $\frac{1}{R_1 + R_2}$
- (c)  $\frac{R_1 + R_2}{2}$
- (d)  $\frac{R_1 + R_2}{R_1 R_2}$
- (e)  $\frac{R_1 R_2}{R_1 + R_2}$

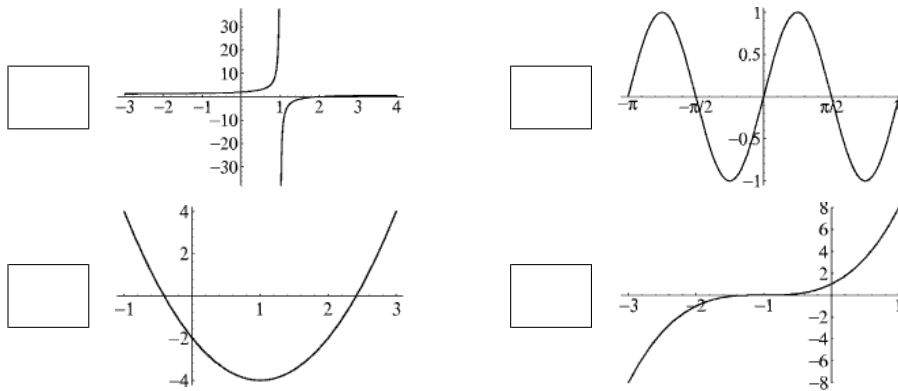
CORRECT
INCORRECT

**Question 2.** Which of the following graphs best represents  $y = -3\sin(2x)$ ?



CORRECT
INCORRECT

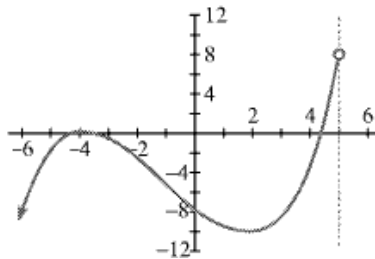
**Question 3.** Match the following graphs with their formulas.



1.  $2(x - 1)^2 - 4$
2.  $\sin(2x)$
3.  $\frac{x - 2}{x - 1}$
4.  $(x + 1)^3$

CORRECT
INCORRECT

**Question 4.** Given the graph of  $y = f(x)$  below, what is the range of the function?



- (a)  $(-\infty, \infty)$
- (b)  $[-10, 8]$
- (c)  $[-10, 8)$
- (d)  $(-\infty, 8)$
- (e)  $(-12, 12)$

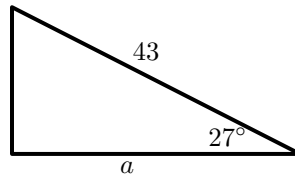
CORRECT
INCORRECT

**Question 5.** Select all intervals for which  $x^2 + 4x - 12 \leq 0$  is true.

- $[-2, 6]$
- $[-2, \infty)$
- $[2, \infty)$
- $(-\infty, -6]$
- $[-6, 2]$

CORRECT
INCORRECT

**Question 6.** Which one of the following is true?



- (a)  $a = 43 \sin 27^\circ$
- (b)  $a = 43 \cos 63^\circ$
- (c)  $a = 43 \sec 63^\circ$
- (d)  $a = \frac{43}{\sin 27^\circ}$
- (e)  $a = \frac{43}{\csc 63^\circ}$

CORRECT
INCORRECT

**Question 7.** Find the solution(s) to the equation  $\ln x + 3 \ln 2 = \ln \frac{2}{x}$ .

ANSWER

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CORRECT
INCORRECT

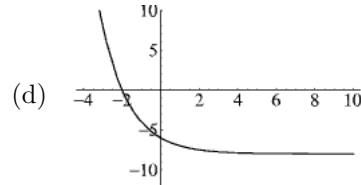
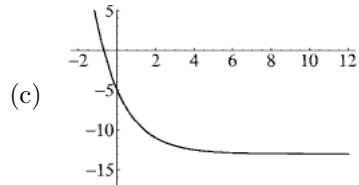
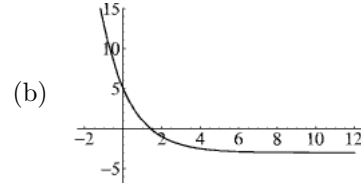
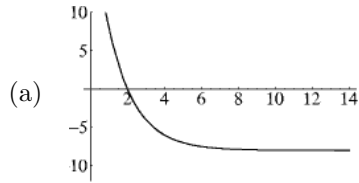
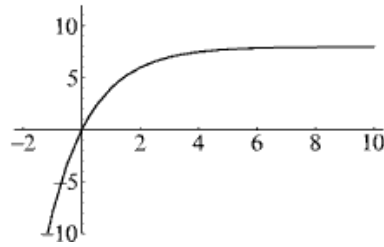
**Question 8.** Find the equation for the secant line of  $y = 8\sqrt{x}$  from  $(1, 8)$  to  $(4, 16)$ .

ANSWER

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CORRECT
INCORRECT

**Question 9.** Given the graph of  $y = f(x)$  below, select the graph of  $y = -f(x) + 5$ .



(e) None of the others

CORRECT
INCORRECT

**Question 10.** What is  $\sin \pi/4$ ?

ANSWER

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MATH 103 Gateway Exam, version (c)

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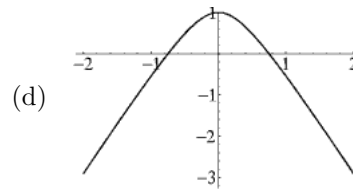
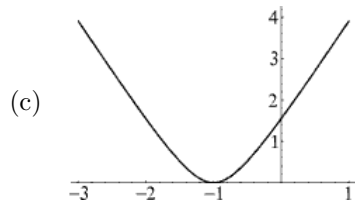
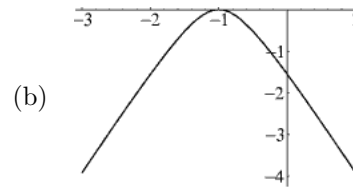
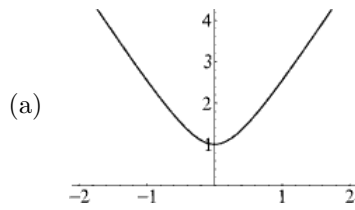
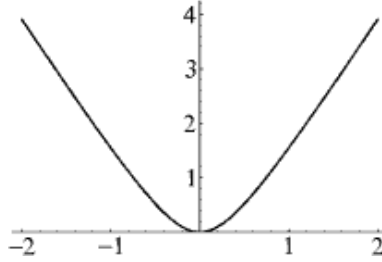
CORRECT
INCORRECT

**Question 1.** Select all intervals for which  $4x + 5 > 1 - 3x$  is true.

- $[-4/7, \infty)$
- $(-\infty, -4/7]$
- $(-4/7, \infty)$
- $(-\infty, -4/7)$
- $(-\infty, 4/7)$

CORRECT
INCORRECT

**Question 2.** Given the graph of  $y = f(x)$  below, select the graph of  $y = -f(x + 1)$ .



(e) None of the others

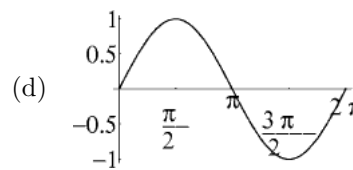
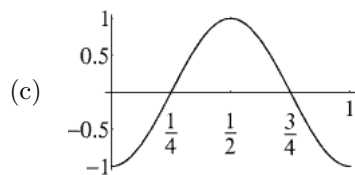
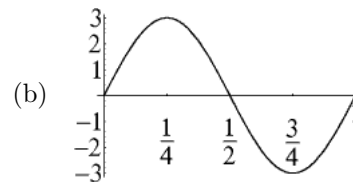
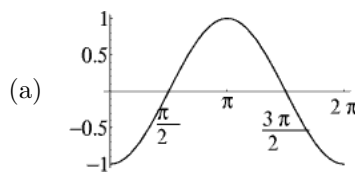
CORRECT
INCORRECT

**Question 3.** Solve the equation  $\ln(3x) + \ln(3) = \ln(x - 3)$  for  $x$ .

ANSWER

CORRECT
INCORRECT

**Question 4.** Which of the following graphs best represents  $y = -\cos(2\pi x)$ ?



CORRECT
INCORRECT

**Question 5.** What is  $\tan 2\pi/3$ ?

- (a) None of these
- (b)  $\sqrt{3}/3$
- (c)  $-\sqrt{3}$
- (d)  $\sqrt{3}$
- (e)  $-\sqrt{3}/3$

CORRECT
INCORRECT

**Question 6.** If  $\theta$  is an acute angle and  $\tan \theta = 7/3$ , then what are  $\cos \theta$ ,  $\sin \theta$ , and  $\csc \theta$ ? (Hint: Draw and label an appropriate triangle.)

ANSWER

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CORRECT
INCORRECT

**Question 7.** Solve the equation  $E = \frac{1}{2}mv^2 + mgh$  for  $m$ .

- (a) None of the others
- (b)  $\frac{E}{\frac{1}{2}v^2 + gh}$
- (c)  $E - \frac{1}{2}v^2 - gh$
- (d)  $\frac{E - gh}{\frac{1}{2}v^2}$
- (e)  $\frac{2E}{v^2 + gh}$

CORRECT
INCORRECT

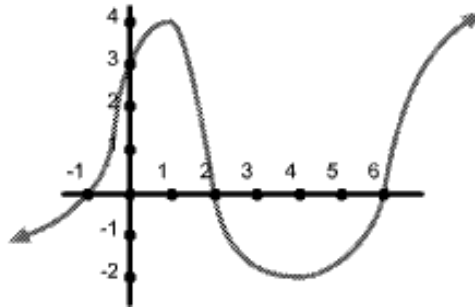
**Question 8.** Find the equation for the secant line of  $y = \log x$  from  $(1, 0)$  to  $(10, 1)$ .

ANSWER

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CORRECT
INCORRECT

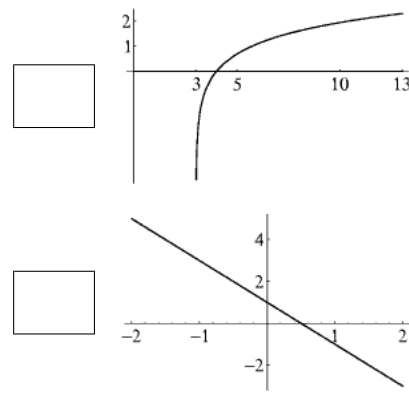
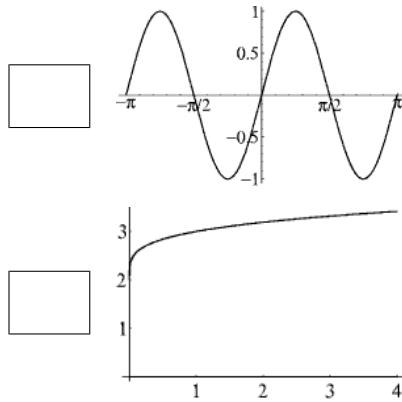
**Question 9.** Given the graph of  $y = f(x)$  below, select all intervals on which the function is increasing.



- (2, 6)
- (-1, 2)
- (1, 4)
- $(-\infty, 1)$
- $(4, \infty)$

CORRECT
INCORRECT

**Question 10.** Match the following graphs with their formulas.



1.  $\sin(2x)$
2.  $-2x + 1$
3.  $x^{1/4} + 2$
4.  $\ln(x - 3)$