Calculus Placement

September, 2015

NAME (please print legibly): _____

Your University ID Number: _____

Your University email _____

Pledge of Honesty

I affirm that I will not give or receive any unauthorized help on this exam, and that all work will be my own.

Signature: _____

Partial credit will not be awarded on this exam. Enter your answers where indicated in order to receive credit. Calculators and notes are not permitted. If you are confused about the wording of a question or need a clarification, you should raise your hand and **ask a proctor** about it.

QUESTION	VALUE	SCORE
1	6	
2	3	
3	6	
4	10	
5	6	
6	8	
7	12	
8	6	
9	8	
10	6	
11	9	
TOTAL	80	

1. (6 points)

A line L has equation:

$$3x - 2y + 1 = 6$$

(a) Find an equation for the line parallel to L that passes through the origin.

Answer:

(b) Find an equation for a line perpendicular to L that contains the point $(1, 2)$.

Answer:

2. (3 points) A line L_1 has the equation $y = x - 3$ and line L_2 has the equation $2x + y = 1$. Find the point of intersection of these two lines.

Answer:

3. (6 points)

(a) Solve the following equation for x:

$$2x^3 + 3x^2 - 2x = 0$$

Answer:

(b) Solve the following equation for x:

$$2x^2 + 4x = 7$$

Answer:

4. (10 points)

(a) Solve the following equation for T in terms of B, y, and x.

$$2x + 6 = \frac{3B - \cos y}{T + 2}$$

Answer:

(b) Solve the same equation for B in terms of x, y, and T.

Answer:

(c) Solve the following equation for x in terms of y:

$$y = \frac{x+1}{x-2}$$

Answer:

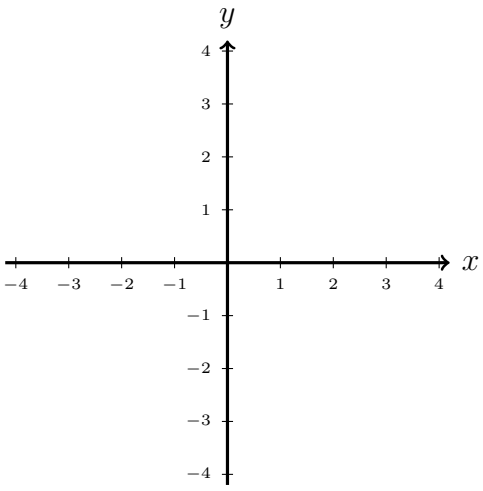
5. (6 points)

(a) Solve the equation for x.

$$|5x - 1| = 3$$

Answer:

(b) Sketch the region in the xy-plane: $\{(x, y)|y \geq x - 1 \text{ and } y \leq 2\}$



6. (8 points)

(a) Suppose a farmer fences a rectangular field using 240 meters of fencing. If the length of the field is three times its width, what is the area of the field?

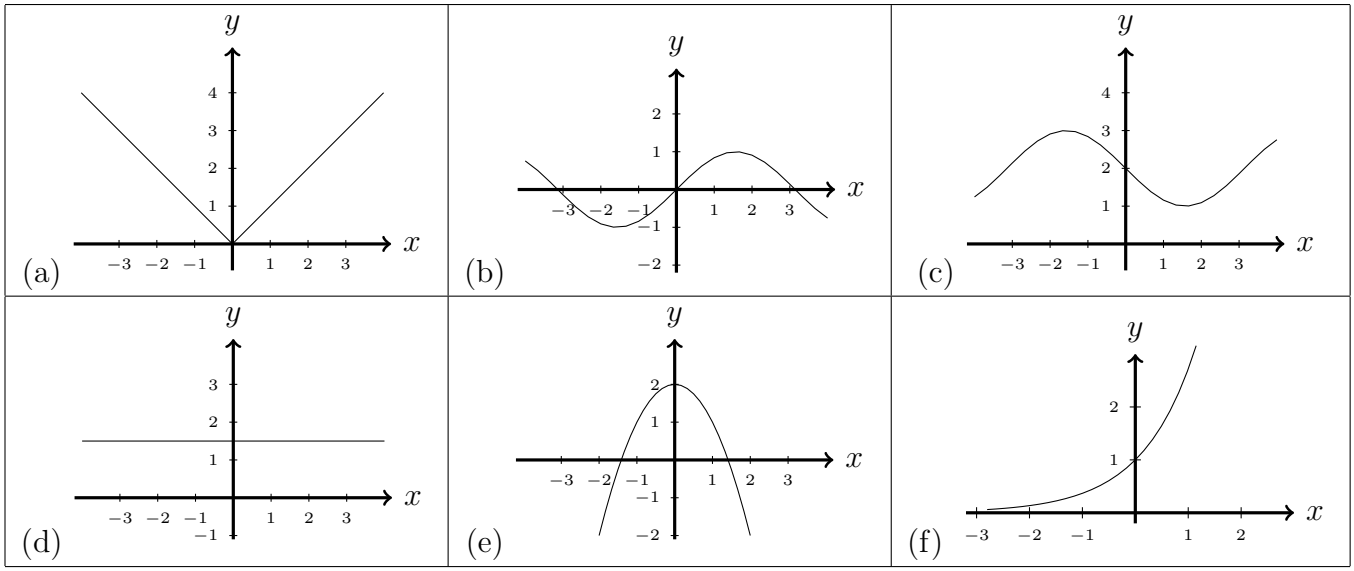
Answer:

(b) Suppose a person whose height is 1.75 meters stands near a 3.25 meter lamp post (at night). If the tip of that person's shadow falls 7 meters from the base of the lamp post, how far is the person standing from the lamp post? (You do not need to simplify your answer.)

Answer:

7. (12 points) Match the following curves to their equations.

Curves:



Equations:

1.) $y = e^x$

2.) $y = \ln x$

3.) $y = |x|$

4.) $y = 1.5$

5.) $x = 1.5$

6.) $y = \sin x$

7.) $y = \cos x$

8.) $y = 2 - \sin x$

9.) $y = 2 + \sin x$

10.) $y = x^2 + 2$

11.) $y = 2 - x^2$

12.) $y = -(x + 2)^2$

Your answers:

(a)_____ (b)_____ (c)_____ (d)_____ (e)_____ (f)_____

8. (6 points)

(a) Covert degrees to radians:

$30° =$_____ radians

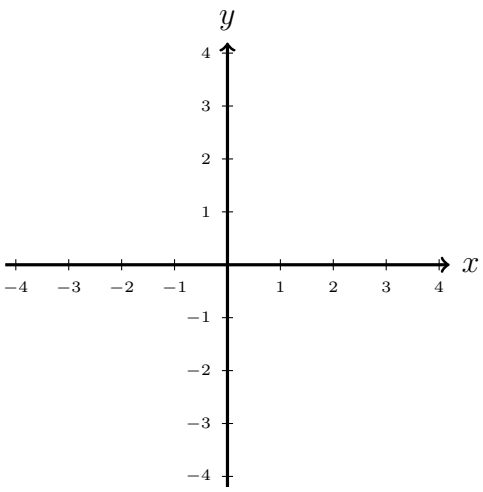
$210° =$_____ radians

(b) Convert radians to degrees:

π radians=_____degrees

$3\pi/2$ radians=_____degrees

(c) Draw (and label) angles of measure $-\pi/3$ and $3\pi/4$ radians measuring from the positive x-axis.



9. (8 points)

(a) Solve for t in the interval $[0, 2\pi)$.

$$(\cos t)(2\cos t - \sqrt{3}) = 0$$

Answer:

(b) If $\cos\theta = 3/8$ and $\tan\theta < 0$, what is $\sin\theta$?

Answer:

10. (6 points) Find the exact value of the following expressions:

(a)

$$\ln(\ln e^{e^3})$$

Answer:

(b)

$$\log_{81}\left(\frac{1}{9}\right)$$

Answer:

11. (9 points) (Multiple Choice)

(a) Which expression below is equal to

$$\frac{3^{-y}4^{1/2}5^{3a+1}}{10(3^y)}?$$

(Circle your answer.)

i.) 5^{3a}

ii.) $\frac{125^a}{3^y}$

iii.) $\frac{9^{2y}5^{3a+1}}{5}$

iv.) $\frac{5^{3a}}{5(3^y)}$

v.) None of the above

(b) Solve for t:

$$3^{\log_3(t)+\log_3(2)} = 5\log_3(81)$$

(Circle your answer.)

i.) $t = \log_3(5)$

ii.) $t = 18$

iii.) $t = 10$

iv.) This can't be solved explicitly.

v.) This can be solved explicitly, but the answer is not given.

(c) Solve for y:

$$2^y - 8(2^{-y}) = 0$$

(Circle your answer.)

i.) $y = \frac{3}{2}$

ii.) $y = -2$

iii.) $y = \ln 3$

iv.) This can't be solved explicitly.

v.) This can be solved explicitly, but the answer is not given.

(End of exam.)