Math 108 - Sample Exam

STUDENT'S NAME: _____

Instructor's name: _____

This exam consists of two parts:
1. a multiple-choice questions part - circle the appropriate answer
2. a short-answer questions part - write the correct answer in the space provided.
You have 45 minutes to answer all questions.

PART 1 - MULTIPLE-CHOICE PROBLEMS

Only one answer in each problem is correct. Circle the correct answer. If you make a mistake and circle the wrong answer, cross it out and properly circle the correct answer.

1. Simplify $\dfrac{(2x^2)^3}{4x^{-3}} =$

   (a) $2x^9$
   (b) $\dfrac{x^9}{2}$
   (c) $2x^3$
   (d) $\dfrac{x^3}{2}$
   (e) $2x^8$

2. The solution to the equation $4x - 5 = 7x + 11$ is:

   (a) $-\dfrac{16}{3}$
   (b) $-\dfrac{3}{16}$
   (c) $\dfrac{16}{11}$
   (d) $\dfrac{6}{11}$
   (e) -2

3. Simpilfy $\dfrac{\left(2x^{\frac{1}{2}}y^{\frac{2}{3}}\right)\left(4x^{-\frac{3}{2}}\right)}{y^{-2}} =$

   (a) $\dfrac{16}{3x}$
   (b) $\dfrac{8x^{\frac{3}{4}}}{y^{\frac{1}{3}}}$
   (c) $\dfrac{8y^4}{x^7}$
   (d) $\dfrac{8y^{\frac{8}{3}}}{x}$
   (e) $\dfrac{8}{xy^{\frac{4}{3}}}$

4. One of the solutions to the equation $3x(x - 2) = 2$ is

   (a) 4
   (b) $1 + 2\sqrt{15}$
   (c) $1 - \dfrac{\sqrt{15}}{3}$
   (d) $1 - \dfrac{\sqrt{3}}{6}$
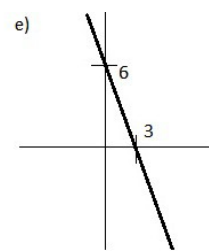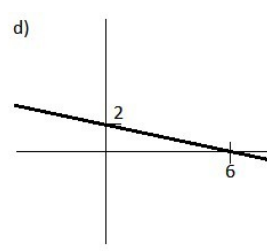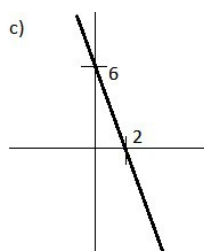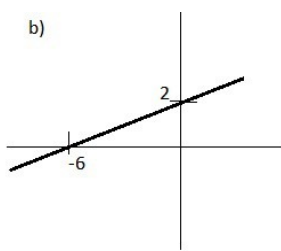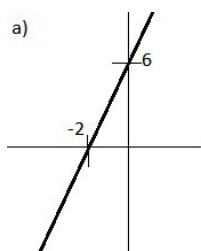   (e) 0

5. Simplify $\left(3\sqrt{x^8}\right)^2 =$

   (a) $9\sqrt{4x^8}$
   (b) $36x^8$
   (c) $6x^4$
   (d) $12x^8$
   (e) $3\sqrt{16x^{16}}$

6. For $x > 0$ expression $\sqrt[-4]{x^{16}}$ is equivalent to:

   (a) x^4
   (b) x^2
   (c) x^{-4}
   (d) $x^{1/2}$
   (e) $\sqrt[6]{x^{16}}$

7. Which graph represents the line $y = 3x + 6$

8. What is the solution of the system

   $4x + y = 1$
   $2x - 3y = 4$

   (a) $x = -1$, $y = \dfrac{1}{2}$

   (b) $x = \dfrac{55}{14}$, $y = \dfrac{9}{7}$

   (c) $x = \dfrac{1}{2}$, $y = -1$

   (d) $x = -\dfrac{1}{14}$, $y = \dfrac{9}{7}$

   (e) $x = \dfrac{1}{14}$, $y = \dfrac{5}{7}$

9. Subtract and simplify $\dfrac{x+2}{x-3} - \dfrac{x-1}{x+2} =$

   (a) -1

   (b) $\dfrac{-x+1}{x-3}$

   (c) $\dfrac{4x+1}{(x-3)(x+2)}$

   (d) $\dfrac{8x+1}{(x-3)(x+2)}$

   (e) $\dfrac{7}{(x-3)(x+2)}$

10. The expresssion $\dfrac{x-y}{\frac{x}{y} - \frac{y}{x}}$ is equivalent to:

    (a) $y - 1$

    (b) $y - x$

    (c) 0

    (d) $\dfrac{xy}{x+y}$

    (e) $\dfrac{(x-y)(y^2 - x^2)}{xy}$

11. Given function $f(x) = x^2 - 1$, find and simplify $f(x - 3)$

    (a) $f(x-3) = -8$

    (b) $f(x-3) = x^2 + 8$

    (c) $f(x-3) = x^2 - 6x + 8$

    (d) $f(x-3) = x^2 - 16$

    (e) $f(x-3) = x^2 - 8x + 16$

12. The graph of $5x - y = 3$ is perpendicular to:

    (a) $15x - 2y = 9$ (b) $3x + 15y = 6$ (c) $2x - 10y = 2$ (d) $10x - 2y = 6$ (e) $y = 5x$

13. Solve for x: $2^{3x-1} = \dfrac{1}{8}$

    (a) $-\dfrac{7}{24}$

    (b) $\dfrac{4}{3}$

    (c) $\dfrac{3}{8}$

    (d) $\dfrac{17}{48}$

    (e) $-\dfrac{2}{3}$

14. Suppose $x \geq 0$, then $\sqrt{x^2 + 16x^4} =$

    (a) $x + 4x^2$

    (b) $x\sqrt{1 + 16x^2}$

    (c) $4x^3$

    (d) $x^2(1 + 4x)$

    (e) $x^2\sqrt{1 + 16x^2}$

15. A small coffee mug costs $3, and a large mug costs $5. Alice bought a total of 65 mugs for which she paid $285. How many large mugs did she buy?

(a) 13   (b) 20   (c) 45   (d) 57   (e) 60
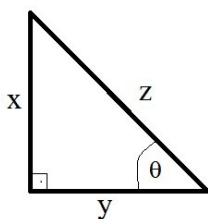
16. If $\log_{16}(x) = -\frac{1}{2}$, then $x =$

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

17. Suppose $0 \leq \theta < 2\pi$ and $2\sin\theta - \sqrt{3} = 0$. One value of θ is:

(a) $-\frac{\sqrt{3}}{2}$ (b) $\frac{\pi}{6}$ (c) $\frac{\pi}{4}$ (d) $\frac{\pi}{2}$ (e) $\frac{2\pi}{3}$

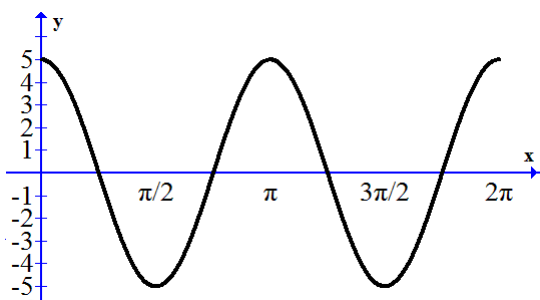18. In the figure below $x = 3$ and $y = 5$, the length $z =$

(a) 4   (b) 34   (c) $\frac{3}{\sin\theta}$ (d) $\frac{5}{\sin\theta}$ (e) $3\sin\theta$

19. $1 - (\cos(2x))^2$ is equivalent to:

(a) $1 - 4\cos^2 x$ (c) $\sin^2(2x)$ (e) None of the above
(b) $1 - \cos(4x^2)$ (d) a, b, and c (all)

20. The sketch below represents a part of a graph of which equation?

(a) $y = 5\sin(2x)$ (c) $y = 5\cos(2x)$ (e) $y = 5\cos\left(\frac{x}{2}\right)$
(b) $y = 5\cos(x)$ (d) $y = 5\sin\left(\frac{x}{2}\right)$

Part 2 on the next page.

PART 2 - SHORT-ANSWER PROBLEMS
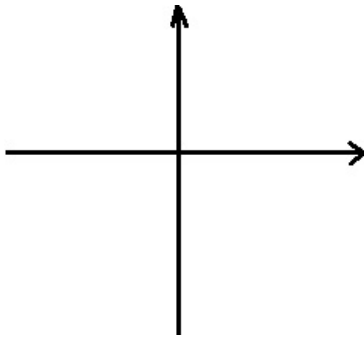
Write answer to each question in the space provided.

21. Solve the inequality: $\dfrac{1}{2} - 3x \le 2x + \dfrac{3}{4}$
    Answer: _____

22. Solve for x in terms of other variables: $p - 2\sqrt{x+c} = u$
    Answer: _____

23. Sketch the graph of $y = -x^2 + 4$

    Answer:

24. Find the value of $\tan(120°)$
    Answer: _____

25. If $\csc\theta = \sqrt{5}$, and $0 < \theta < \dfrac{\pi}{2}$ find the value of $\cos\theta$
    Answer: _____