

FORM A

**MAP 103: Proficiency Algebra
Final Exam, Fall 2006**

Tuesday, December 19, 2:00pm - 4:30pm

Name: _____ Student ID#: _____

Name of Instructor: _____ Section #: _____

Directions: Do not turn this page over until you are directed to do so. There are a total of 13 pages to this exam, not including the cover sheet. Be sure to have all of them. There are 33 multiple-choice questions on this exam. Each question is worth three points, and you are given one point for taking the exam, so one may earn a possible total of 100 points on this exam. For each question, five answer choices labeled (a) through (e) are given. Choose the choice that you feel best answers the question or completes the sentence. *Place your answer to each question on this sheet. This sheet will be the only sheet graded!* You may not leave the exam room until 3:30pm at the earliest. You may *not* use a calculator or any other electrical device for this exam. You may not consult any outside resources, including fellow test-takers, notes, and textbooks. You will also not receive any information from the proctors regarding the wording of any of the exam questions. Good luck!

Remember to place all answers below!

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|-----------|-----------|-----------|
| 1. _____ | 12. _____ | 23. _____ |
| 2. _____ | 13. _____ | 24. _____ |
| 3. _____ | 14. _____ | 25. _____ |
| 4. _____ | 15. _____ | 26. _____ |
| 5. _____ | 16. _____ | 27. _____ |
| 6. _____ | 17. _____ | 28. _____ |
| 7. _____ | 18. _____ | 29. _____ |
| 8. _____ | 19. _____ | 30. _____ |
| 9. _____ | 20. _____ | 31. _____ |
| 10. _____ | 21. _____ | 32. _____ |
| 11. _____ | 22. _____ | 33. _____ |

Exam Score: _____ Subscore: _____ Initials: _____

1. $6\left(\frac{2}{3} + \frac{3}{6}\right) - \frac{1}{3}(9 - 12)$ equals

- (a) 8
- (b) 4
- (c) 0
- (d) -4
- (e) -8

2. When $x = 0$, $2^x + 2x + \frac{1}{1-x}$ is

- (a) 0
- (b) 1
- (c) 2
- (d) 3
- (e) all of the above

3. As an interval, the solution set for the inequality

$$\frac{3}{2} \left(\frac{2}{3} - \frac{2}{3}x \right) \leq \frac{1}{2} (2 - 4x)$$

is

- (a) $(-\infty, 0)$
- (b) $(-\infty, 0]$
- (c) $[-\infty, 0)$
- (d) $[-\infty, 0]$
- (e) $[0, -\infty)$

4. Which is an equation of the line containing the point $(2, -1)$ perpendicular to the line $y + \frac{2}{3}x = 4$?

(a) $y = -\frac{2}{3}x + 4$

(b) $y = 2x + 4$

(c) $y = \frac{3}{2}x - 4$

(d) $y = -\frac{3}{2}x - 4$

(e) $y = \frac{3}{2}x + 4$

5. Factor the following trinomial: $6a^2 - 23a + 15$.

(a) $(6a + 3)(a + 5)$

(b) $(3a - 5)(2a - 3)$

(c) $(6a - 5)(a - 3)$

(d) $(2a + 5)(3a + 3)$

(e) $(2a + 5)(3a - 3)$

6. The expression

$$\frac{2}{x-2} - \frac{x}{x+2}$$

equals

(a) $\frac{2-x}{x^2+4}$

(b) $\frac{x+2}{x-2}$

(c) $\frac{4-x^2}{x^2-4}$

(d) $\frac{-x^2+4x+4}{x^2-4}$

(e) $\frac{x^2-4x-4}{x^2+4}$

7. $\frac{1 - \frac{x}{y}}{\frac{x^2}{y^2} - \frac{x}{y}}$ is

(a) $\frac{y}{x + y}$

(b) -1

(c) $-\frac{y}{x + y}$

(d) $\frac{x - y^2}{y^2}$

(e) undefined

8. Solve for x in the following equation:

$$2x - \frac{6}{x} = 4$$

(a) $x = 6, x = -2$

(b) $x = 3, x = -1$

(c) $x = -6, x = -2$

(d) $x = -3, x = 1$

(e) $x = 3, x = -2$

9. Find the value of $\sqrt[3]{\frac{64}{125}}$.

(a) $\frac{8}{25}$

(b) $\frac{4}{5}$

(c) $\left(\frac{64}{125}\right)^3$

(d) $\frac{5}{4}$

(e) $\frac{1}{2}$

10. The graph of $\frac{1}{2}y + 2 = x$ is parallel to the graph of

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

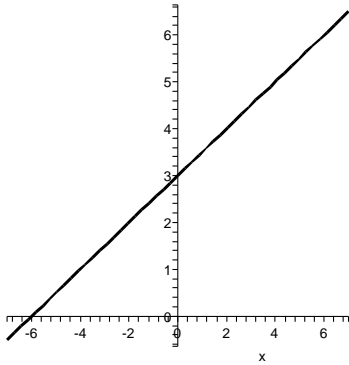
11. The expression $5x - 3(\frac{5}{3}x + \frac{1}{3}) + 1$ equals

- (a) -1
- (b) $-x$
- (c) 0
- (d) x
- (e) 1

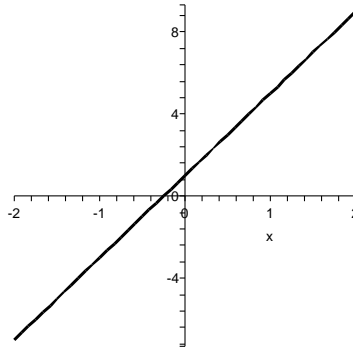
12. When $x \neq 0$, $4[\frac{x}{2}(\frac{1}{2x} - \frac{x}{2}) + \frac{3}{2}]$ is

- (a) 10
- (b) $x^2 - 6$
- (c) $x^2 - 10$
- (d) $6 - x^2$
- (e) $-x^2 + 7$

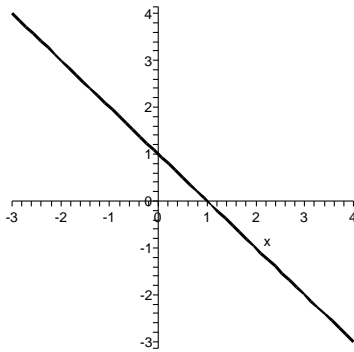
13. Identify the correct graph of the equation $-\frac{1}{3}y + 1 = \frac{x}{6}$.



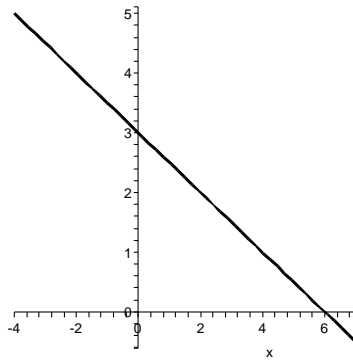
(a)



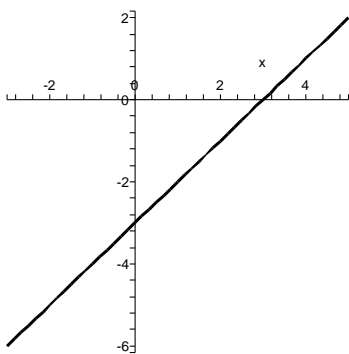
(b)



(c)



(d)



(e)

14. Let $p, q, r \neq 0$. Solve for p in terms of q and r in the equation $\frac{1}{p} + \frac{1}{q} + \frac{1}{r} = 1$.

- (a) $p = -q - r$
- (b) $p = q + r$
- (c) $p = \frac{qr}{qr-r+q}$
- (d) $p = \frac{qr}{qr-r-q}$
- (e) p cannot be determined

15. Which of the given relations chosen from I, II, and III is/are (a) function(s) of x ?

I. $y = x^2$

II. $x = y^2$

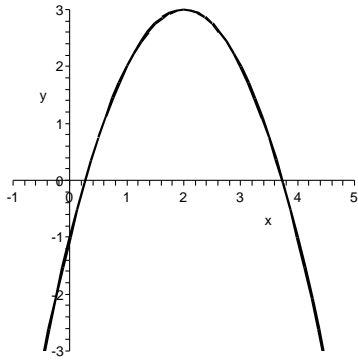
III. $y = \pm\sqrt{x}$

- (a) I, only
- (b) II, only
- (c) III, only
- (d) II and III, only
- (e) I, II, and III

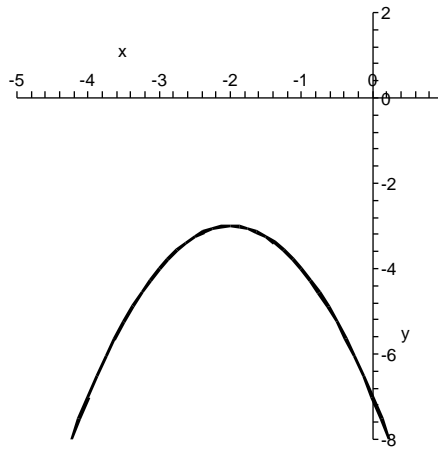
16. Let $f(x) = \begin{cases} x + 1 & \text{if } x \leq 0 \\ 1 & \text{if } x > 0 \end{cases}$. What is the range of $f(x)$?

- (a) $(-\infty, \infty)$
- (b) $(-\infty, 1]$
- (c) $[1, \infty)$
- (d) All real numbers
- (e) None of the above

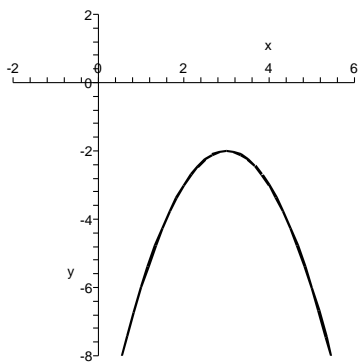
17. Let $f(x) = -(x + 3)^2 - 2$. Which of the following is the graph of $f(x)$?



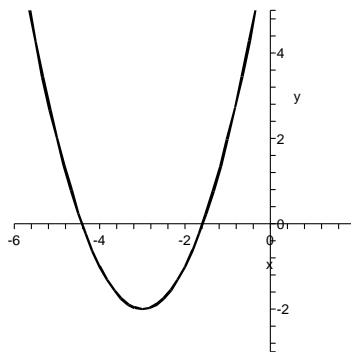
(a)



(b)



(c)



(d)

(e) None of the above.

18. Add $-2x^2 + x - 5$ and $3x^2 - x - 5$.

- (a) $5x^2 + 2x - 10$
- (b) $x^4 + x^2 - 10$
- (c) $x^2 - 2x - 10$
- (d) $x^2 + 2x$
- (e) $x^2 - 10$

19. Subtract $7x^2 - 4xy - y^2$ from $4x^2 - 3xy + y^2$.

- (a) $-3x^2 + 7xy$
- (b) $-3x^2 + xy + 2y^2$
- (c) $3x^2 - xy$
- (d) $3x^2 + 7xy$
- (e) $-3x^2 - xy + y^2$

20. Multiply $3x^2 - 2x + 10$ by $x + 2$.

- (a) $3x^3 + 4x^2 + 30$
- (b) $7x^2 + 6x + 20$
- (c) $9x^2 + 4x + 20$
- (d) $3x^3 + 4x^2 + 6x + 20$
- (e) $3x^3 - 4x^2 - 14x - 30$

21. Factor the binomial $4xy^3 - 36xy$ completely.

- (a) $4x(y^3 - 9y)$
- (b) $4xy(y^2 - 9)$
- (c) $(2xy^2 - 6)(2xy + 6)$
- (d) $4xy(y + 3)(y - 3)$
- (e) $(2xy^2 - 4)(2xy + 9)$

22. The solution set for the equation $y^3 - y^2 = 2y$ is

- (a) $\{2, -1\}$
- (b) $\{-2, 1\}$
- (c) $\{-2, 1, 0\}$
- (d) $\{2\}$
- (e) None of the above.

23. $\left(8^{-\frac{2}{3}}\right)^{-1}$ is equivalent to

- (a) $\frac{1}{8^{\frac{2}{3}}}$
- (b) $-\frac{1}{4}$
- (c) $8^{\frac{3}{2}}$
- (d) 64
- (e) 4

24. $81^{\frac{1}{16}} \cdot 81^{\frac{3}{16}}$ is the same as

- (a) $\sqrt[4]{81^{16}}$
- (b) $6561^{\frac{4}{16}}$
- (c) 3
- (d) $81^{\frac{3}{256}}$
- (e) 9

25. The graphs of $f(x)$ and $f^{-1}(x)$ are symmetric about the

- (a) x -axis
- (b) y -axis
- (c) line $y = x$
- (d) all of these
- (e) none of these

26. Let $f(x) = \sqrt{x-3} + 2$. Which of the following expressions is equivalent to $f^{-1}(x)$?

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

27. Let $f(x) = \frac{1}{x}$ and $g(x) = \frac{1}{x-3}$. Evaluate $f(g(3))$.

- (a) 3
- (b) 0
- (c) 1
- (d) -6
- (e) $f(g(3))$ is undefined

28. Solve for x in the following equation:

$$\frac{1}{49} = 7^{5x+1}$$

- (a) $x = -\frac{1}{2}$
- (b) $x = -1$
- (c) $x = -\frac{3}{5}$
- (d) $x = 5$
- (e) x is none of the above

29. Solve for x in the following equation:

$$17^{\log_{17}(3)} = 2x$$

- (a) $x = -\frac{3}{2}$
- (b) $x = 2$
- (c) $x = -2$
- (d) $x = \frac{3}{2}$
- (e) x is none of the above

30. The expression $\log_3 \sqrt[5]{4x}$ is equivalent to

- (a) $\frac{1}{5} \log 4x$
- (b) $\frac{1}{5} \log x$
- (c) $-\frac{1}{5} \log 4x$
- (d) $-\frac{1}{5} \log_3 4x$
- (e) none of the above

31. If $f(x) = 2^x$, then $f(x + h)$ is

- (a) $2x + 2h$
- (b) $2(x + h)$
- (c) $2^x 2^h$
- (d) $2^x(x + h)$
- (e) none of these

32. If $f(x) = \log_9 x$ and $g(x) = 81^{100}$, then $(f \circ g)(x)$ is

- (a) 200
- (b) 100^2
- (c) 9
- (d) 81
- (e) none of these

33. Which of the following has a range of $(0, \infty)$?

(a) $f(x) = x^2$

(b) $g(x) = 2^x$

(c) $h(x) = \log_2 x$

(d) $j(x) = 2x$

(e) $k(x) = \sqrt{2x}$