

EXAM 1 REVIEW - MATH 101

The following is a review of the concepts you should know for this exam. This review is a sample and is not intended to mirror the exam questions. In addition, any problems similar to those discussed in class or in assigned homework may be assessed on the exam.

1. Find the distance between the points $P = (-1, 3)$ and $Q = (4, -2)$.
2. Find the midpoint of the line segment joining $(5.6, -2.6)$ and $(-9.1, 3.7)$.
3. Which of the following points are on the graph of $y = x^3 - 3x + 1$?
 - a) $(-2, -1)$
 - b) $(2, 3)$
 - c) $(3, 1)$
4. Find all values of k if $(k, 5)$ is 13 units from $(4, -7)$.
5. Graph the following equations by finding the intercepts and plotting points.
 - a) $3x - 5y = 9$
 - b) $x^3 - 4x^2 = y$
6. Identify the center and radius, then graph the equation: $x^2 + y^2 - 4x + 8y - 5 = 0$.
7. Write the equation of the circle with center at $P = (-2, 1)$ and $r = 1.5$.
8. Find the slope of a line through the given points.
 - a) $(2, 8)$ and $(6, -4)$
 - b) $(-7, 4)$ and $(-3, 6)$
 - c) $(7, -2)$ and $(-5, 7)$
9. Find the slope and the y -intercept and graph the line of:
 - a) $6x - 15y = 20$
 - b) $4x + 14y = 21$
10. Write an equation for the line through $(5, 2)$ that:
 - a) is perpendicular to the line $3x + 2y = 20$
 - b) is parallel to the line $4x - 3y = 12$
 - c) is horizontal.
 - d) has an undefined slope.
11. If the point $(1, 3)$ is one the graph of f , what point must also be on the graph if f has y -axis symmetry?
 - a) $(-1, 3)$
 - b) $(1, -3)$
 - c) $(-1, -3)$
 - d) $(-3, -1)$
12. If the graphs of a system of two linear equations result in parallel lines, the system is:
 - a) consistent, one solution
 - b) consistent, no solution
 - c) inconsistent, one solution
 - d) inconsistent, no solution

13. When solving a system of equations by the elimination method, you get a result of $0 = 0$ after adding the equations. This means the system is:
- a) consistent, infinite solutions b) consistent, no solution
 c) inconsistent, infinite solutions d) inconsistent, no solution
14. Given the following system, the resulting equation after substituting the expression for y from the second equation into the first is:

$$\begin{cases} 2x - 3y = 15 \\ y = x + 2 \end{cases}$$

- (a) $2(x + 2) - 3y = 15$ (b) $2x - 3(x + 2) = 15$
 (c) $2x - 3x + 2 = 15$ (d) $2(x + 2) - 3(x + 2) = 15$
15. Given the following system, what must you multiply both sides of the second equation by in order to eliminate the y -terms?

$$\begin{cases} 3x - 4y = 21 \\ 4x + y = 13 \end{cases}$$

- (a) 4 (b) -4 (c) 3 (d) -3
16. Given the following system, what must you multiply both sides of the second equation by in order to eliminate the x -terms?

$$\begin{cases} 7x - 3y = 21 \\ -x - y = 12 \end{cases}$$

- (a) 3 (b) -3 (c) 7 (d) -7

Solve the following systems by substitution or elimination.

17. $\begin{cases} 5x - 2y = 11 \\ 2x + 3y = 12 \end{cases}$ 18. $\begin{cases} \frac{1}{3}x - 2y = 1 \\ 5x - 30y = 18 \end{cases}$

19. Write the augmented matrix corresponding to the system:

$$\begin{cases} 4x - 5y + z = 0 \\ -2x - y + 6z = 19 \\ x + 2z = 10 \end{cases}$$

20. Write the system of equations corresponding to the augmenting matrix:

$$\left[\begin{array}{ccc|c} 1 & -3 & 5 & 0 \\ -2 & 5 & 0 & -1 \\ -1 & 0 & 4 & 11 \end{array} \right]$$

Solve by using matrix row operations.

21. $\begin{cases} x + \frac{1}{4}y = 7 \\ 8x + 2y = 56 \end{cases}$ 22. $\begin{cases} x + 2y + 4z = -3 \\ 2x + 7y + 15z = -12 \\ 4x + 7y + 13z = -10 \end{cases}$

23. Find the function $y = ax^2 + bx + c$ whose graph contains the points $(1, -1)$, $(3, -1)$, and $(-2, 14)$.
24. Cholesterol intake should be limited to 300 mg or less each day. One serving of scrambled eggs from McDonalds and one Double Beef Whopper from Burger King exceed this intake by 241 mg. Two servings of scrambled eggs and three Double Beef Whoppers provide 1257 mg of cholesterol. Determine the cholesterol content in each item.
25. A baseball stadium has two types of seats: club level seats costing \$20.00 each and upper deck seats costing \$5.00 each. On a certain day last July, ticket receipts for the team totaled \$346,425. If 26,580 people attended the game, how many people sat in the club level? How many sat in the upper deck?

Answers:

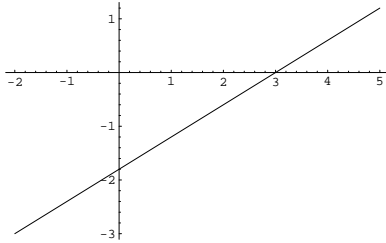
1. $5\sqrt{2} \approx .7071$

2. $(-1.75, .55)$

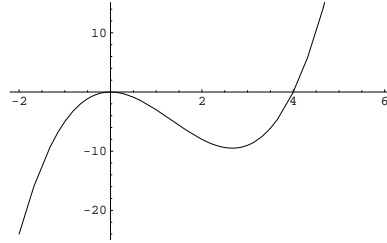
3. a) yes b) yes c) no

4. $k = 9, -1$

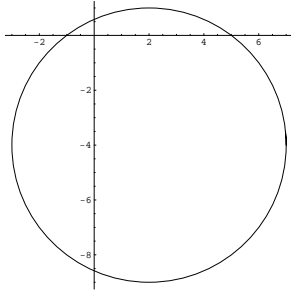
5. a) $y\text{-int} = -9/5, x\text{-int} = 3$



b) $y\text{-int} = 0, x\text{-int(s)} = 0, 4; (1, -3), (-1, -5), (5, 25)$



6. Center = $(2, -4)$, Radius = 5



7. $(x + 2)^2 + (y - 1)^2 = 2.25$

8. a) -3 b) $1/2$ c) $-3/4$

9. a) Slope = $\frac{2}{5}$, $y\text{-intercept} = \frac{-4}{3}$; graph $y = \frac{2}{5}x - \frac{4}{3}$ to check
 b) Slope = $\frac{-2}{7}$, $y\text{-intercept} = \frac{3}{2}$; graph $y = -\frac{2}{7}x + \frac{3}{2}$ to check

10. a) $\frac{2}{3}x - \frac{4}{3} = y$ b) $\frac{4}{3}x - \frac{14}{3} = y$ c) $y = 2$ d) $x=5$

11. a

12. d 13. a 14. b 15. a 16. c

17. $x = 3, y = 2$

18. No solution

19.
$$\left[\begin{array}{ccc|c} 4 & -5 & 1 & 0 \\ -2 & -1 & 6 & 19 \\ 1 & 0 & 2 & 10 \end{array} \right]$$

20.
$$\begin{cases} x - 3y + 5z = 0 \\ -2x + 5y = -1 \\ -x + 4z = 11 \end{cases}$$

21. Infinitely many solutions on the line $y = -4x + 28$

22. $(x, y, z) = (1, -2, 0)$

23. $y = x^2 - 4x + 2$

24. a serving of scrambled eggs contains 366 mg of cholesterol and Double Whoppers contain 175 mg of cholesterol each

25. 14235 people in club seating, 12345 people in upper deck