M101 7.1–7.3 practice

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the system by substitution.

1) $x - 2y = -16$
$2x - 2y = -22$ 1) _____

2) $4x - 5y = 8$
$9x + 3y = 75$ 2) _____

Solve the system by elimination.

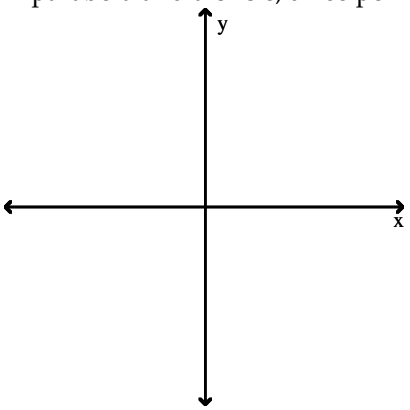
3) $x + 3y = 8$
$-2x + 4y = -16$ 3) _____

4) $-7x + 7y = -49$
$3x - 2y = 22$ 4) _____

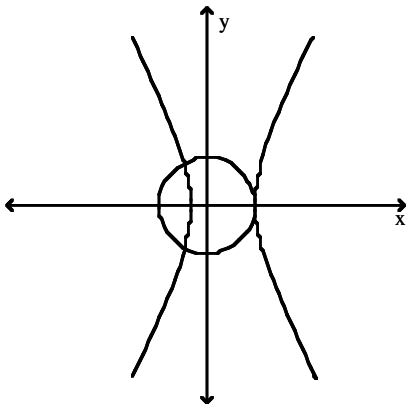
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Draw a sketch of the two graphs described, with the indicated number of points of intersection.

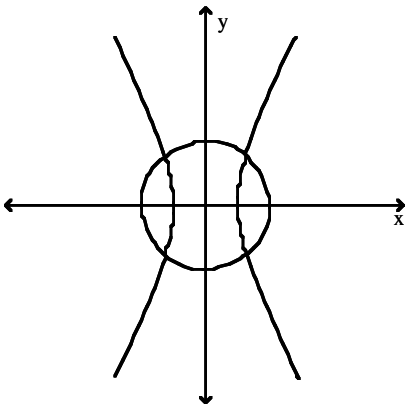
5) A parabola and a circle; three points 5) _____



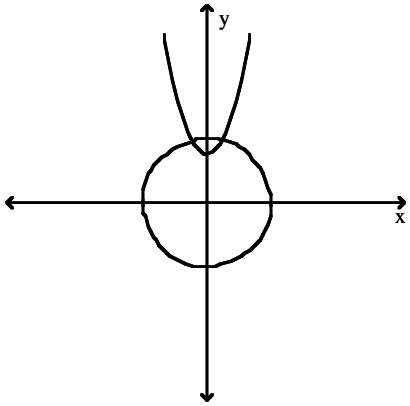
A)



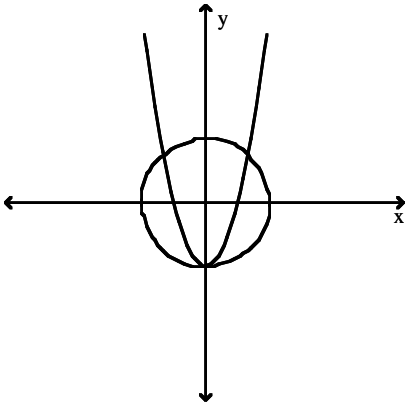
B)



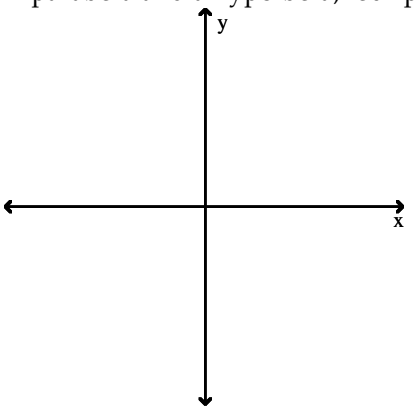
C)



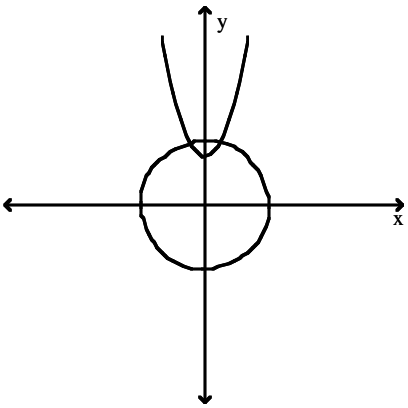
D)



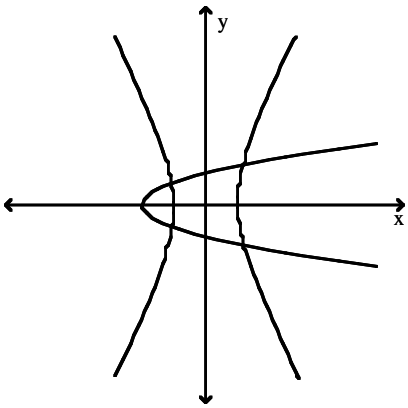
6) A parabola and a hyperbola; four points 6) _____



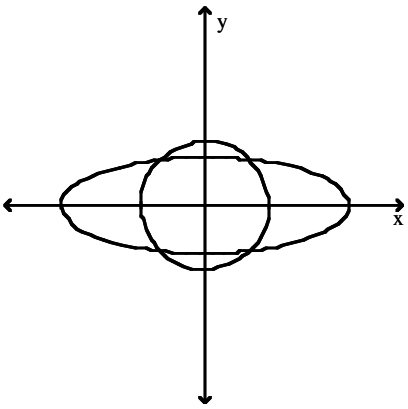
A)



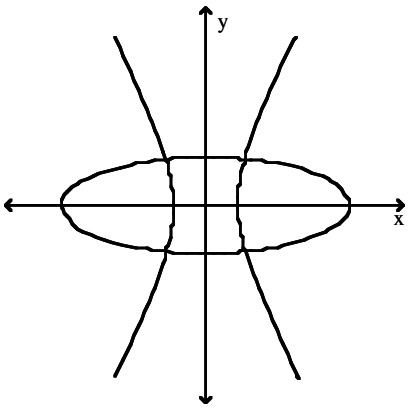
B)



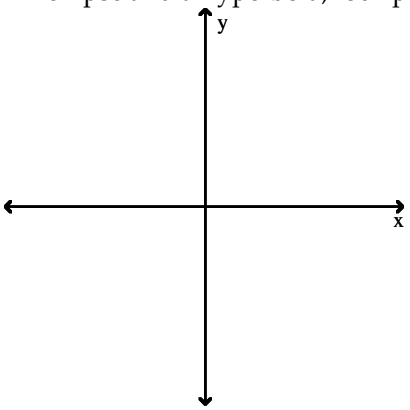
C)



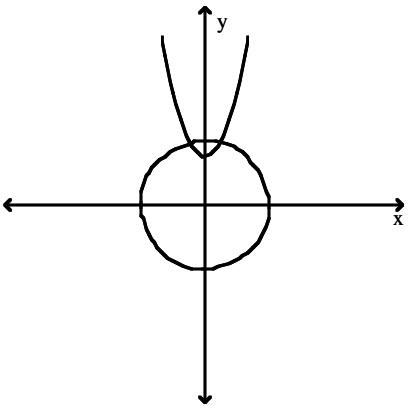
D)



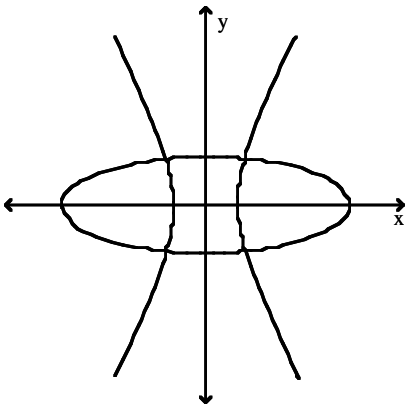
7) An ellipse and a hyperbola; four points 7) _____



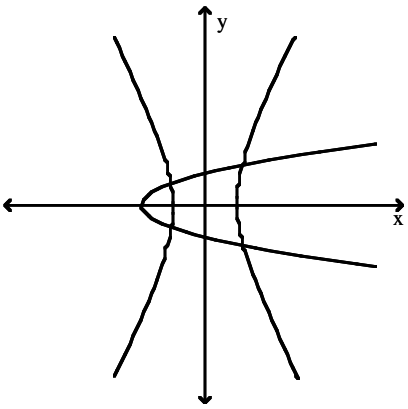
A)



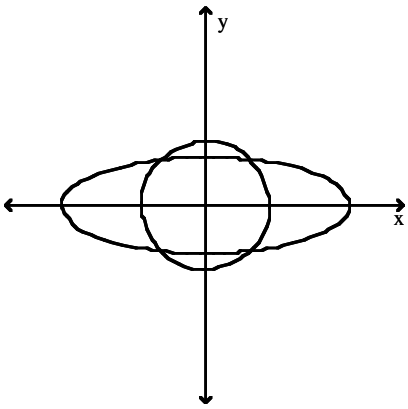
B)



C)



D)

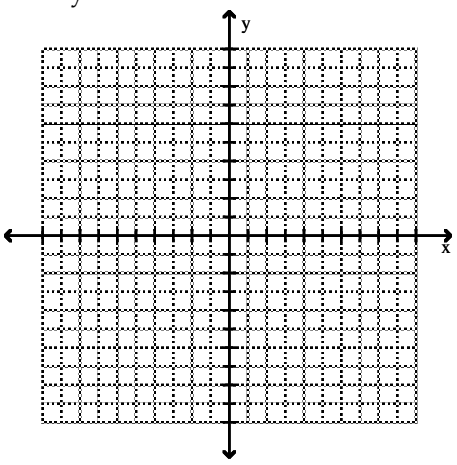


SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the system graphically. Do not use a calculator.

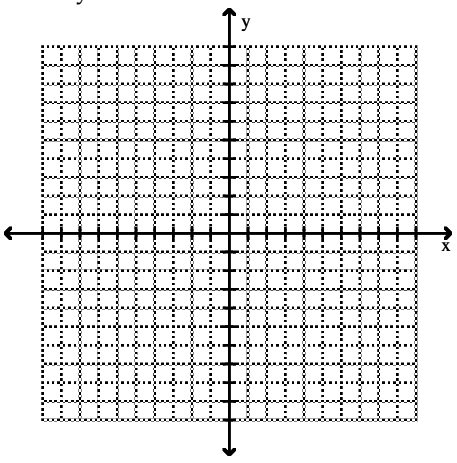
8) $x - y = 0$
$2x - y = -4$

8) _____



9) $x^2 + y^2 = 5$
$x - y = -1$

9) _____



Solve the nonlinear system of equations.

10) $x^2 + y^2 = 61$
$x - y = 1$

10) _____

11) $x^2 - y^2 = 39$
$x - y = 3$

11) _____

Solve the problem. Round to an appropriate number of significant digits.

12) A contractor mixes concrete from bags of pre–mix for small jobs. How many bags with 4% cement should he mix with 6 bags of 7% cement to produce a mix containing 5% cement?

12) _____

13) A theatre sells two types of tickets to their plays; children's tickets and adult tickets. For today's performance they have sold a total of 1035 tickets. Also, they have sold 4 times as many children's tickets as adult tickets. How many children's tickets have they sold? 13) _____

Solve the problem.

14) A rectangular plot has area 126 yd^2 with a perimeter of 46 yd. What is the length of the longest side? 14) _____

15) Bob fenced in a rectangular garden in his yard. The length of the rectangle is 4 feet longer than the width and the perimeter is 56 feet. What is the width of the rectangle? 15) _____

Use the substitution–of–variable technique to solve the system analytically.

16) $\frac{-9}{x} + \frac{1}{y} = -\frac{19}{8}$ 16) _____

$\frac{-8}{x} - \frac{2}{y} = -\frac{7}{4}$

17) $\frac{4}{x} + \frac{9}{y} = \frac{11}{2}$ 17) _____

$\frac{8}{x} - \frac{7}{y} = \frac{41}{6}$

Answer the question.

18) When using the substitution or elimination method to solve a system of two equations, you end up with an equation stating $0 = 7$. What does this indicate to you about the system of equations? 18) _____

19) If the graphs of a system of two equations are a line and a parabola, what are the possible numbers of solutions (with real coordinates) of this system? 19) _____

20) If the graphs of a system of two equations are a circle and a parabola, what are the possible numbers of solutions (with real coordinates) of this system? 20) _____

Solve the system analytically.

21) $x - y + 2z = -3$ 21) _____
$4x + z = -1$
$x + 2y + z = 1$

22) $x - y + z = -4$ 22) _____
$x + y + z = 0$
$x + y - z = -6$

23) 23) _____
$2x - 5y - 3z = -1$
$6x - 5y + 6z = 4$
$10y + 3z = 3$

Solve the system in terms of the arbitrary variable listed.

24) y; 24) _____

$3x + y + z = 5$

$4x + 5y - z = -8$

25) y; 25) _____

$2x - 5y + z = 11$

$3x + y - 6z = 1$

26) x; 26) _____

$x + y - 2z = 8$

$3x + z = -6$

Solve the problem.

27) A $64,000 trust is to be invested in bonds paying 8%, CDs paying 6%, and mortgages paying 10%. The bond and CD investment together must equal the mortgage investment. To earn a $5520 annual income from the investments, how much should the bank invest in bonds? 27) _____

Use a system of equations to solve problem.

28) Find the equation of the parabola $y = ax^2 + bx + c$ that passes through the points (–2, 0), (0, –6), and (3, 2). 28) _____

29) Suppose that the position of a particle moving along a straight line is given by $s(t) = at^2 + bt + c$, where t is time in seconds and a, b, and c are real numbers. If $s(0) = -2$, $s(1) = -2$, and $s(2) = -10$, find a, b, and c. Then find s(10). 29) _____

Write the augmented matrix for the system.

30) $5x + 2y = 39$ 30) _____

$7y = 14$

$\left[\begin{array}{c|c} & \\ & \end{array}\right]$

31) $5x + 8y + 2z = 48$ 31) _____

$8x + 6y + 3z = 56$

$4x + 6y + 8z = 50$

$\left[\begin{array}{c|c} & \\ & \\ & \end{array}\right]$

Write the system of equations associated with the augmented matrix. Do not solve.

32) $\left[\begin{array}{cc|c} 9 & -8 & 2 \\ -4 & -7 & 9 \end{array}\right]$ 32) _____

The augmented matrix is in row–echelon form and represents a system of linear equations. Solve the system using back–substitution.

33) $\left[\begin{array}{cc|c} 1 & -5 & -5 \\ 0 & 0 & 8 \end{array}\right]$ 33) _____

34) $\left[\begin{array}{ccc|c} 1 & 2 & -3 & -2 \\ 0 & 1 & 4 & 5 \\ 0 & 0 & 1 & 3 \end{array}\right]$ 34) _____

Solve the system.

35) $\begin{aligned} 3x + 5y &= 19 \\ 5x \quad &= -10 \end{aligned}$ 35) _____

36) $\begin{aligned} 8x - y + 4z &= 86 \\ 6x + 8y - 3z &= 58 \\ -4x - 2y + z &= -36 \end{aligned}$ 36) _____

Solve the problem.

37) A chemist has prepared two acid solutions, one of which is 4% acid by volume, another 11% acid. How many cubic centimeters of each should the chemist mix together to obtain 50 cm^3 of 6.66% solution? 37) _____

38) John has a jarful of quarters and nickels. There are 108 coins in the jar. The value of the coins is $16.80. How many of each type of coin are there? 38) _____

39) Anne and Nancy use a metal alloy that is 26.6% copper to make jewelry. How many ounces of a 25% alloy must be mixed with a 29% alloy to form 70 ounces of the desired alloy? 39) _____

Provide an appropriate response.

40) Suppose that you are solving a system of three linear equations by the row echelon method and obtain the following augmented matrix. 40) _____

$$\left[\begin{array}{ccc|c} 1 & 11 & -13 & -22 \\ 0 & 0 & 0 & 0 \\ 0 & 4 & -8 & -4 \end{array}\right]$$

What conclusion can you draw about the solutions of the system?