

MATH 260 (PRECALCULUS) SAMPLE TEST CHAPTER 9, 10, and 11

INSTRUCTOR: ANNE SISWANTO; TOTAL POINTS: 100; TIME: 70 MINUTES.

Direction: No graphing calculator is allowed during test. Please write your answer in the answer blanks and show all work to get full credits.

Find an equation of the parabola described.

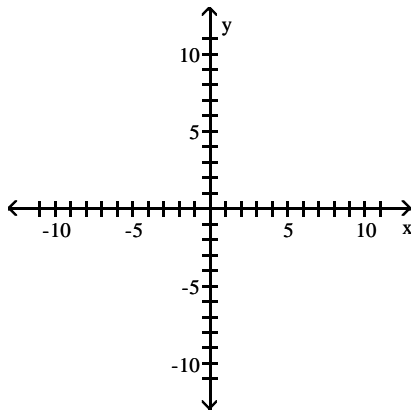
- 1) Focus at $(0, -8)$; directrix the line $y = 8$

Objective: (9.2) Analyze Parabolas with Vertex at the Origin

Find the vertex, focus, and directrix of the parabola.

Graph the parabola.

2) $x^2 = 8y$



Objective: (9.2) Analyze Parabolas with Vertex at the Origin

Find an equation for the parabola described.

- 3) Vertex at $(6, -5)$; focus at $(6, -3)$

Objective: (9.2) Analyze Parabolas with Vertex at (h, k)

Find the vertex, focus, and directrix of the parabola with the given equation.

4) $(y + 2)^2 = 4(x - 4)$

Objective: (9.2) Analyze Parabolas with Vertex at (h, k)

Find the vertex, focus, and directrix of the parabola.

Graph the equation.

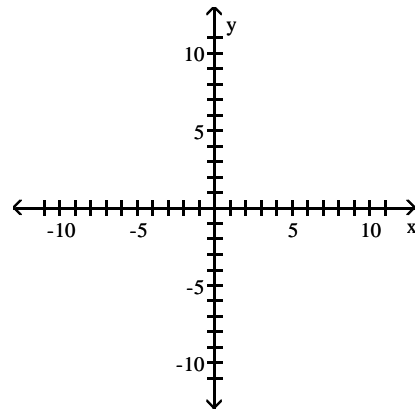
5) $(y - 3)^2 = -4(x - 2)$

Objective: (9.2) Analyze Parabolas with Vertex at (h, k)

6) $x^2 - 14x = 12y - 85$

Objective: (9.2) Analyze Parabolas with Vertex at (h, k)

7) $y^2 + 6y = 12x + 63$



Objective: (9.2) Analyze Parabolas with Vertex at (h, k)

Solve the problem.

- 8) A reflecting telescope contains a mirror shaped like a paraboloid of revolution. If the mirror is 20 inches across at its opening and is 3 feet deep, where will the light be concentrated?

Objective: (9.2) Solve Applied Problems Involving Parabolas

- 9) A bridge is built in the shape of a parabolic arch. The bridge arch has a span of 192 feet and a maximum height of 25 feet. Find the height of the arch at 20 feet from its center.

Objective: (9.2) Solve Applied Problems Involving Parabolas

- 10) A satellite dish is shaped like a paraboloid of revolution. The signals that emanate from a satellite strike the surface of the dish and are reflected to a single point, where the receiver is located. If the dish is 8 feet across at its opening and is 2 feet deep at its center, at what position should the receiver be placed?

Objective: (9.2) Solve Applied Problems Involving Parabolas

- 11) A sealed-beam headlight is in the shape of a paraboloid of revolution. The bulb, which is placed at the focus, is 3 centimeters from the vertex. If the depth is to be 6 centimeters, what is the diameter of the headlight at its opening?

Objective: (9.2) Solve Applied Problems Involving Parabolas

Find the center, foci, and vertices of the ellipse.

12) $64x^2 + 25y^2 = 1600$

Objective: (9.3) Analyze Ellipses with Center at the Origin

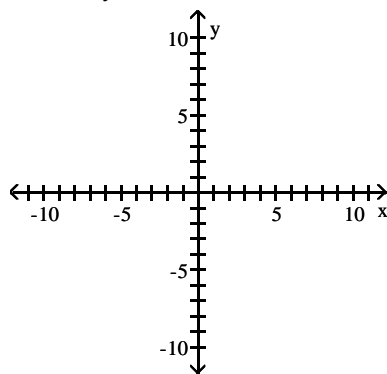
Find an equation for the ellipse described.

- 13) Center at (0, 0); focus at (-2, 0); vertex at (6, 0)

Objective: (9.3) Analyze Ellipses with Center at the Origin

Graph the ellipse and locate the foci.

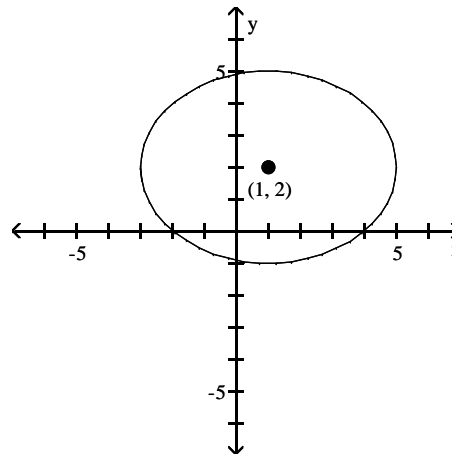
14) $9x^2 + 16y^2 = 144$



Objective: (9.3) Analyze Ellipses with Center at the Origin

Write an equation for the graph.

15)



Objective: (9.3) Analyze Ellipses with Center at (h, k)

Find the center, foci, and vertices of the ellipse.

16) $\frac{(x - 3)^2}{36} + \frac{(y + 1)^2}{16} = 1$

Objective: (9.3) Analyze Ellipses with Center at (h, k)

17) $16(x + 3)^2 + 9(y - 2)^2 = 144$

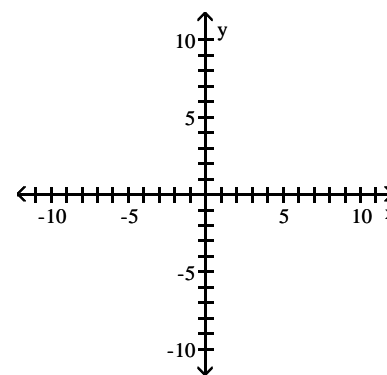
Objective: (9.3) Analyze Ellipses with Center at (h, k)

18) $4x^2 + 5y^2 - 24x + 70y + 261 = 0$

Objective: (9.3) Analyze Ellipses with Center at (h, k)

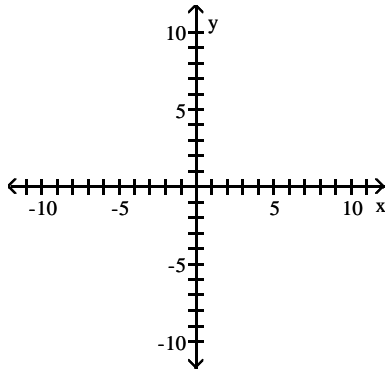
Graph the equation.

19) $\frac{(x - 2)^2}{4} + \frac{(y + 2)^2}{9} = 1$



Objective: (9.3) Analyze Ellipses with Center at (h, k)

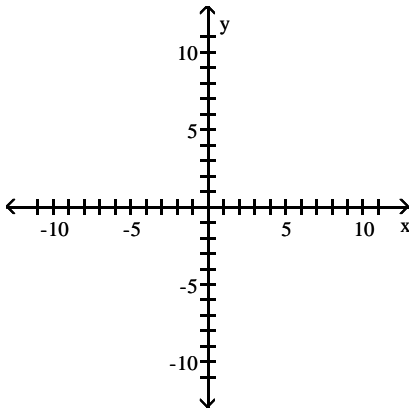
20) $4(x + 1)^2 + 16(y - 1)^2 = 64$



Objective: (9.3) Analyze Ellipses with Center at (h, k)

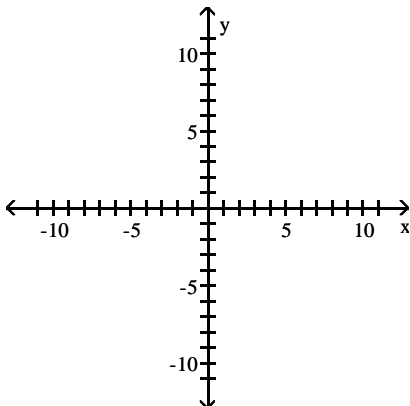
Find an equation for the ellipse described. Graph the equation.

- 21) Foci at (4, 5) and (4, -1); length of major axis is 10



Objective: (9.3) Analyze Ellipses with Center at (h, k)

- 22) Center at (-3, 4); focus at (-6, 4); contains the point (-9, 4)



Objective: (9.3) Analyze Ellipses with Center at (h, k)

Solve the problem.

- 23) A bridge is built in the shape of a semielliptical arch. It has a span of 112 feet. The height of the arch 30 feet from the center is to be 11 feet. Find the height of the arch at its center.

Objective: (9.3) Solve Applied Problems Involving Ellipses

- 24) A hall 130 feet in length was designed as a whispering gallery. If the ceiling is 25 feet high at the center, how far from the center are the foci located?

Objective: (9.3) Solve Applied Problems Involving Ellipses

- 25) A race track is in the shape of an ellipse 80 feet long and 60 feet wide. What is the width 32 feet from the center?

Objective: (9.3) Solve Applied Problems Involving Ellipses

Find an equation for the hyperbola described.

- 26) Vertices at (0, ±6); asymptotes at $y = \pm \frac{3}{7}x$

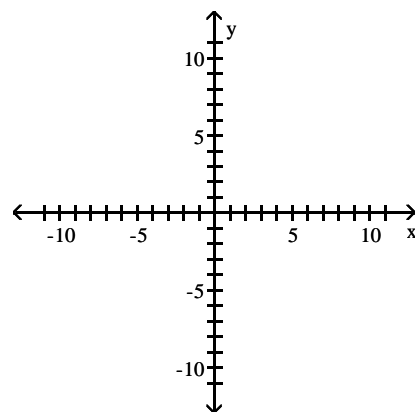
Objective: (9.4) Analyze Hyperbolas with Center at the Origin

- 27) Vertices at (±5, 0); foci at (±6, 0)

Objective: (9.4) Analyze Hyperbolas with Center at the Origin

Find an equation for the hyperbola described. Graph the equation.

- 28) Center at (0, 0); vertex at (0, 8); focus at (0, $\sqrt{113}$)



Objective: (9.4) Analyze Hyperbolas with Center at the Origin

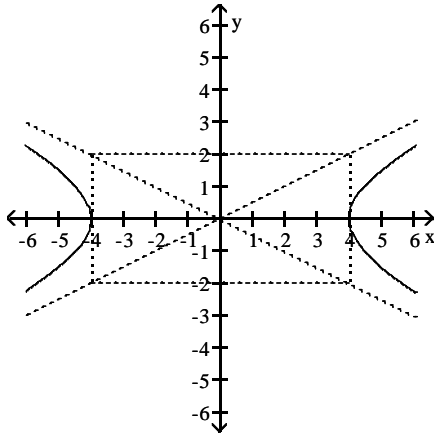
Find the center, transverse axis, vertices, foci, and asymptotes of the hyperbola.

29) $49y^2 - 25x^2 = 1225$

Objective: (9.4) Analyze Hyperbolas with Center at the Origin

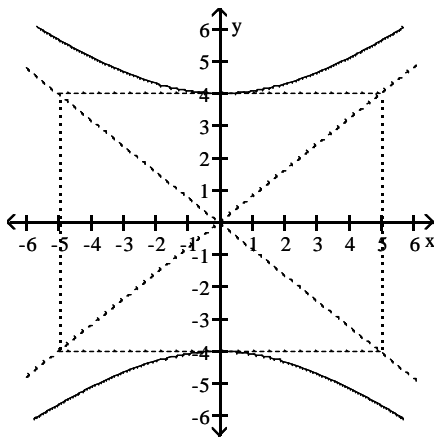
Write an equation for the hyperbola.

30)



Objective: (9.4) Analyze Hyperbolas with Center at the Origin

31)



Objective: (9.4) Analyze Hyperbolas with Center at the Origin

Find the asymptotes of the hyperbola.

32) $y^2 - x^2 = 4$

Objective: (9.4) Find the Asymptotes of a Hyperbola

33) $\frac{(x+2)^2}{25} - \frac{(y+3)^2}{4} = 1$

Objective: (9.4) Find the Asymptotes of a Hyperbola

34) $x^2 - y^2 + 6x + 2y - 1 = 0$

Objective: (9.4) Find the Asymptotes of a Hyperbola

Find an equation for the hyperbola described.

35) Vertices $(\frac{1}{2}, -3)$ and $(-\frac{9}{2}, -3)$; asymptotes

$y + 3 = \pm \frac{6}{5}(x + 2)$

Objective: (9.4) Analyze Hyperbolas with Center at (h, k)

36) center at (1, 3); focus at (-1, 3); vertex at (0, 3)

Objective: (9.4) Analyze Hyperbolas with Center at (h, k)

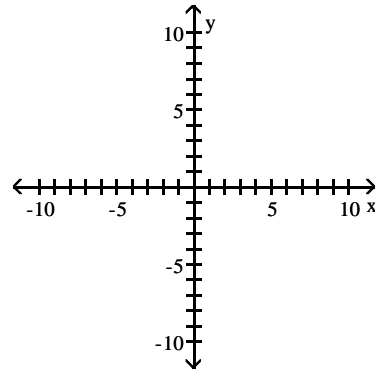
Find the center, transverse axis, vertices, foci, and asymptotes of the hyperbola.

37) $\frac{(x-2)^2}{9} - \frac{(y+2)^2}{4} = 1$

Objective: (9.4) Analyze Hyperbolas with Center at (h, k)

Graph the hyperbola.

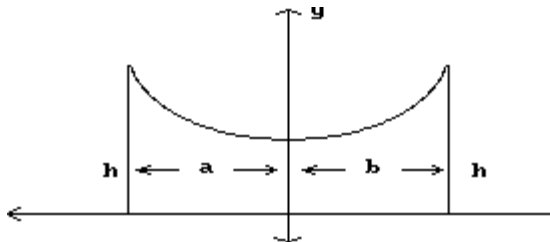
38) $\frac{(y+2)^2}{4} - \frac{(x+2)^2}{25} = 1$



Objective: (9.4) Analyze Hyperbolas with Center at (h, k)

Solve the problem.

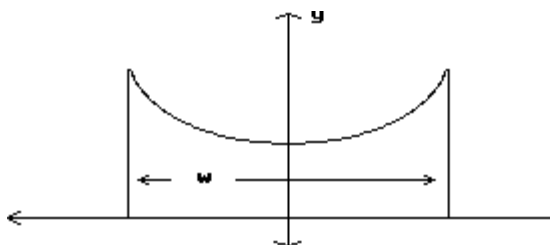
- 39) The roof of a building is in the shape of the hyperbola $y^2 - x^2 = 53$, where x and y are in meters. Refer to the figure and determine the height h of the outside walls.



$a = b = 4$ m

Objective: (9.4) Solve Applied Problems Involving Hyperbolas

- 40) The roof of a building is in the shape of the hyperbola $y^2 - x^2 = 15$, where x and y are in meters. Determine the distance, w , the outside walls are apart, if the height of each wall is 9 m.



Objective: (9.4) Solve Applied Problems Involving Hyperbolas

Solve the system of equations by using substitution.

41)
$$\begin{cases} 3x + y = 13 \\ 2x + 9y = -8 \end{cases}$$

Objective: (10.1) Solve Systems of Equations by Substitution

42)
$$\begin{cases} x + 7y = -2 \\ 3x + y = 34 \end{cases}$$

Objective: (10.1) Solve Systems of Equations by Substitution

Solve the problem.

- 43) A flat rectangular piece of aluminum has a perimeter of 52 inches. The length is 8 inches longer than the width. Find the width.

Objective: (10.1) Solve Systems of Equations by Elimination

- 44) A retired couple has \$160,000 to invest to obtain annual income. They want some of it invested in safe Certificates of Deposit yielding 5%. The rest they want to invest in AA bonds yielding 12% per year. How much should they invest in each to realize exactly \$15,700 per year?

Objective: (10.1) Solve Systems of Equations by Elimination

- 45) A tour group split into two groups when waiting in line for food at a fast food counter. The first group bought 8 slices of pizza and 7 soft drinks for \$39.16. The second group bought 6 slices of pizza and 7 soft drinks for \$32.52. How much does one slice of pizza cost?

Objective: (10.1) Solve Systems of Equations by Elimination

Solve the system of equations.

46)
$$\begin{cases} x + y + z = 10 \\ x - y + 2z = 3 \\ 5x + y + z = 18 \end{cases}$$

Objective: (10.1) Solve Systems of Three Equations Containing Three Variables

47)
$$\begin{cases} x - y + 4z = -11 \\ 2x + z = -4 \\ x + 2y + z = -14 \end{cases}$$

Objective: (10.1) Solve Systems of Three Equations Containing Three Variables

Solve the problem.

- 48) The Family Arts Center charges \$24 for adults, \$16 for senior citizens, and \$8 for children under 12 for their live performances on Sunday afternoon. This past Sunday, the paid revenue was \$13,720 for 878 tickets sold. There were 41 more children than adults. How many children attended?

Objective: (10.1) Solve Systems of Three Equations Containing Three Variables

- 49) Find real numbers a , b , and c such that the graph of the function $y = ax^2 + bx + c$ contains the points $(1, 1)$, $(2, 4)$, and $(-3, 29)$.

Objective: (10.1) Solve Systems of Three Equations Containing Three Variables

Solve the system of equations.

$$50) \begin{cases} x - y + 5z = -5 \\ 4x + z = 0 \\ -x + y - 5z = 15 \end{cases}$$

Objective: (10.1) Identify Inconsistent Systems of Equations Containing Three Variables

$$51) \begin{cases} x + 4y - z = 3 \\ x + 5y - 2z = 5 \\ 3x + 12y - 3z = 9 \end{cases}$$

Objective: (10.1) Express the Solution of a System of Dependent Equations Containing Three Variables

Perform the row operation(s) on the given augmented matrix.

$$52) R_2 = -1r_1 + r_2$$

$$\left[\begin{array}{cc|c} 1 & 2 & 12 \\ 1 & 2 & -5 \end{array} \right]$$

Objective: (10.2) Perform Row Operations on a Matrix

$$53) R_3 = 4r_1 + r_3$$

$$\left[\begin{array}{ccc|c} -7 & -5 & -1 & -10 \\ 6 & -2 & 9 & 5 \\ 28 & -6 & 6 & 18 \end{array} \right]$$

Objective: (10.2) Perform Row Operations on a Matrix

Solve each system of equations using matrices (row operations). If the system has no solution, say that it is inconsistent.

$$54) \begin{cases} 6x + 5y = -2 \\ 2x + 9y = 14 \end{cases}$$

Objective: (10.2) Solve a System of Linear Equations Using Matrices

$$55) \begin{cases} 6x - 7y - z = 32 \\ x + 5y + 3z = 27 \\ 7x + y + z = 67 \end{cases}$$

Objective: (10.2) Solve a System of Linear Equations Using Matrices

$$56) \begin{cases} 7x - y - 5z = 39 \\ 3x + 8z = 51 \\ 5y + z = 48 \end{cases}$$

Objective: (10.2) Solve a System of Linear Equations Using Matrices

Use Cramer's rule to solve the linear system.

$$57) \begin{cases} 4x + 2y = -4 \\ 2x + y = -2 \end{cases}$$

Objective: (10.3) Use Cramer's Rule to Solve a System of Two Equations Containing Two Variables

$$58) \begin{cases} -2x + 3y = 2 \\ 4x + 5y = 40 \end{cases}$$

Objective: (10.3) Use Cramer's Rule to Solve a System of Two Equations Containing Two Variables

Find the value of the determinant.

$$59) \begin{vmatrix} -2 & 5 & 4 \\ 3 & -2 & 1 \\ 1 & 6 & -3 \end{vmatrix}$$

Objective: (10.3) Evaluate 3 by 3 Determinants

Solve for x.

$$60) \begin{vmatrix} x & -4 & -1 \\ -2 & 2 & 0 \\ -1 & -2 & 8 \end{vmatrix} = 10$$

Objective: (10.3) Evaluate 3 by 3 Determinants

Use Cramer's rule to solve the linear system.

$$61) \begin{cases} -3x + 9y - z = -7 \\ x - 3y - 6z = -4 \\ -3x + y + z = -21 \end{cases}$$

Objective: (10.3) Use Cramer's Rule to Solve a System of Three Equations Containing Three Variables

$$62) \begin{cases} 6x - 8z = 18 \\ 3x + 5y + 7z = 62 \\ -3x - 9y = -57 \end{cases}$$

Objective: (10.3) Use Cramer's Rule to Solve a System of Three Equations Containing Three Variables

Perform the indicated operation, whenever possible.

$$63) \begin{bmatrix} 1 & -3 \\ 7 & -9 \\ 4 & -6 \end{bmatrix} + \begin{bmatrix} 8 & -7 \\ -9 & 2 \\ -2 & -3 \end{bmatrix}$$

Objective: (10.4) Find the Sum and Difference of Two Matrices

Perform the indicated matrix operations.

64) Let $A = \begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 4 \\ -1 & 6 \end{bmatrix}$. Find $2A + B$.

Objective: (10.4) Find Scalar Multiples of a Matrix

65) Let $C = \begin{bmatrix} 1 \\ -3 \\ 2 \end{bmatrix}$ and $D = \begin{bmatrix} -1 \\ 3 \\ -2 \end{bmatrix}$. Find $C - 2D$.

Objective: (10.4) Find Scalar Multiples of a Matrix

Perform the matrix multiplication.

66) Let $A = \begin{bmatrix} 8 & -8 & -2 \\ 6 & -5 & 9 \end{bmatrix}$ and $B = \begin{bmatrix} 7 & 2 & 7 \\ 7 & 1 & -9 \\ -9 & -6 & 9 \end{bmatrix}$. Find

AB .

Objective: (10.4) Find the Product of Two Matrices

Perform the indicated operations and simplify.

67) Let $A = \begin{bmatrix} 3 & -4 \\ -2 & 5 \end{bmatrix}$, $B = \begin{bmatrix} 5 & -2 & 8 \\ 1 & 0 & -3 \end{bmatrix}$, and $C = \begin{bmatrix} 7 & -9 & 0 \\ 3 & -5 & 1 \\ -1 & 6 & 2 \end{bmatrix}$. Find $AB + BC$.

Objective: (10.4) Find the Product of Two Matrices

Find the inverse of the matrix.

68) $\begin{bmatrix} 4 & 2 \\ 1 & 3 \end{bmatrix}$

Objective: (10.4) Find the Inverse of a Matrix

69) $\begin{bmatrix} 1 & 1 & 1 \\ 2 & 1 & 1 \\ 2 & 2 & 3 \end{bmatrix}$

Objective: (10.4) Find the Inverse of a Matrix

70) $\begin{bmatrix} 1 & 0 & 8 \\ 1 & 2 & 3 \\ 2 & 5 & 3 \end{bmatrix}$

Objective: (10.4) Find the Inverse of a Matrix

Solve the system using the inverse method.

71) $\begin{cases} 2x + 6y = 2 \\ 2x - y = -5 \end{cases}$

Objective: (10.4) Solve a System of Linear Equations Using an Inverse Matrix

72) $\begin{cases} x + 2y + 3z = 6 \\ x + y + z = -7 \\ 2x + 2y + z = -12 \end{cases}$

Objective: (10.4) Solve a System of Linear Equations Using an Inverse Matrix

73) $\begin{cases} x + 2y + 3z = 3 \\ x + y + z = 5 \\ -x + y + 2z = -4 \end{cases}$

Objective: (10.4) Solve a System of Linear Equations Using an Inverse Matrix

Write the partial fraction decomposition of the rational expression.

74) $\frac{x - 8}{(x - 2)(x - 4)}$

Objective: (10.5) Decompose P/Q, Where Q Has Only Nonrepeated Linear Factors

75) $\frac{11x^2 - x - 18}{x(x + 1)(x - 1)}$

Objective: (10.5) Decompose P/Q, Where Q Has Only Nonrepeated Linear Factors

76) $\frac{x + 4}{x^3 - 2x^2 + x}$

Objective: (10.5) Decompose P/Q, Where Q Has Repeated Linear Factors

77) $\frac{x + 1}{(x - 2)^2(x + 4)}$

Objective: (10.5) Decompose P/Q, Where Q Has Repeated Linear Factors

78) $\frac{14x + 1}{(x - 1)(x^2 + x + 1)}$

Objective: (10.5) Decompose P/Q, Where Q Has a Nonrepeated Irreducible Quadratic Factor

79) $\frac{4x^3 + 4x^2}{(x^2 + 5)^2}$

Objective: (10.5) Decompose P/Q, Where Q Has a Repeated Irreducible Quadratic Factor

Solve the system of equations using substitution.

80)

$$\begin{cases} xy = 12 \\ x + y = -7 \end{cases}$$

Objective: (10.6) Solve a System of Nonlinear Equations Using Substitution

81)

$$\begin{cases} y = x^2 - 4x + 4 \\ x + y = 14 \end{cases}$$

Objective: (10.6) Solve a System of Nonlinear Equations Using Substitution

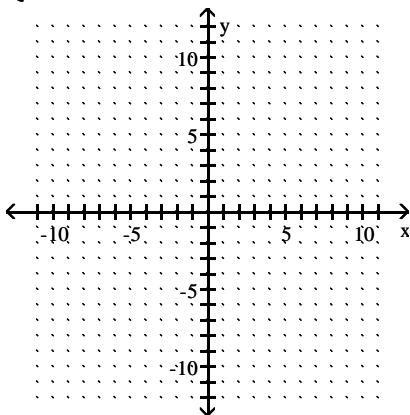
82)

$$\begin{cases} xy - x^2 = -20 \\ x - 2y = 3 \end{cases}$$

Objective: (10.6) Solve a System of Nonlinear Equations Using Substitution

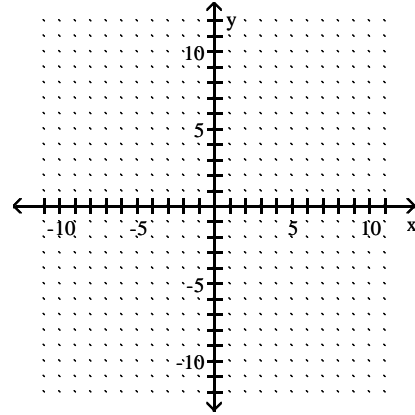
Graph the system of inequalities.

$$83) \begin{cases} 2x + 3y \geq 6 \\ x - y \geq 3 \\ y \leq 2 \end{cases}$$



Objective: (10.7) Graph a System of Inequalities

$$84) \begin{cases} y > x^2 \\ 2x + 2y \leq 4 \end{cases}$$

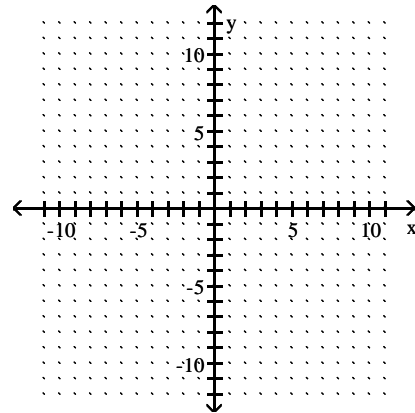


Objective: (10.7) Graph a System of Inequalities

Graph the region indicated by graphing the system of inequalities. Label all points of intersection.

85)

$$\begin{cases} y \geq x^2 - 8 \\ y \leq -x^2 \end{cases}$$



Objective: (10.7) Graph a System of Inequalities

Evaluate the factorial expression.

$$86) \frac{8!}{6! 2!}$$

Objective: (11.1) Write the First Several Terms of a Sequence

$$87) \frac{n(n+9)!}{(n+10)!}$$

Objective: (11.1) Write the First Several Terms of a Sequence

Write out the first five terms of the sequence.

$$88) \left\{ (-1)^n - 1 \left(\frac{n+2}{2n-1} \right) \right\}$$

Objective: (11.1) Write the First Several Terms of a Sequence

The given pattern continues. Write down the n th term of the sequence suggested by the pattern.

$$89) 4, 10, 16, 22, 28, \dots$$

Objective: (11.1) Write the First Several Terms of a Sequence

$$90) 2, 4, 8, 16, 32, \dots$$

Objective: (11.1) Write the First Several Terms of a Sequence

$$91) \frac{1}{1}, \frac{1}{4}, \frac{1}{9}, \frac{1}{16}, \frac{1}{25}, \dots$$

Objective: (11.1) Write the First Several Terms of a Sequence

The sequence is defined recursively. Write the first four terms.

$$92) a_1 = 4 \text{ and } a_n = 4a_{n-1} \text{ for } n \geq 2$$

Objective: (11.1) Write the Terms of a Sequence Defined by a Recursive Formula

Express the sum using summation notation with a lower limit of summation not necessarily 1 and with k for the index of summation.

$$93) 5 + 7 + 9 + 11 + \dots + 25$$

Objective: (11.1) Use Summation Notation

$$94) \frac{4}{5} + \frac{5}{6} + \frac{6}{7} + \frac{7}{8} + \dots + \frac{18}{19}$$

Objective: (11.1) Use Summation Notation

$$95) 2 + \frac{5}{2} + 3 + \frac{7}{2} + \dots + 10$$

Objective: (11.1) Use Summation Notation

Use the summation properties to evaluate the series. The

following rules may be needed: $\sum_{i=1}^n i = \frac{n(n+1)}{2};$

$$\sum_{i=1}^n i^2 = \frac{n(n+1)(2n+1)}{6}; \quad \sum_{i=1}^n i^3 = \frac{n^2(n+1)^2}{4}.$$

96)

$$\sum_{k=1}^{25} 2k$$

Objective: (11.1) Find the Sum of a Sequence

97)

$$\sum_{k=1}^{16} (2k^3 - 7)$$

Objective: (11.1) Find the Sum of a Sequence

98)

$$\sum_{k=1}^{25} (k^2 + 9)$$

Objective: (11.1) Find the Sum of a Sequence

Find the n th term and the indicated term of the arithmetic sequence whose initial term, a , and common difference, d , are given.

$$99) a = -5; d = 2$$

$$a_n = ?; a_8 = ?$$

Objective: (11.2) Find a Formula for an Arithmetic Sequence

Find the indicated term of the sequence.

$$100) \text{ The fifteenth term of the arithmetic sequence } -4, -2, 0, \dots$$

Objective: (11.2) Find a Formula for an Arithmetic Sequence

$$101) \text{ The twenty-third term of the arithmetic sequence } 28, 23, 18, \dots$$

Objective: (11.2) Find a Formula for an Arithmetic Sequence

Find the first term, the common difference, and give a recursive formula for the arithmetic sequence.

102) 6th term is 55; 14th term is -9

Objective: (11.2) Find a Formula for an Arithmetic Sequence

Find the indicated term using the given information.

103) $a = -4$, $d = \frac{3}{8}$; a_{33}

Objective: (11.2) Find a Formula for an Arithmetic Sequence

104) $a_{11} = -25$, $a_{15} = -33$; a_1

Objective: (11.2) Find a Formula for an Arithmetic Sequence

Find the sum of the arithmetic sequence.

105) $2 + 4 + 6 + \dots + 878$

Objective: (11.2) Find the Sum of an Arithmetic Sequence

106) $-3 + 1 + 5 + 9 + 13 + \dots + (4n - 7)$

Objective: (11.2) Find the Sum of an Arithmetic Sequence

107) $\{-3n + 2\}$, $n = 26$

Objective: (11.2) Find the Sum of an Arithmetic Sequence

Solve the problem.

108) A theater has 30 rows with 21 seats in the first row, 26 in the second row, 31 in the third row, and so forth. How many seats are in the theater?

Objective: (11.2) Find the Sum of an Arithmetic Sequence

109) A brick staircase has a total of 16 steps. The bottom step requires 108 bricks. Each successive step requires 5 less bricks than the prior one. How many bricks are required to build the staircase?

Objective: (11.2) Find the Sum of an Arithmetic Sequence

A geometric sequence is given. Find the common ratio and write out the first four terms.

110) $\left\{6\left(\frac{1}{2}\right)^{n-1}\right\}$

Objective: (11.3) Find a Formula for a Geometric Sequence

Use the formula for the general term (the n th term) of a geometric sequence to find the indicated term of the sequence with the given first term, a_1 , and common ratio, r .

111) Find a_9 when $a_1 = 1000$, $r = \frac{1}{3}$.

Objective: (11.3) Find a Formula for a Geometric Sequence

Find the n th term of the geometric sequence.

112) $6, 3, \frac{3}{2}, \frac{3}{4}, \dots$

Objective: (11.3) Find a Formula for a Geometric Sequence

113) $7, -21, 63, -189, 567, \dots$

Objective: (11.3) Find a Formula for a Geometric Sequence

Solve the problem.

114) For the geometric sequence $2, 1, \frac{1}{2}, \frac{1}{4}, \dots$, find

a_n .

Objective: (11.3) Find a Formula for a Geometric Sequence

115) A particular substance decays in such a way that it loses half its weight each day. How much of the substance is left after 9 days if it starts out at 128 grams?

Objective: (11.3) Find a Formula for a Geometric Sequence

Find the sum.

116) $\sum_{k=1}^5 \left(\frac{4}{3}\right)(4)^k$

Objective: (11.3) Find the Sum of a Geometric Sequence

117)

$$\sum_{k=1}^n 5 \cdot 7^{k-1}$$

Objective: (11.3) Find the Sum of a Geometric Sequence

Solve the problem.

118) A small business owner made \$60,000 the first year he owned his store and made an additional 5% over the previous year in each subsequent year. Find how much he made during his fourth year of business. Find his total earnings during the first four years. (Round to the nearest cent, if necessary.)

Objective: (11.3) Find the Sum of a Geometric Sequence

119) Initially, a pendulum swings through an arc of 3 feet. On each successive swing, the length of the arc is 0.8 of the previous length. After 10 swings, what total length will the pendulum have swung (to the nearest tenth of a foot)?

Objective: (11.3) Find the Sum of a Geometric Sequence

Determine whether the infinite geometric series converges or diverges. If it converges, find its sum.

120) $4 - 1 + \frac{1}{4} - \dots$

Objective: (11.3) Determine Whether a Geometric Series Converges or Diverges

121) $-15 - 3 - \frac{3}{5} - \dots$

Objective: (11.3) Determine Whether a Geometric Series Converges or Diverges

122)

$$\sum_{k=1}^{\infty} 4 \left(\frac{3}{2} \right)^{k-1}$$

Objective: (11.3) Determine Whether a Geometric Series Converges or Diverges

Use the Principle of Mathematical Induction to show that the statement is true for all natural numbers n.

123) $2 + 5 + 8 + \dots + (3n - 1) = \frac{n}{2}(3n + 1)$

Objective: (11.4) Prove Statements Using Mathematical Induction

124) $1 + 3 + 3^2 + \dots + 3^{n-1} = \frac{3^n - 1}{2}$

Objective: (11.4) Prove Statements Using Mathematical Induction

125) $1 \cdot 2 + 2 \cdot 3 + 3 \cdot 4 + \dots + n(n + 1) = \frac{n(n + 1)(n + 2)}{3}$

Objective: (11.4) Prove Statements Using Mathematical Induction

Evaluate the expression.

126) $\binom{8}{4}$

Objective: (11.5) Evaluate a Binomial Coefficient

Find the indicated coefficient or term.

127) The coefficient of x in the expansion of $(2x + 7)^3$

Objective: (11.5) Use the Binomial Theorem

128) The coefficient of x^8 in the expansion of $(x^2 - 3)^7$

Objective: (11.5) Use the Binomial Theorem

129) The 5th term in the expansion of $(2x + 4)^5$

Objective: (11.5) Use the Binomial Theorem

Expand the expression using the Binomial Theorem.

130) $(x + 1)^6$

Objective: (11.5) Use the Binomial Theorem

131) $(4x^2 + 3)^3$

Objective: (11.5) Use the Binomial Theorem