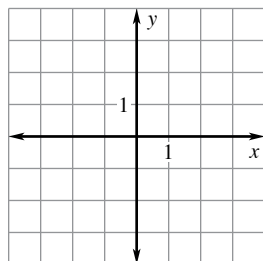


End-of-Course Test

1. Graph $y = 2(x + 1)^2 - 3$. Identify the vertex.



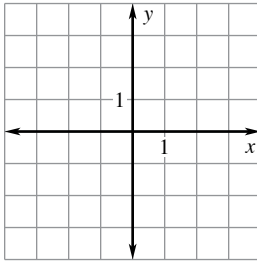
2. Solve the equation $x^2 - 5x + 4 = 0$.
3. Write the product $(4 - 7i)(-2 + 3i)$ as a complex number in standard form.
4. Solve $2x^2 + 6x + 3 = 0$ by completing the square.
5. Use the quadratic formula to solve the equation $4x^2 - 4x - 11 = 0$.
6. Simplify $\left(\frac{64m^{-3}}{27n^{-6}}\right)^{2/3}$.
7. Find the product $(x - 2)(3x + 2)(x + 2)$.
8. Factor completely $54y^3 - 128$.
9. Divide $2x^4 + 2x^3 - 13x^2 - x + 6$ by $x + 2$ using synthetic division.
10. Find all the real zeros of $f(x) = 2x^4 + 5x^3 - 11x^2 - 20x + 12$.
11. Write the expression $\sqrt[3]{\frac{81xz^4}{8x^2y}}$ in simplest form. Assume all variables are positive.
12. Find an equation for the inverse of the relation $y = 7x - 4$.
13. Let $f(x) = 3x^2$ and $g(x) = x^{3/2}$. Find $\frac{f(x)}{g(x)}$, and state the domain of $\frac{f(x)}{g(x)}$.
14. Given $f(x) = 2x - 3$ and $g(x) = x^2 - 2$, find $g(f(5))$.
15. Solve the equation $\sqrt[4]{x^2 - 8} = 2$.

Answers

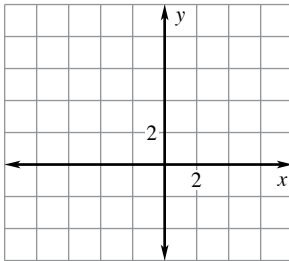
1. See left.
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____

End-of-Course Test *continued*

16. Graph $y = -2\left(\frac{1}{2}\right)^{x+1} + 3$. State the domain and range.



17. Expand $\log_3 \frac{2x^3}{5\sqrt{y}}$.
18. Evaluate $\log_2 64$.
19. Use the change-of-base formula to evaluate $\log_2 17$.
20. Solve the equation $4^{2x-1} = 360$.
21. Graph $y = \frac{5}{x+1} + 2$. State the domain and range.



22. Simplify the product $\frac{9x+27}{2x^2+8x+8} \cdot \frac{4x^2-16}{6x+18}$.
23. Simplify the complex fraction $\frac{2 + \frac{5}{x} + \frac{3}{x^2}}{\frac{2}{x^2} + \frac{5}{x} + 3}$.
24. Solve $\frac{3}{x^2-9} = \frac{6}{x+3}$.
25. Determine whether the function $g(x) = 2x^3 - 3x$ is *even*, *odd*, or *neither*.
26. Find the number of possible 5-card hands that contain 3 aces and 2 eights when using a standard 52-card deck.

Answers

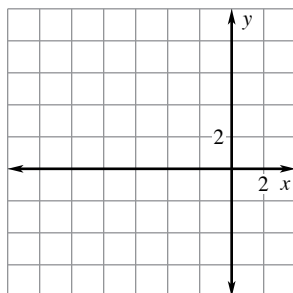
16. See left.

17. _____
18. _____
19. _____
20. _____
21. See left.

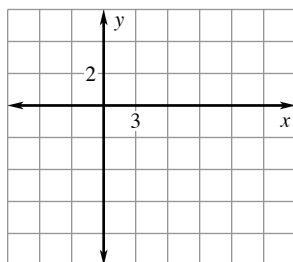
22. _____
23. _____
24. _____
25. _____
26. _____

End-of-Course Test *continued*

- 27.** Out of the 80 students in the freshman class at a small school, 27 students are either in the band or in the choir. There are 22 freshmen who are in the band and 17 freshmen who are in the choir. What is the probability that a randomly selected freshman is both in the band *and* in the choir?
- 28.** A normal distribution has a mean of 28 and a standard deviation of 1.5. What is the z -score for a data value of 25.75?
- 29.** The results of a survey were reported on a television news program. The reporter stated that the margin of error for the survey was $\pm 3.5\%$. To the nearest whole number, how many people were surveyed?
- 30.** Find the sum of the series $\sum_{n=40}^{43} (8 - n)$.
- 31.** Find the sum of the series $\sum_{k=1}^6 2^k$.
- 32.** Find the 9th term of the geometric sequence 10, -20 , 40, -80 , ...
- 33.** Use the formula for the sum of an infinite geometric series to write the repeating decimal 0.729729729... as a fraction in lowest terms.
- 34.** Write a recursive rule for the sequence 3, 5.5, 8, 10.5, 13, ...
- 35.** Find the distance between and the midpoint of the line segment joining the two points $(-3, 5)$ and $(4, 1)$.
- 36.** Write an equation of the line tangent to the circle $x^2 + y^2 = 34$ at the point $(-5, -3)$.
- 37.** Graph the circle $(x + 5)^2 + (y - 1)^2 = 49$.



- 38.** Graph the hyperbola $\frac{(x - 4)^2}{36} - \frac{(y + 2)^2}{9} = 1$.

**Answers**

- 27.** _____
- 28.** _____
- 29.** _____
- 30.** _____
- 31.** _____
- 32.** _____
- 33.** _____
- 34.** _____
- 35.** _____
- 36.** _____
- 37.** See left.
- 38.** See left.

End-of-Course Test *continued*

- 39.** Write the equation of the circle with center $(3, -4)$ and radius 5.
- 40.** Write the equation of the parabola with vertex $(-2, 3)$ and focus $(-2, 1)$.
- 41.** Write the conic section $16x^2 - 9y^2 - 72y - 288 = 0$ in standard form by completing the square.
- 42.** Solve the quadratic system.
- $$\frac{x^2}{16} + \frac{y^2}{4} = 1$$
- $$\frac{x^2}{4} - \frac{y^2}{3} = 1$$
- 43.** Convert $\frac{7\pi}{6}$ to degrees.
- 44.** Find the values of the other 5 trigonometric functions of x if $\tan x = -\frac{5}{12}$ and $\cos x < 0$.
- 45.** Solve $\triangle ABC$ with $B = 49^\circ$, $C = 90^\circ$, and $c = 13.3$.
- 46.** Find c in $\triangle ABC$ where $A = 64^\circ$, $C = 55^\circ$, and $b = 18$.
- 47.** Evaluate the function $\cos(-150^\circ)$ without using calculator.
- 48.** Write an equation of the graph of $y = \sin 3\pi x$ translated down 2 units and right 3 units, and then reflected in the x -axis.
- 49.** Simplify the expression $\cot \theta \cos\left(\frac{\pi}{2} - \theta\right)$.
- 50.** Solve $4 \sin^2 \theta - 3 = 0$ in the interval $0^\circ \leq \theta < 360^\circ$.
- 51.** Find the exact value of $\cos 195^\circ$.
- 52.** Solve the equation $2 \sin \frac{x}{2} - 1 = 0$ for $0 < x < 2\pi$.

Answers

- 39.** _____
- 40.** _____
- 41.** _____
- 42.** _____
- 43.** _____
- 44.** _____
- _____
- _____
- _____
- 45.** _____
- _____
- _____
- 46.** _____
- 47.** _____
- 48.** _____
- 49.** _____
- 50.** _____
- 51.** _____
- 52.** _____

Answers

End of Course Test

1. ; $(-1, -3)$

2. 1, 4 3. $13 + 26i$ 4. $\frac{-3 \pm \sqrt{3}}{2}$

5. $\frac{1 \pm 2\sqrt{3}}{2}$ 6. $\frac{16n^4}{9m^2}$ 7. $3x^2 + 2x^2 - 12x - 8$

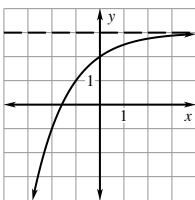
8. $2(3y - 4)(9y^2 + 12y + 16)$

9. $2x^3 - 2x^2 - 9x + 17 - \frac{28}{x+2}$

10. $-3, -2, \frac{1}{2}, 2$ 11. $\frac{3z\sqrt{2x^2y^2z}}{2xy}$ 12. $\frac{x+4}{7}$

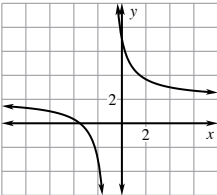
13. $3x^{1/2}$; all positive real numbers 14. 47

15. $\pm 2\sqrt{6}$

16. ; domain: all real numbers;
range: $y \leq 3$

17. $\log_3 2 + 3 \log_3 x - \log_3 5 - \frac{1}{2} \log_3 y$ 18. 6

19. 4.09 20. 2.62

21. ; domain: all real numbers
except -1 ; range: all real
numbers except 2

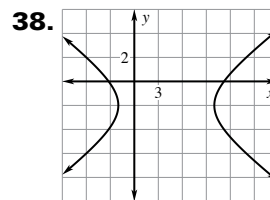
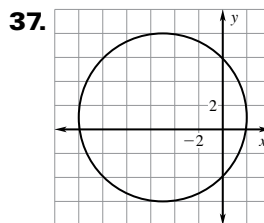
22. $\frac{3(x-2)}{(x+2)}$ 23. $\frac{2x+3}{3x+2}$ 24. $\frac{7}{2}$ 25. add

26. 24 hands 27. $\frac{12}{80} = \frac{3}{20} = 0.15$ 28. -1.5

29. 816 people 30. -134 31. 126 32. 2560

33. $\frac{27}{37}$ 34. $a_1 = 3, a_n = a_{n-1} + 2.5$

35. $\sqrt{65}, \left(\frac{1}{2}, 3\right)$ 36. $y = -\frac{5}{3}x - \frac{34}{3}$



39. $(x-3)^2 + (y+4)^2 = 25$

40. $(x+2)^2 = -8(y-3)$

41. $\frac{x^2}{9} - \frac{(y+4)^2}{16} = 1$ 42. $\left(\pm\sqrt{7}, \pm\frac{3}{2}\right)$

43. 210°

44. $\sin x = \frac{5}{13}, \cos x = -\frac{12}{13}, \csc x = \frac{13}{5},$

$\sec x = -\frac{13}{12}, \cot x = -\frac{12}{5}$

45. $A = 41^\circ, a = 8.7, b = 10.0$ 46. 16.86

47. $-\frac{\sqrt{3}}{2}$ 48. $y = -\sin(3\pi x - 3) + 2$

49. $\cos \theta$ 50. $60^\circ, 120^\circ, 240^\circ, 300^\circ$

51. $\frac{-\sqrt{2} - \sqrt{6}}{4}$ 52. $\frac{2\pi}{3}, \frac{4\pi}{3}$