

Write an equation of the line with the given characteristics. (2.4)

1. slope: -2 , y -intercept: 7

2. points: $(5, 0)$, $(-3, 2)$

3. vertical line through $(4, 2)$

Solve the system. (3.1, 3.2, 3.6, 4.3, 4.5, 10.7)

4. $x - 2y = 6$
 $3x + y = 4$

5. $x + y + z = 10$
 $-x + 2y - z = 2$
 $3x - y + 4z = 10$

6. $x^2 + y^2 = 16$
 $x^2 + y^2 - 6x - 8y + 16 = 0$

Solve the matrix equation. (4.4)

7. $\begin{bmatrix} 4 & 3 \\ -1 & -1 \end{bmatrix} X = \begin{bmatrix} 2 & -5 \\ 3 & -1 \end{bmatrix}$

8. $\begin{bmatrix} 5 & 3 \\ 7 & 4 \end{bmatrix} X = \begin{bmatrix} -1 & 6 \\ 2 & 0 \end{bmatrix}$

9. $\begin{bmatrix} 8 & -1 \\ -2 & 0 \end{bmatrix} X = \begin{bmatrix} 6 & 0 \\ 3 & -2 \end{bmatrix}$

Perform the indicated operations. (6.3, 6.5, 9.4, 9.5)

10. $(-2x^2 - x + 4) - (3x + 10)$

11. $(x - 4)(2x^2 + 3x - 1)$

12. $(x^3 - 5x + 6) \div (x - 2)$

13. $\frac{x+6}{8x+10} \div \frac{x^2-36}{2x}$

14. $\frac{6x}{x^2+3x-10} + \frac{x-4}{x-2}$

15. $\frac{4x}{x-7} - \frac{1}{x+7}$

Evaluate the expression without using a calculator. (7.1, 8.4)

16. $8^{2/3}$

17. $125^{-1/3}$

18. $-9^{3/2}$

19. $\sqrt[5]{-1}$

20. $\sqrt[4]{10,000}$

21. $\log_2 \frac{1}{16}$

22. $\log_3 81$

23. $\ln e^7$

24. $\log 0.01$

25. $\log_5 1$

Find the distance between the two points. Then find the midpoint of the line segment connecting the two points. (10.1)

26. $(0, 0)$, $(3, -8)$

27. $(-5, 0)$, $(0, 2)$

28. $(-1, -4)$, $(2, 3)$

29. $(7, 4)$, $(0, -3)$

Write the next term of the sequence. Then write a rule for the n th term. (11.1–11.3)

30. $1, 4, 9, 16, \dots$

31. $8, 4, 2, 1, \dots$

32. $2, 6, 18, 54, \dots$

33. $-6, -1, 4, 9, \dots$

Find the sum of the series. (11.1–11.4)

34. $\sum_{i=1}^{10} 16$

35. $\sum_{i=1}^5 (3i - 1)$

36. $\sum_{i=0}^4 1000\left(\frac{1}{2}\right)^i$

37. $\sum_{n=1}^{\infty} 2\left(-\frac{1}{3}\right)^{n-1}$

Find the number of permutations or combinations. (12.1, 12.2)

38. ${}_6P_5$

39. ${}_{10}P_2$

40. ${}_3P_3$

41. ${}_8C_1$

42. ${}_4C_2$

43. ${}_7C_4$

Find the arc length and area of a sector with the given radius r and central angle θ . (13.2)

44. $r = 11$ cm, $\theta = 80^\circ$

45. $r = 6$ in., $\theta = 270^\circ$

46. $r = 3$ ft, $\theta = 120^\circ$

Evaluate the function without using a calculator. (13.3)

47. $\tan 390^\circ$

48. $\sin(-45^\circ)$

49. $\csc 90^\circ$

50. $\cot\left(-\frac{3\pi}{4}\right)$

51. $\cos \frac{5\pi}{3}$

Evaluate the expression without using a calculator. Give your answer in both radians and degrees. (13.4)

52. $\cos^{-1} 0$ 53. $\sin^{-1} \frac{1}{2}$ 54. $\tan^{-1} 1$ 55. $\cos^{-1} \left(-\frac{\sqrt{2}}{2} \right)$ 56. $\tan^{-1} (-\sqrt{3})$

Solve $\triangle ABC$. (13.5, 13.6)

57. $A = 65^\circ, a = 7, b = 4$ 58. $B = 110^\circ, a = 3, c = 8$ 59. $a = 10, b = 9, c = 4$

Find the area of $\triangle ABC$. (13.5, 13.6)

60. $A = 63^\circ, c = 13, b = 20$ 61. $C = 98^\circ, a = 34, b = 20$ 62. $a = 7, b = 4, c = 6$

Graph the parametric equations. Then write an xy -equation and state the domain. (13.7)

63. $x = \frac{1}{4}t + 1, y = t - 3$ for $0 \leq t \leq 4$ 64. $x = -2t, y = t + 3$ for $1 \leq t \leq 5$

Graph the function. (14.1, 14.2)

65. $y = 5 \cos 2x$ 66. $y = 4 \sin \frac{1}{3}\pi x$ 67. $y = 5 + \sin 4x$ 68. $y = -3 + \tan \frac{1}{2}x$

Simplify the expression. (14.3)

69. $\tan(-x) + \tan x \sec^2 x$ 70. $\frac{\sin\left(\frac{\pi}{2} - x\right)}{\sin x}$ 71. $\tan x \sec x - \csc x \sec^2 x$


Find the general solution of the equation. (14.4)

72. $3 \sin x = \sqrt{3} + 5 \sin x$ 73. $2 \cos^2 \frac{x}{2} - 1 = 0$ 74. $\cos x \sin^2 x - \cos x = 0$

Find the exact value of the expression. (14.6, 14.7)


75. $\sin 255^\circ$ 76. $\sin 157.5^\circ$ 77. $\tan 105^\circ$ 78. $\tan \frac{\pi}{12}$ 79. $\cos \frac{13\pi}{12}$


80. **FRactal Geometry** Tell whether $c = 1 + i$ is in the Mandelbrot set. Use absolute value to justify your answer. (5.4)

81.  **GIRLS BASKETBALL** The heights (in inches) of the girls chosen for the first team on PARADE's 23rd annual All-America High School Girls Basketball Team are listed below. Find the mean, median, mode(s), range, and standard deviation of the heights. Draw a box-and-whisker plot for the heights.


► Source: Parade Magazine (7.7)

76, 74, 76, 71, 72, 78, 66, 68, 74, 69

82.  **EQUAL GENDERS** What is the probability that a family with four children has exactly two girls and two boys in any order? Assume that having a girl and having a boy are equally likely events. (12.6)

83.  **RIALTO TOWER** Suppose you are looking at the Rialto Tower in Melbourne, Australia, which reaches a height of 794 feet. Your angle of elevation to the top of the building is 39.8° . How far are you from the base of the building?

► Source: Council on Tall Buildings and Urban Habitat (13.1)

84.  **BICYCLING** As you pedal up a hill, the pedals on your mountain bike make one revolution every two seconds. The maximum height of the pedal is 19 inches above the ground and the minimum height is 5 inches above the ground. Write a trigonometric model for the height H of the pedal as a function of time t . (14.1, 14.2)