

Solve the equation. (1.3, 1.7, 5.2–5.6, 6.4, 7.6, 8.6, 9.6)

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| 1. $-4x + 5 = 33$ | 2. $\frac{1}{4}(x - 7) = 2$ | 3. $ x - 3 = 11$ | 4. $ 8 - 3x = 1$ |
| 5. $x^2 + 7x + 10 = 0$ | 6. $5x^2 - 13 = 32$ | 7. $-x^2 = 16$ | 8. $x^2 + 6x - 5 = 0$ |
| 9. $4x^2 - x + 1 = 0$ | 10. $x^3 - 27 = 0$ | 11. $x^3 + x^2 - 4x = 4$ | 12. $\sqrt{x + 5} = 7$ |
| 13. $8(x - 3)^{3/2} = 1$ | 14. $4^{x+1} = 64$ | 15. $\log 4x = 2$ | 16. $\frac{1}{x-4} = \frac{6}{x+6}$ |

Graph in a three-dimensional coordinate system. (3.5)

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| 17. $(0, 4, 1)$ | 18. $(3, -2, -1)$ | 19. $4x + 4y - z = 8$ | 20. $2x + 6y + 4z = 12$ |
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Evaluate the determinant of the matrix. (4.3)

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| 21. $\begin{bmatrix} 4 & -2 \\ -1 & 5 \end{bmatrix}$ | 22. $\begin{bmatrix} -3 & 10 \\ -6 & 3 \end{bmatrix}$ | 23. $\begin{bmatrix} 3 & -2 & 4 \\ -1 & 5 & 0 \\ 0 & 2 & 1 \end{bmatrix}$ | 24. $\begin{bmatrix} -5 & -1 & 4 \\ 1 & 0 & 6 \\ 1 & 3 & 0 \end{bmatrix}$ |
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The variables x and y vary inversely. Use the given values to write an equation relating x and y . Then find y when $x = 2$. (9.1)

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| 25. $x = -2, y = 20$ | 26. $x = \frac{1}{3}, y = 9$ | 27. $x = 20, y = -\frac{4}{5}$ | 28. $x = 1, y = 4$ |
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The variable z varies jointly with x and y . Use the given values to write an equation relating x , y , and z . Then find z when $x = -1$ and $y = 5$. (9.1)

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| 29. $x = 2, y = 3, z = -4$ | 30. $x = -2, y = 6, z = 24$ | 31. $x = \frac{1}{2}, y = \frac{1}{4}, z = \frac{3}{8}$ |
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Find the distance between the two points. Then find the midpoint of the line segment connecting the two points. (10.1)

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| 32. $(0, 0), (-9, 2)$ | 33. $(0, 8), (5, 0)$ | 34. $(-5, 14), (3, -8)$ | 35. $(-2, -3), (5, 1)$ |
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Graph the conic section. (10.2–10.6)

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| 36. $\frac{y^2}{121} - \frac{x^2}{49} = 1$ | 37. $x^2 + y^2 = 16$ | 38. $\frac{x^2}{81} + \frac{y^2}{36} = 1$ | 39. $(y + 4)^2 = x - 1$ |
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Write an equation of the conic section. (10.2–10.6)

40. Parabola with vertex at $(0, 0)$ and directrix $y = -2$
41. Circle with center at $(2, -2)$ and radius 3
42. Ellipse with center at $(0, 0)$, vertex at $(8, 0)$, and co-vertex at $(0, 5)$
43. Hyperbola with vertices at $(0, 2)$ and $(0, -2)$ and foci at $(0, 3)$ and $(0, -3)$

Find the point(s) of intersection, if any, of the graphs in the system. (10.7)

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| 44. $16x^2 + y^2 - 24y + 80 = 0$
$16x^2 + 25y^2 - 400 = 0$ | 45. $x^2 + y^2 + 36x - 10y + 324 = 0$
$x^2 + y^2 + 36x - 20y + 324 = 0$ |
| 46. $x^2 + y^2 - 4x + 2y = 20$
$y^2 - 5x + 34 = 0$ | 47. $x^2 - y - 2 = 0$
$x^2 + 4y^2 - 3y - 4 = 0$ |

Tell whether the sequence is *arithmetic*, *geometric*, or *neither*. Explain your answer. (11.2, 11.3)

48. $-7, -1, 5, 11, \dots$

49. $7, 21, 63, 189, \dots$

50. $2, 3, 6, 11, \dots$

51. $1, 0.1, 0.01, 0.001, \dots$

Write the first five terms of the sequence. (11.1, 11.5)

52. $a_n = 5n - 2$

53. $a_n = 10 - n^2$

54. $a_1 = 5$
 $a_n = a_{n-1} + 6$

55. $a_1 = 1$
 $a_n = a_{n-1} + n^2$

Write an explicit rule and a recursive rule for the sequence. (Recall that d is the common difference of an arithmetic sequence and r is the common ratio of a geometric sequence.) (11.2, 11.3, 11.5)

56. $r = 2, a_1 = 5$

57. $d = -6, a_1 = 1$

58. $3, 5, 7, 9, \dots$

59. $243, 81, 27, 9, \dots$

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

60. $\sum_{i=1}^{40} i$

61. $\sum_{i=1}^5 (7 + i)$

62. $\sum_{i=1}^6 \left(\frac{3}{4}\right)^{i-1}$

63. $\sum_{i=1}^{\infty} 8\left(\frac{1}{2}\right)^{i-1}$

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

64. ${}_8P_5$

65. ${}_6P_6$

66. ${}_{20}P_2$

67. ${}_8C_4$

68. ${}_5C_5$

69. ${}_7C_2$

Use the binomial theorem to write the binomial expansion. (12.2)

70. $(x + 4)^5$

71. $(2x + 5)^3$

72. $(x + y)^6$

73. $(3x - 1)^4$

74. $(x + 2)^4$

75. $(x^2 - 4)^3$

Find the indicated probability. (12.4, 12.5)

76. $P(A) = 0.3$

$P(B) = 0.5$

$P(A \text{ or } B) = 0.75$

$P(A \text{ and } B) = ?$

77. A and B are dependent events.

$P(B|A) = 0.5$

$P(A) = 0.4$

$P(A \text{ and } B) = ?$

78. A and B are independent events.

$P(A) = 90\%$

$P(B) = 10\%$

$P(A \text{ and } B) = ?$

Calculate the probability of tossing a coin 5 times and getting exactly the given number of tails. (12.6)

79. 0


80. 1


81. 2


82. 3


83. 4


84. 5

85.  **OVERNIGHT DELIVERY** The table at the right gives a company's overnight delivery charges for packages up to 10 pounds. Write and graph a piecewise function for this situation. (2.7)

86.  **EARNING INTEREST** You deposit \$1000 in an account that pays 4% annual interest compounded monthly. What is the balance after 5 years? (8.1)

87.  **FISH POPULATION** A lake initially contains 7000 fish. Each year the population declines 20% and the lake is restocked with 1000 new fish. Write a recursive rule for the number of fish in the lake after n years. What happens to the population of fish in the lake over time? (11.5)

88.  **PASSWORD** You need to select a four-character password for a computer account. Any digit 0–9 and any letter A–Z can be used for a character, and digits and letters can be repeated. How many possible passwords are there? (12.1)

89.  **CLASS CLUB** A high school club has 10 members. The faculty advisor selects members at random to fill leadership positions for president, vice president, treasurer, and secretary. Find the probability that Mark, one of the club members, is selected for a leadership position. (12.3)

Package weight (lb)	Delivery charge (\$)
0.5	11.75
1	14.00
2	15.75
3	18.50
4	21.25
5	24.00
6	26.25
7	28.00
8	30.25
9	31.00
10	32.75