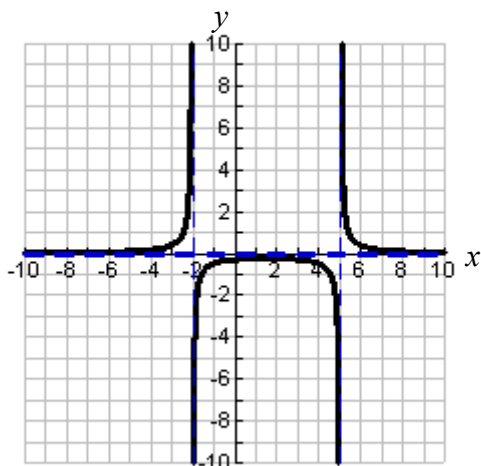


There may be instances where your decimal approximation is slightly different from the given answer, depending on how you may have rounded during the solving of the problem.

1.



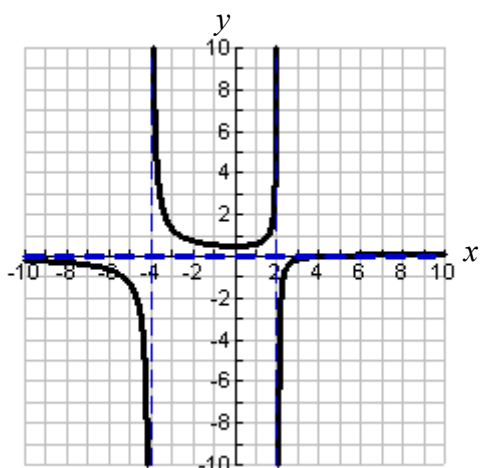
Vertical Asymptotes: $x = -2, x = 5$

Horizontal Asymptote: $y = 0$

x-intercept: none

y-intercept: $\left(0, -\frac{3}{10}\right)$

2.



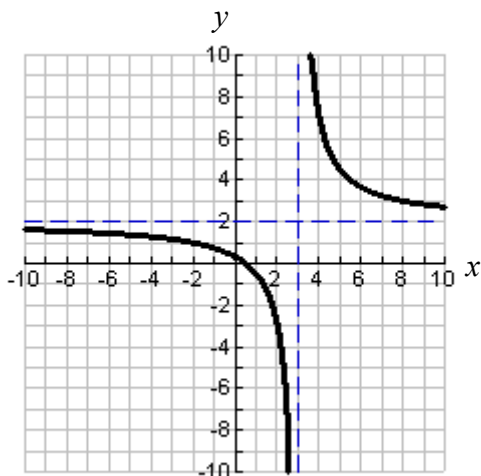
Vertical Asymptotes: $x = -4, x = 2$

Horizontal Asymptote: $y = 0$

x-intercept: $(4, 0)$

y-intercept: $\left(0, \frac{1}{2}\right)$

3.



Vertical Asymptote: $x = 3$

Horizontal Asymptote: $y = 2$

x-intercept: $\left(\frac{1}{2}, 0\right)$

y-intercept: $\left(0, \frac{1}{3}\right)$

4. **D**

5. $x = -5, x = 2$

6. $y = 3, y = 13$

7. $x = -2$ ($x = 4$ is extraneous)

8. **D**

9. **B**

10. **B**

11. **C**

12. **C**

13. a. $5x$ b. xy^2

14. 4.543

15. -3.173

16. $g(x) = -3^{x+5}$

17. $g(x) = 9^{-\frac{x}{7}}$

18. $x = \frac{1}{2} \ln 19$

19. $x = \frac{1}{2} \left(\frac{\ln 800}{\ln 5} - 1 \right)$

20. $x = 5.675$

21. $x = 2.548$

22. $x = 3.389$

23. $x = \frac{50}{3} \approx 16.666\dots$

24. $x = 5$ ($x = -1$ is extraneous)

25. $x = 3$

26. $x = 5$

27. a. $N(t) = 600 \cdot 3^{\frac{t}{4}}$

b. $N(7) = 4103$

c. $t = 10.907$ weeks

28. $r = .115 = 11.5\%$ per year

29. approximately 3 years

30. a. 1300

b. .04 or 4% per year

c. 1939

d. 16.348 years

31. a. 78%

b. 16.575 years

32. $V(t) = 100000(1.08)^t$

33. $y = 2x - 7$

34. $y = 2x - 3$

35. a.

$x = 132 \cos(20^\circ)t$ or $124.039t$

$y = -16t^2 + 132 \sin(20^\circ)t$ or $-16t^2 + 45.147t$

b. $x = 248.079$ feet, $y = 26.293$ feet

36. a.

$x = 82 \cos(63^\circ)t$ or $x = 37.227t$

$y = -16t^2 + 82 \sin(63^\circ)t + 2$ or $-16t^2 + 73.063t + 2$

b. $x = 55.841$ feet $y = 75.594$ feet

c. Yes. When the ball is 150 feet from the punter ($t = 4.029$), the ball is at a height of 36.6 ft. Since the kick returner is 6 ft tall, the ball goes over his head.d. The ball hits the ground at $t = 4.594$ sec about 171 feet from the punter.

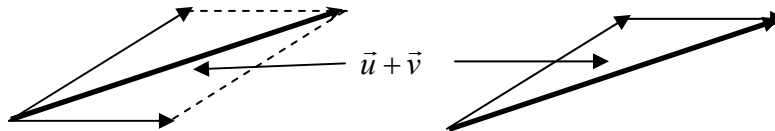
37. $\langle x, y \rangle = \langle 1, 4 \rangle + t \langle 2, 5 \rangle$ or $\langle x - 1, y - 4 \rangle = t \langle 2, 5 \rangle$
 $x = 1 + 2t$
 $y = 4 + 5t$

38. **B**

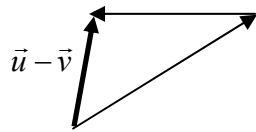
39. Magnitude is 10, direction is 126.87°

40. 6

41.



42.



43. $-4\vec{i} - 8\vec{j}$

44. $36\vec{i} + 16\vec{j}$

45. -3

46. 96.116°

47. $r = 6$

48. $r = 7.5$

49. a. 444.456 mph
 b. 5.478° North of West

50. $\sum_{n=1}^{\infty} 8 \cdot 2^{n-1}$ or $\sum_{n=0}^{\infty} 8 \cdot 2^n$

$$51. \quad \sum_{n=1}^7 11 + 4(n-1) = \sum_{n=1}^7 7 + 4n \quad \text{or} \quad \sum_{n=0}^6 (11 + 4n)$$

$$52. \quad 13.5$$

$$53. \quad \text{No sum or } \infty$$

$$54. \quad 24$$

$$55. \quad 34$$

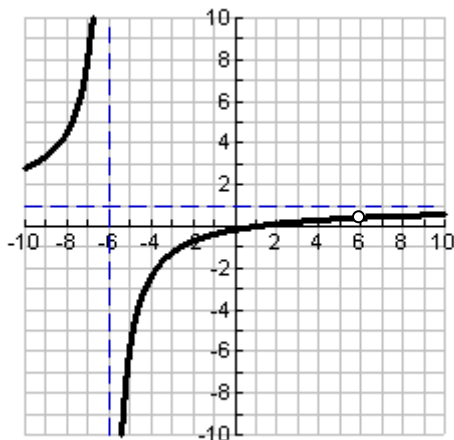
$$56. \quad 104$$

$$57. \quad x^4 - 8x^3 + 24x^2 - 32x + 16$$

$$58. \quad 40$$

Answers to HONORS problems

59.



Vertical Asymptote: $x = -6$

Horizontal Asymptote: $y = 1$

Domain: $x \neq -6, x \neq 6$

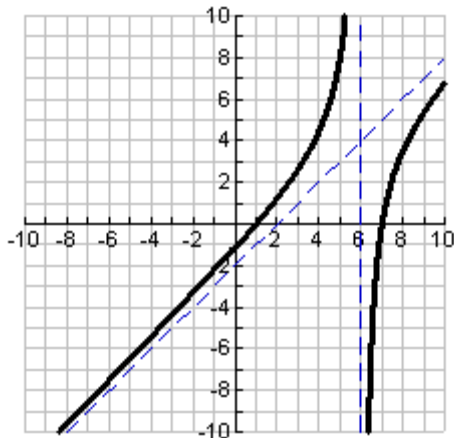
Range: $y \neq 1, y \neq \frac{5}{12}$

Removable Discontinuity: $\left(6, \frac{5}{12}\right)$

x-intercept: $(1, 0)$

y-intercept: $\left(0, -\frac{1}{6}\right)$

60.



Vertical Asymptote: $x = 6$
 Horizontal Asymptote: none
 Domain: $x \neq 6$
 Range: all real numbers
 Removable Discontinuity: none
 x-intercept: $(1, 0), (7, 0)$
 y-intercept: $\left(0, -\frac{7}{6}\right)$

61. $\frac{5}{x-2} + \frac{8}{x-3}$

62. $\frac{3}{x+1} - \frac{3}{x-2}$

63. $-\frac{1}{12}$

64. $(0, 2)$

65. $(-5, -2) \cup [3, \infty)$

66. a. $(-2, \infty)$

b. All real numbers

c. reflect about the x -axis, translate two units left and 5 units down

67. a. 1500

b. 1.5 weeks

c. 30000

68. 6.982 minutes

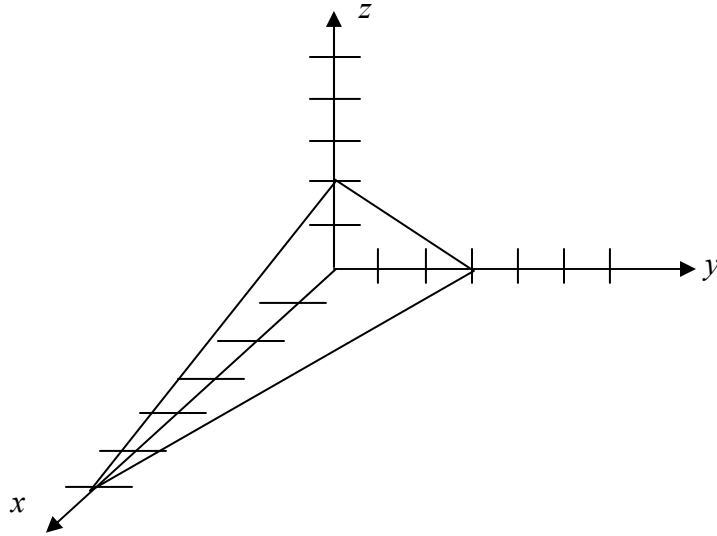
69. $\frac{x^2}{25} + \frac{y^2}{64} = 1$

70. a. $\langle 1, 7, -9 \rangle$

b. $\sqrt{131}$

71. a. 68.213°
- b. $-11\vec{i} - 19\vec{j} - 5\vec{k}$
- c. The cross product is a vector perpendicular to the given two vectors. Its magnitude is equal to the area of the parallelogram defined by the two vectors.
- d. $\langle x, y, z \rangle = \langle 2, 4, -3 \rangle + t \langle -4, 1, 5 \rangle$

72.



73. $r = \frac{9}{\cos \theta + \sin \theta}$

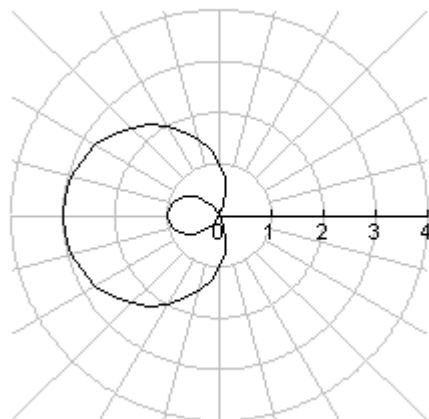
74. $r = 7 \sec \theta$

75. $y = 6$

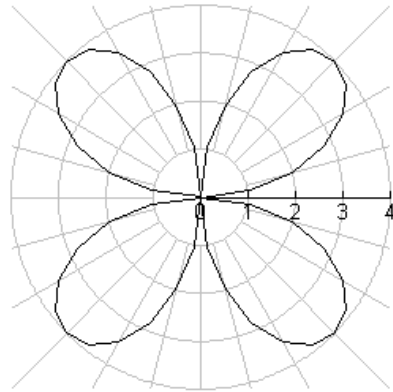
76. $2x + 5y = 3$

77. $(4, 0, 0), (0, 10, 0), (0, 0, -5)$

78.



79.



80. $\left(\frac{2}{3}, 70.529^\circ\right), \left(\frac{2}{3}, 289.471^\circ\right), (-2, 180^\circ)$

81. $(0, 0^\circ), (0, 180^\circ), \left(\frac{\sqrt{3}}{2}, 60^\circ\right), \left(-\frac{\sqrt{3}}{2}, 300^\circ\right)$

82. $(4, 4\sqrt{3})$

83. $(-2\sqrt{2}, -2\sqrt{2})$

84. $\left(8, \frac{5\pi}{3}\right)$

85. $\left(\sqrt{2}, \frac{5\pi}{4}\right)$

86. **B**

87. $12\left(\cos\frac{7\pi}{6} + i\sin\frac{7\pi}{6}\right)$

88. $\sqrt{41}(\cos 141.34^\circ + i\sin 141.34^\circ)$

89. $3 - 3i\sqrt{3}$

90. 2

91. $2\left(\cos\frac{\pi}{4} + i\sin\frac{\pi}{4}\right)$

92. $81(\cos 220^\circ + i\sin 220^\circ)$

93.

$2(\cos 15^\circ + i\sin 15^\circ), 2(\cos 105^\circ + i\sin 105^\circ), 2(\cos 195^\circ + i\sin 195^\circ), 2(\cos 285^\circ + i\sin 285^\circ)$

94. $\frac{1}{1-x}$

95. 20

96. $\frac{1}{9} - \frac{1}{27} + \frac{2}{81} - \frac{6}{243} + \frac{24}{729} - \frac{120}{2187}$