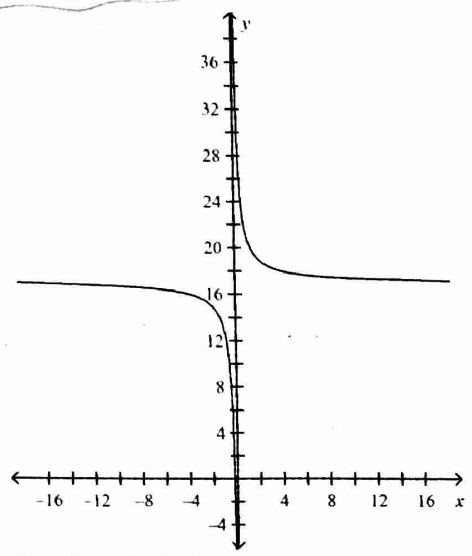
Math 3 Final Exam Review Semester 2
Answer Section

1. e^{12}
2. $8e$
3. $\frac{36}{e^{10x}}$
4. $\log_4 1 = 0$
5. $\log_{20} 0.0025 = -2$
6. $\log_{49} 343 = \frac{3}{2}$
7. $\log_5 \frac{1}{25} = -2$
8. 14
9. $2x$
10. $g(x) = 4^{-x+4}$
11. $g(x) = 5\log_{1/9}(x-8)$
12. $g(x) = -2(x-1)^2; (1,0)$
13. $f(x) = 6(3x)^2 - 7; (0,-7)$
14. $f(x) = -(3x-6)^2 - 9; (2,-9)$
15. $9\log_2 x - \log_2 5 - \log_2 y$
16. $\frac{1}{4}\log_6 7 + \frac{1}{4}\log_6 x$
17. $\log_2 8$
18. $\log \frac{x^5}{16}$
19. 2.738
20. B
21. $x = -1$
22. $x \approx 2.087$
23. $x = 4$
24. $x = 631$
25. $x = 4$
26. $t = -9$ and $t = 0$
27. $t = -6$ and $t = 0$
28. $a = -3$, $a = 3$, and $a = 4$
29. $v = -8$, $v = 0$, and $v = 8$
30. $w = 2$, $w = -2$, $w = 3$, and $w = -3$
31. C, D, E
32. $y = -\frac{10}{x}; y = \frac{10}{7}$

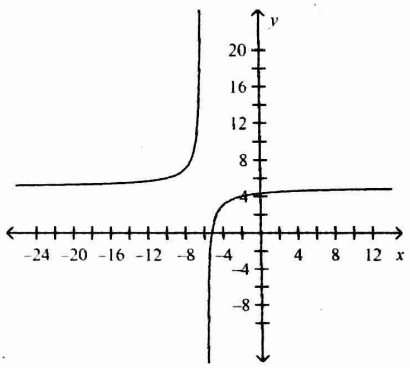
33. $y = \frac{18}{x}; y = \frac{9}{4}$

34.



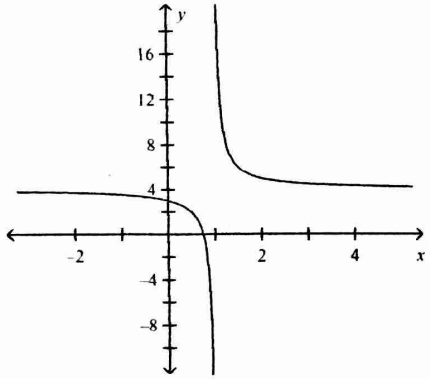
The domain is all real numbers except 0, and the range is all real numbers except 17.

35.

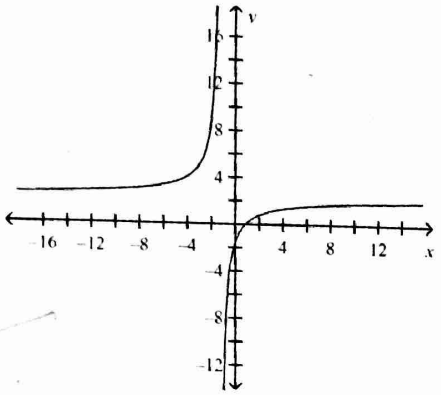


The domain is all real numbers except –6, and the range is all real numbers except 5.

36.



The domain is all real numbers except 1, and the range is all real numbers except 4.

37. 

The domain is all real numbers except –1.25, and the range is all real numbers except 2.25.

38. $\frac{x-2}{x-4}, x \neq -4$

39. $\frac{x-2}{x-3}$

40. $\frac{7x-9}{12x}$

41. $-10x^{9}y^{15}, x \neq 0, y \neq 0$

42. $\frac{9x^{10}}{y^{4}}, x \neq 0$

43. $x+3, x \neq 0, x \neq 1, x \neq 8$

44. $\frac{(x+10)(x-6)}{7x}, x \neq -5$

45. $\frac{x+8}{x-6}$

46. $5x^{4}+26x^{3}+2x^{2}-39x-8$

47. $36d^{2}+60d+25$

48. $729c^{3}-243c^{2}+27c-1$

49. $\frac{1}{x-4}, x \neq 0, x \neq 7, x \neq 9$

50. $-\frac{5}{4}, x \neq 0, x \neq 3, x \neq 4$

51. $\frac{9x^{5}}{10y^{2}z^{7}}, x \neq 0$

52. $\frac{-14}{17x^{2}+16}$

53. $\frac{-2x^{2}+3x+15}{4x^{2}(x+5)}$

54. $\frac{x+6}{2(x+5)}, x \neq 4$

55. $\frac{3x^2 + 2x + 4}{12x^2(x + 2)}$

56. $\frac{17x - 28}{3(x + 4)(x + 9)}$

57. $\frac{4(x + 10)}{(x + 3)(x + 7)}$

58. $x = -1$

59. $x = 4, x = 20$

60. $x = 9, x = -7$

61. $x = 7, x = -6$

62. $x = \frac{3}{2}$

63. $x = \frac{3}{2}$

64. $x = 3, x = -3$

65. There is no solution.

66. There is no solution.

67. $x = -\frac{9}{5}$

68. $x = \frac{3 \pm \sqrt{41}}{4}$

69. $x = \frac{-11 \pm \sqrt{13}}{3}$

70. $\cos\theta = \frac{33}{34}$

$\sin\theta = \frac{\sqrt{67}}{34}$ $\csc\theta = \frac{34\sqrt{67}}{67}$

$\tan\theta = \frac{\sqrt{67}}{33}$ $\cot\theta = \frac{33\sqrt{67}}{67}$

71. $\cot\theta = \frac{2}{5}$

$\sin\theta = \frac{5\sqrt{29}}{29}$ $\csc\theta = \frac{\sqrt{29}}{5}$

$\cos\theta = \frac{2\sqrt{29}}{29}$ $\sec\theta = \frac{\sqrt{29}}{2}$

72. $E = 71°, d \approx 4.13, f \approx 12.69$

73. $E = 55°, e \approx 38.56, f \approx 47.07$

74. $E = 51°, d \approx 13.85\ e \approx 17.10$

75. A, D, E

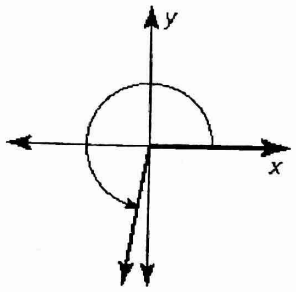
76. 488.73

77. $\sin\theta = \frac{3}{5}$, $\cos\theta = \frac{4}{5}$, $\tan\theta = \frac{3}{4}$
$\csc\theta = \frac{5}{3}$, $\sec\theta = \frac{5}{4}$, $\cot\theta = \frac{4}{3}$

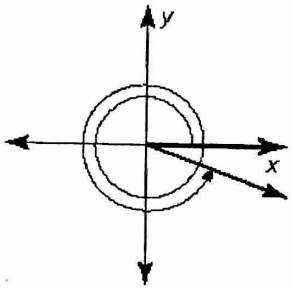
78. $\sin\theta = \frac{7}{25}$, $\cos\theta = \frac{24}{25}$, $\tan\theta = \frac{7}{24}$
$\csc\theta = \frac{25}{7}$, $\sec\theta = \frac{25}{24}$, $\cot\theta = \frac{24}{7}$

79. 80.2 ft

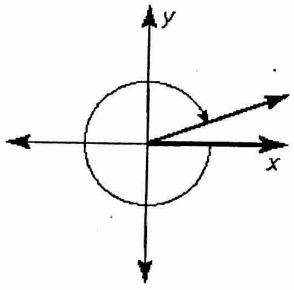
80.



81.



82.



83. D
84. C
85. C
86. $\frac{7\pi}{36}$ rad
87. –6°
88. 300

89. $\sin\theta = \frac{12}{13}$, $\csc\theta = \frac{13}{12}$
$\cos\theta = \frac{5}{13}$, $\sec\theta = \frac{13}{5}$
$\tan\theta = \frac{12}{5}$, $\cot\theta = \frac{5}{12}$

90. $\sin\theta = \frac{12}{13}$, $\csc\theta = \frac{13}{12}$
$\cos\theta = -\frac{5}{13}$, $\sec\theta = -\frac{13}{5}$
$\tan\theta = -\frac{12}{5}$, $\cot\theta = -\frac{5}{12}$

91. $\sin\theta = -1$, $\csc\theta = -1$
$\cos\theta = 0$, $\sec\theta =$ undefined
$\tan\theta =$ undefined, $\cot\theta = 0$

92. $\sin\theta = 0$, $\csc\theta =$ undefined
$\cos\theta = -1$, $\sec\theta = -1$
$\tan\theta = 0$, $\cot\theta =$ undefined

93. $\sin\theta = 1$, $\csc\theta = 1$
$\cos\theta = 0$, $\sec\theta =$ undefined
$\tan\theta =$ undefined, $\cot\theta = 0$

94. $31°$

95. $\sec\theta = -\frac{5}{4}$

$\sin\theta = \frac{3}{5}$, $\csc\theta = \frac{5}{3}$

$\tan\theta = -\frac{3}{4}$, $\cot\theta = -\frac{4}{3}$

96. $\csc\theta = -\frac{5}{3}$

$\cos\theta = -\frac{4}{5}$, $\sec\theta = -\frac{5}{4}$

$\tan\theta = \frac{3}{4}$, $\cot\theta = \frac{4}{3}$

97. C, D

98. $\frac{\sin^2\theta}{1-\sin^2\theta} = \frac{\sin^2\theta}{\cos^2\theta}$

$= \left(\frac{\sin\theta}{\cos\theta}\right)^2$

$= \tan^2\theta$

99. yes;

$$\frac{2-\cos^2\theta}{\sin\theta} = \frac{1+1-\cos^2\theta}{\sin\theta}$$

$$= \frac{1+\sin^2\theta}{\sin\theta}$$

$$= \frac{1}{\sin\theta} + \frac{\sin^2\theta}{\sin\theta}$$

$$= \csc\theta + \sin\theta$$

100. $m\angle B \approx 59.7°, m\angle C \approx 82.3°, a \approx 19.3$
101. $m\angle A \approx 17.1°, m\angle B \approx 45.9°, c \approx 48.4$
102. $m\angle A \approx 30.9°, m\angle B \approx 55.8°, m\angle C \approx 93.3°$
103. about 234.6 units^2
104. C, D
105. $l \approx 9.8, m \approx 11.1, M = 98°$
106. $a \approx 5.8, c \approx 7.9, B = 69°$
107. $K \approx 41.6°, k \approx 12.2, L \approx 60.4°$
108. about 28.8 mi
109. 27.8 cm^2
110. a. about 966 mi^2
b. about 31.2 mi
111. $(0, 0, -3)$
112. $(4, 2, 0)$
113. The maximum value is 2. The domain is all real numbers and the range is $y \le 2$. The function is increasing to the left of $x = 0$ and decreasing to the right of $x = 0$.
114. The maximum value is 2. The domain is all real numbers and the range is $y \le 2$. The function is increasing to the left of $x = 2$ and decreasing to the right of $x = 2$.
115. $h(-6) = -13.228$
116. $h(x) \to -\infty$ as $x \to -\infty$ and $h(x) \to -\infty$ as $x \to \infty$
117. A
118. A
119. $x^6 + x^5 + 5x^3 + 3x^2 - 4x + 10$
120. $-4x^3 - 2x^2 + 13x + 3$
121. $2x - 3 - \frac{6}{x-3}$
122. $2x - 2 + \frac{9}{x+2}$
123. $2x^2 + 10x + 50 + \frac{248}{x-5}$
124. $x^3 - 2x^2 + 2x + 4 + \frac{2}{x-2}$ → $x^2 - 4x + 8 - \frac{8x-10}{x^2-2}$ ↓ for modified question 124 ↙
125. $(s-1)(s^2+s+1)$
126. $(n^2+7)(n+10)$

#156 $g(x) = 5\sqrt{x} - 1$

Hint: multiply entire equation by 5 first.

#157 $g(x) = -5\sqrt[3]{x-3} - 4$