

## Math 150 Exam 2 Review Answer Key

1. (a)  $(\frac{\sqrt{3}}{2}, -\frac{1}{2})$   
 (b)  $(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2})$
2. Negative
3. (a)  $-\frac{2\sqrt{3}}{3}$   
 (b)  $-\sqrt{3}$
4.  $\sin t = -\frac{1}{5}, \csc t = -5$   
 $\cos t = -\frac{2\sqrt{6}}{5}, \sec t = -\frac{5\sqrt{6}}{12}$   
 $\tan t = \frac{\sqrt{6}}{12}, \cot t = 2\sqrt{6}$
5.  $\sin t = -\sqrt{\frac{1}{1 + \cot^2 t}}$
6. Amplitude: 3, Period:  $\pi$ , Phase Shift:  $\frac{\pi}{3}$   
 Start with  $\sin x$ , horizontally shrink by a factor of  $\frac{1}{2}$ , shift right  $\frac{\pi}{3}$ , vertically stretch by a factor of 3, reflect across the  $x$ -axis. See Full Solutions for graph.
7. (a) Period:  $4\pi$   
 Start with  $\tan x$ , horizontally stretch by a factor of 4, shift left  $\pi$ . See Full Solutions for graph.  
 (b) Period:  $2\pi$   
 Start with  $\sec x$ , shift right  $\pi$ , vertically stretch by a factor of 2, shift up 1. See Full Solutions for graph.
8. (a)  $h = \frac{\ln 2}{0.05}$   
 (b)  $t = \frac{\ln 5}{0.05}$
9. (a)  $x = 4$  only; ( $x = \pm\sqrt{2}$  are extraneous)  
 (b)  $x = \frac{1}{3} \left( \frac{\log 5}{\log 2} + 4 \right)$
10.  $-\frac{6}{5}$
11. (a) Domain:  $(-\infty, \infty)$ ; Range:  $(-\infty, -2)$ ; Horizontal Asymptote:  $y = -2$   
 As  $x \rightarrow -\infty, y \rightarrow -2$ ; As  $x \rightarrow \infty, y \rightarrow -\infty$   
 (b) Domain:  $(2, \infty)$ ; Range:  $(-\infty, \infty)$ ; Vertical Asymptote:  $x = 2$   
 As  $x \rightarrow 2^+, y \rightarrow \infty$ ; As  $x \rightarrow \infty, y \rightarrow -\infty$
12.  $(-6, 4)$
13.  $x$ -intercepts:  $-2, 1, 3$   
 $y$ -intercept:  $-12$   
 End behavior: As  $x \rightarrow -\infty, y \rightarrow \infty$ ; As  $x \rightarrow \infty, y \rightarrow \infty$   
 Graph is above  $x$ -axis on  $(-\infty, 2) \cup (3, \infty)$   
 Graph is below  $x$ -axis on  $(-2, 1) \cup (1, 3)$   
 See Full Solutions for graph.

14.  $x$ -intercepts:  $-3, 3$   
 $y$ -intercept:  $\frac{27}{4}$   
Vertical Asymptotes:  $x = -4, 1$   
Horizontal Asymptote:  $y = 3$   
Graph is above  $x$ -axis on  $(-\infty, -4) \cup (-3, 1) \cup (3, \infty)$   
Graph is below  $x$ -axis on  $(-4, -3) \cup (1, 3)$   
See Full Solutions for graph.
15. (a) Zeros:  $x = -5, \pm 2\sqrt{3}$ ;  $P(x) = (x + 5)(x - 2\sqrt{3})(x + 2\sqrt{3})$   
(b) Zeros:  $x = -3, 1, \frac{3}{2} \pm \frac{\sqrt{3}}{2}i$ ;  $P(x) = (x + 3)(x - 1)(x - (\frac{3}{2} + \frac{\sqrt{3}}{2}i))(x - (\frac{3}{2} - \frac{\sqrt{3}}{2}i))$
16.  $-\frac{48}{29} - \frac{4}{29}i$
17. 4, 2, or 0 positive real zeros; 1 negative real zero
18.  $Q(x) = \frac{1}{2}x^2 - 3x + 5$ ;  $R(x) = -38x + 26$