

Math 150 Exam 2 Review Answer Key

1. (a) $(\frac{\sqrt{3}}{2}, -\frac{1}{2})$
(b) $(-\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}})$
2. Negative
3. (a) $-\sqrt{3}$
(b) $\frac{1}{\sqrt{2}}$
(c) $-\frac{2}{\sqrt{3}}$
4. (a) $y = \frac{1}{7}$
(b) $\sin t = \frac{1}{7}, \cos t = -\frac{4\sqrt{3}}{7}, \tan t = -\frac{1}{4\sqrt{3}}, \csc t = 7, \sec t = -\frac{7}{4\sqrt{3}}, \cot t = -4\sqrt{3}$
5. $\sin t = -\frac{1}{5}, \csc t = -5$
 $\cos t = -\frac{2\sqrt{6}}{5}, \sec t = -\frac{5}{2\sqrt{6}}$
 $\tan t = \frac{1}{2\sqrt{6}}, \cot t = 2\sqrt{6}$
6. $\sin t = -\sqrt{\frac{1}{1 + \cot^2 t}}$
7. Amplitude: 3, Period: π , 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.
8. (a) Period: 4π
Start with $\tan x$, horizontally stretch by a factor of 4, shift left 12π .
(b) Period: $\frac{2\pi}{5}$
Start with $\sec x$, horizontally shrink by a factor of $\frac{1}{5}$, shift right $\frac{\pi}{5}$, vertically stretch by a factor of 2, shift up 1.
9. $n_0 = \frac{2000}{e^{\frac{10 \ln 4}{7}}} \approx 276$
10. (a) $h = \frac{\ln 2}{0.05}$
(b) $t = \frac{\ln \frac{7}{25}}{-0.05} \approx 25.459$ years
11. $-\frac{6}{5}$
12. (a) $x = \frac{\ln 6 + 4 \ln 2}{3 \ln 2 - 1}$
(b) $x = 4$ only; ($x = \pm\sqrt{2}$ are extraneous)
13. (a) Domain: $(-\infty, \infty)$; Range: $(-\infty, -2)$; Horizontal Asymptote: $y = -2$
(b) Domain: $(2, \infty)$; Range: $(-\infty, \infty)$; Vertical Asymptote: $x = 2$
14. (a) $(-6, 4)$
(b) $\{x | x \neq n\pi, \text{ for any integer } n\}$

(c) $\{x \mid x \neq -3, 3, \frac{\pi}{2} + n\pi, \text{ for any integer } n\}$

(d) $(-\infty, \frac{5}{3})$

15. x -intercepts: $(-1, 0), (2, 0), (4, 0)$

y -intercept: $(0, 2)$

End behavior: As $x \rightarrow \infty, y \rightarrow -\infty$; As $x \rightarrow -\infty, y \rightarrow \infty$; See Full Solutions for graph.

16. x -intercepts: $(-7, 0), (-3, 0), (3, 0)$

y -intercept: $(0, \frac{189}{16})$

Hole at $x = 5$

Vertical Asymptotes: $x = -4, x = 1$

Horizontal Asymptote: $y = 3$; See Full Solutions for graph.

17. Zeros: $x = -5, 2 \pm \sqrt{3}$; $P(x) = (x + 5)(x - (2 + \sqrt{3}))(x - (2 - \sqrt{3}))$

18. $-\frac{4}{29} + \frac{48}{29}i$

19. $Q(x) = \frac{1}{2}x^2 - 3x + 5$; $R(x) = -38x + 26$