

Precalculus Final Exam Review: Part 1 (Solutions)

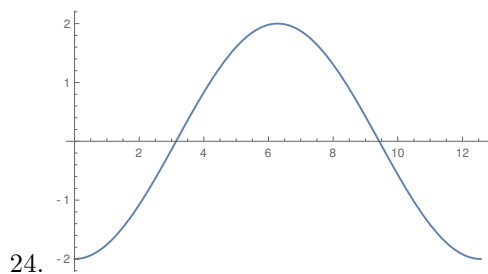
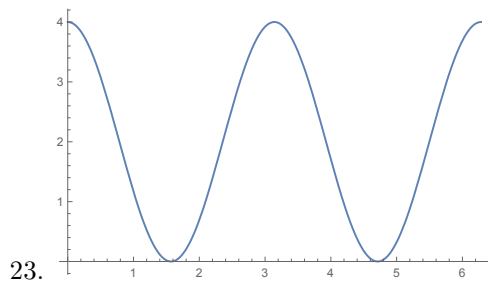
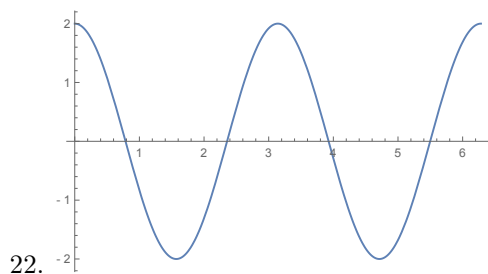
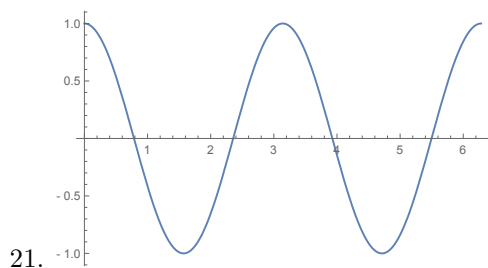
1. $x \in \{-1\} \cup [4, \infty)$
2. $f^{-1}(x) = \frac{x-2}{x+1}$
3. $f^{-1}(x) = 2\sqrt[3]{x} + 1$
4. $x = 3$
5. $x \in (-3, 3)$
6. $\ln 7 + \ln x + \frac{1}{2} \ln(3-4x) - \ln 2 - 3 \ln(x-1)$
7. $x = \frac{21}{e} + 2$
8. $x = \frac{3 \ln\left(\frac{1}{2}\right) + \ln\left(\frac{1}{5}\right)}{\ln\left(\frac{1}{5}\right) + \ln\left(\frac{1}{2}\right)}$
9. $s = 980$ m
10. (a) 50.3 m^2 ; (b) 80° ; (c) 17 m
11. (a) 1.5π rad/sec; (b) about 15 mi/hr
12. (a) $\sqrt{3}$ (e) $\sqrt{3}$
(b) $-\sqrt{3}$ (f) $-\sqrt{3}$
(c) $\sqrt{3}$ (g) $-\sqrt{3}$
(d) $-\sqrt{3}$ (h) $-\sqrt{3}$
13. $\sin t = \frac{\sqrt{3}}{2}$, $\cos t = \frac{1}{2}$, $\tan t = \sqrt{3}$, $\csc t = \frac{2\sqrt{3}}{3}$, $\sec t = 2$, $\cot t = \frac{\sqrt{3}}{3}$
14. $\sin \theta = \frac{\sqrt{5}}{3}$, $\tan \theta = \frac{\sqrt{5}}{2}$, $\csc \theta = \frac{3\sqrt{5}}{5}$, $\sec \theta = \frac{3}{2}$, $\cot \theta = \frac{2\sqrt{5}}{5}$
15. $x = 5$, $y = -12$, $r = 13$; Q IV; $\sin \theta = -\frac{12}{13}$; $\cos \theta = \frac{5}{13}$; $\tan \theta = -\frac{12}{5}$; $\csc \theta = -\frac{13}{12}$;
 $\sec \theta = \frac{13}{5}$; $\cot \theta = -\frac{5}{12}$
16. 82.5 ft

17. one triangle

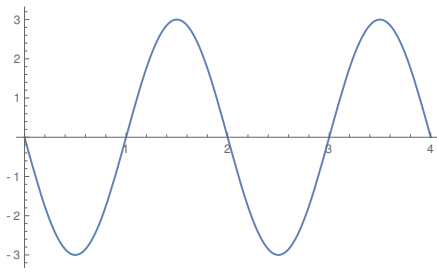
18. $v = 601.1$ km

19. (graph in textbook)

20. (graph in textbook)

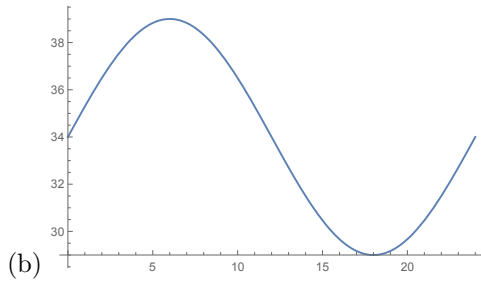


25. Amplitude: π , Period: 1, VS: 1 up, HS: $\frac{1}{2}$ right, PI: $\left[\frac{1}{2}, \frac{3}{2}\right)$



26.

27. (a) $f(t) = 5 \sin\left(\frac{\pi}{12}t\right) + 34$;



(b)

28. (identity)

29. (identity)

30. (a) $\frac{3416}{4505}$; (b) $-\frac{1767}{4505}$; (c) $\frac{3416}{2937}$

31. $\frac{\sqrt{2}}{2}$

32. $\frac{1}{8} - \frac{1}{8} \cos(4x)$

33. $\sin \theta = \frac{\sqrt{2-\sqrt{3}}}{2}$, $\cos \theta = -\frac{\sqrt{2+\sqrt{3}}}{2}$, $\tan \theta = -\sqrt{\frac{2-\sqrt{3}}{2+\sqrt{3}}} = -2 + \sqrt{3}$

34. $-\frac{\pi}{6}$

35. $\frac{3\pi}{4}$

36. $\frac{24}{25}$

37. $x = \frac{2\pi}{3}, \frac{5\pi}{3}$

38. P.R.: $x = \frac{\pi}{2}, \frac{\pi}{6}$; $[0, 2\pi)$: $x = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{\pi}{6}, \frac{5\pi}{6}$; all: $x = \frac{\pi}{2} + \pi k, \frac{\pi}{6} + 2\pi k, \frac{5\pi}{6} + 2\pi k$

$$39. \text{ P.R.: } x = -\frac{\pi}{8}; [0, 2\pi): x = \frac{3\pi}{8}, \frac{7\pi}{8}, \frac{11\pi}{8}, \frac{15\pi}{8}; \text{ all: } x = \frac{3\pi}{8} + \frac{\pi}{2}k$$

$$40. \text{ P.R.: } x = \frac{\pi}{4}, \frac{\pi}{2}; [0, 2\pi): x = \frac{\pi}{4}, \frac{5\pi}{4}, \frac{\pi}{2}, \frac{3\pi}{2}; \text{ all: } x = \frac{\pi}{2} + \pi k, \frac{\pi}{4} + \pi k$$

$$41. \left(\frac{5}{2}, \frac{7}{4}\right)$$

$$42. \left\{(x, y, z) \mid x - \frac{5}{2}y - 2z = 3\right\}$$

$$43. \left(-1, -\frac{3}{2}, 2\right)$$

$$44. \begin{cases} A + B + C = 180 \\ A + C = 3B \\ C = 2B + 10 \end{cases}$$

$$45. 1$$

$$46. \left(\frac{7}{13}, \frac{31}{13}, \frac{-9}{13}\right)$$

$$47. -1, 4, 19, 364$$

$$48. d = 3, a_1 = 1$$

$$49. 1275$$

$$50. r = \frac{2}{3}, a_1 = 729$$

$$51. \frac{3}{2}$$

$$52. 1540$$

$$53. v^{24} - 6v^{22}w + \frac{33}{2}v^{20}w^2$$