

## Precalculus Final Exam Review: Part 2 (Solutions)

1.  $x \in (-\infty, -5) \cup (-3, 1) \cup (7, \infty)$
2.  $f^{-1}(x) = \frac{x}{1-x}$
3.  $x = 1$
4.  $x \in (-\infty, -3) \cup (2, \infty)$
5.  $\ln(x-2)$
6.  $x = \frac{e^2 - 63}{9}$
7.  $x = \frac{\ln 4}{2 \ln 4 - \ln 7}$
8.  $r = 9.4 \text{ km}$
9.  $\theta = 5.6 \text{ rad}$
10. (a)  $70\pi \text{ rad/min}$ ; (b) about 30 mi/hr
11. (a)  $\frac{\sqrt{3}}{2}$  (e)  $\frac{\sqrt{3}}{2}$   
(b)  $-\frac{\sqrt{3}}{2}$  (f)  $\frac{\sqrt{3}}{2}$   
(c)  $-\frac{\sqrt{3}}{2}$  (g)  $-\frac{\sqrt{3}}{2}$   
(d)  $\frac{\sqrt{3}}{2}$  (h)  $\frac{\sqrt{3}}{2}$
12.  $\sin t = -\frac{\sqrt{7}}{3}$ ,  $\cos t = \frac{\sqrt{2}}{3}$ ,  $\tan t = -\frac{\sqrt{14}}{2}$ ,  $\csc t = -\frac{3\sqrt{7}}{7}$ ,  $\sec t = \frac{3\sqrt{2}}{2}$ ,  $\cot t = -\frac{\sqrt{14}}{7}$
13. Angles — Sides  
 $A = 90^\circ$ ;  $a = 9.9\sqrt{2} \text{ mm}$   
 $B = 45^\circ$ ;  $b = 9.9 \text{ mm}$   
 $C = 45^\circ$ ;  $c = 9.9 \text{ mm}$
14.  $\sin \theta = -\frac{1}{2}$ ;  $\cos \theta = -\frac{\sqrt{3}}{2}$ ;  $\tan \theta = \frac{\sqrt{3}}{3}$

15. Angles — Sides

$$A = 37^\circ; a = 16.6 \text{ cm}$$

$$B = 47^\circ; b = 20.2 \text{ cm}$$

$$C = 96^\circ; c = 27.5 \text{ cm}$$

16. Angles — Sides

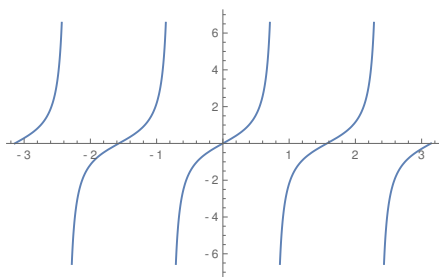
$$A = 120.4^\circ; a = 75 \text{ cm}$$

$$B = 21.6^\circ; b = 32 \text{ cm}$$

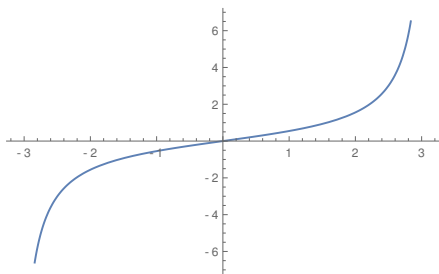
$$C = 38^\circ; c = 53.5 \text{ cm}$$

17. (graph in textbook)

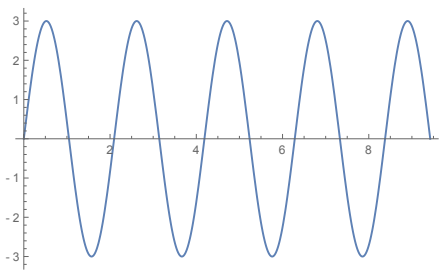
18. (graph in textbook)



19.

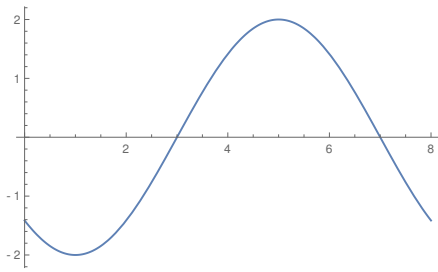


20.



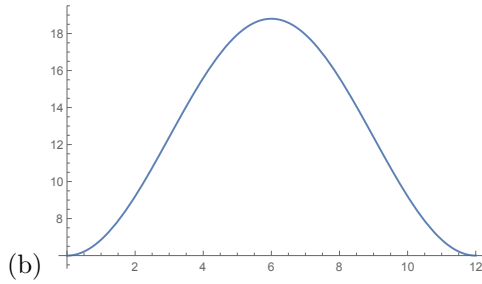
21.

22. Amplitude: 4, Period: 16, VS: 2 down, HS: 2 left, PI:  $[-2, 14)$



23.

24. (a)  $f(t) = -6.4 \cos\left(\frac{\pi}{6}t\right) + 12.4$ ;



(b)

25. (identity)

26. (identity)

27.  $\frac{\sqrt{6} - \sqrt{2}}{4}$

28.  $\sin \theta = \frac{4}{5}, \cos \theta = \frac{3}{5}, \tan \theta = \frac{4}{3}$

29.  $\frac{1}{16} - \frac{1}{16} \cos(2x) - \frac{1}{16} \cos(4x) + \frac{1}{16} \cos(2x)\cos(4x)$  or  
 $\frac{1}{16} - \frac{1}{32} \cos(2x) - \frac{1}{16} \cos(4x) + \frac{1}{32} \cos(6x)$

30.  $\sin\left(\frac{\theta}{2}\right) = \frac{3}{\sqrt{13}}, \cos\left(\frac{\theta}{2}\right) = \frac{2}{\sqrt{13}}, \tan\left(\frac{\theta}{2}\right) = \frac{3}{2}$

31.  $-\frac{\pi}{4}$

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

33.  $\sqrt{\frac{12}{12+x^2}}$

34.  $x = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$

$$35. \text{ P.R.: } x = 0, \frac{\pi}{12}; [0, 2\pi): x = 0, \pi, \frac{\pi}{12}, \frac{7\pi}{12}, \frac{13\pi}{12}, \frac{19\pi}{12}; \text{ all: } x = 0 + \pi k, \frac{\pi}{12} + \frac{\pi}{2}k$$

$$36. \text{ P.R.: } x = \frac{2\pi}{9}; [0, 2\pi): x = \frac{2\pi}{9}, \frac{10\pi}{9}, \frac{14\pi}{9}; \text{ all: } x = \frac{2\pi}{9} + \frac{4\pi}{3}k, \frac{10\pi}{9} + \frac{4\pi}{3}k$$

$$37. \text{ P.R.: } x = \frac{\pi}{2}, \frac{3\pi}{2}; [0, 2\pi): x = \frac{\pi}{2}, \frac{3\pi}{2}; \text{ all: } x = \frac{\pi}{2} + 6\pi k, \frac{3\pi}{2} + 6\pi k, \frac{5\pi}{2} + 6\pi k$$

38. The height of the Eiffel Tower is 984 ft and the height of the CN Tower is 1815 ft.

$$39. (-5, -4, 1)$$

$$40. (p - 4, -2p + 8, p)$$

$$41. 1$$

$$42. (-5, 9)$$

$$43. 12, 5, 1, \frac{1}{8}$$

$$44. 9 \text{ terms}$$

$$45. 11:00 \text{ PM}$$

$$46. -10920$$

$$47. \$2214.84; 6 \text{ years}$$

$$48. 16x^4 - 96x^3 + 216x^2 - 216x + 81$$