Math 125 Solutions to Review Packet

Part I

1. (a) $x \approx 5.32$ (b) $x \approx 148.07$ (c) $\theta \approx 52°$

2. The height of the building is about 1160 feet

3. The angle formed by two cables is about $31°$.

Part II

1. (a) F (b) F (c) T (d) T (e) F (f) F (g) F (h) F (i) F (j) T (k) T (l) F (m) T (n) F (o) T (p) F (q) T (r) T (s) F (t) F

2. (a) $y = x$ (b) $-\frac{11\pi}{6}$ (c) 660° (d) $\frac{8}{\pi}$ meters (e) $5, \quad \frac{2\pi}{3}, \quad -\frac{\pi}{3}$

(f) $\sin\theta = \frac{\text{opp}}{\text{hyp}}, \ \cos\theta = \frac{\text{adj}}{\text{hyp}}, \ \tan\theta = \frac{\text{opp}}{\text{adj}}, \ \csc\theta = \frac{\text{hyp}}{\text{opp}}, \ \sec\theta = \frac{\text{hyp}}{\text{adj}}, \ \cot\theta = \frac{\text{adj}}{\text{opp}}$

(g) $\frac{\sqrt{3}}{2}$ (h) $-\frac{1}{2}$ (i) 1 (j) $-1 \le x \le 1, \quad 0 \le y \le \pi$ (k) $-\frac{\pi}{4}$ (l) $\frac{3\pi}{4}$ (m) $\frac{5\pi}{6}$ (n) $-\frac{\pi}{6}$

(o) $\frac{4}{5}$ (p) $\frac{1}{\tan x}$ (q) $\frac{\cos x}{\sin x}$ (r) $1 + \tan^2 x$ (s) $\sin x \cos y + \cos x \sin y$ (t) $\cos x \cos y + \sin x \sin y$

(u) $\cos^2 x - \sin^2 x = 2\cos^2 x - 1 = 1 - 2\sin^2 x$ (v) $\pm\sqrt{\frac{1-\cos x}{2}}$ (w) $\frac{\pi}{3} + k\pi, \quad k \text{ is an integer}$

(x) $y = -2$ (y) $3^x = 8$ (z) $\ln x$ (aa) x (bb) x (cc) 0 (dd) 1 (ee) 5 (ff) 7

(gg) $2\log x + \log y - \frac{1}{2}\log(x+1)$ (hh) $\ln\frac{x^2 - y^2}{x^3}$

3. (a) $\frac{2x-1}{(x-1)^2}$ (b) $\frac{x(x+3)}{(x+4)(x+1)}$

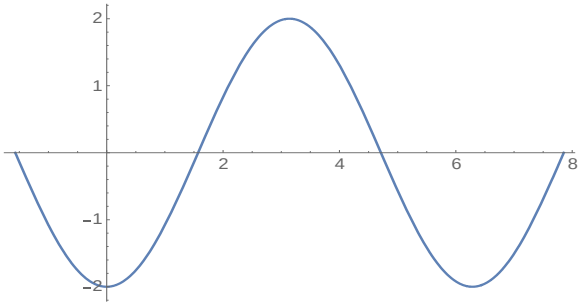
4. (a) $x = \pm 2, \frac{3}{2}$ (b) $x = -6, 3$ (c) $x = k\pi, \quad x = \frac{\pi}{6} + 2k\pi, \quad x = \frac{5\pi}{6} + 2k\pi$, k is an integer

(d) $x = \frac{3\pi}{2} + 2k\pi, \quad x = \frac{\pi}{6} + 2k\pi, \quad x = \frac{5\pi}{6} + 2k\pi$, k is an integer (e) $x = \frac{\ln\frac{32}{5}}{\ln 8}$

(f) $x = -15$ (g) $x = 1$ (h) $x = 3$, $x = -4$ is an extraneous solution.

5. (a) $[1,4]$ (b) $(-\infty -1)\cup\left(\frac{7}{3},\infty\right)$

6. $y=2\sin\left(x-\frac{\pi}{2}\right)$ on $\left[-\frac{\pi}{2},\frac{5\pi}{2}\right]$



7. (a) $\frac{1}{2},\ \pi,\ -\frac{\pi}{3}$ (b) $y=-\frac{1}{2}\cos\left[2\left(x+\frac{\pi}{3}\right)\right]$ (may vary)

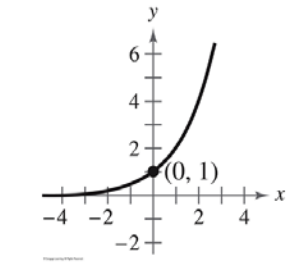
8. $x=200\sqrt{3}$ feet

9. $\sin 2x=-\frac{3}{5},\ \cos 2x=\frac{4}{5}$

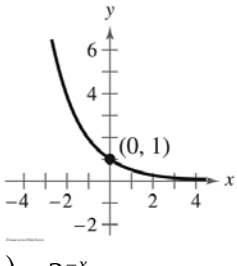
10. (a) $L=\cos^2 x\csc x-\csc x=\csc x\left(\cos^2 x-1\right)=\csc x\left(-\sin^2 x\right)=\frac{1}{\sin x}\left(-\sin^2 x\right)=-\sin x=R$

(b) $L=\frac{1}{1-\sin^2 x}=\frac{1}{\cos^2 x}=\sec^2 x=1+\tan^2 x=R$

11.



$f(x)=2^x$



$g(x)=2^{-x}$

12. (a) $f(x)=-\log_3(-x)$, (b) $f(x)=\log_3(1-x)$, (c) $f(x)=-\log_3(x+2)$, (d) $f(x)=\log(x-1)$