6.5 day 1 #1-25 odd

1. $\cot t \sin t$

$\frac{\cos t}{\sin t} \cdot \sin t = \cos t$

3. $\csc t \sin t$

$\frac{1}{\sin t} \cdot \sin t = 1$

5. $\sin^2 t + \cot^2 t \sin^2 t$

$\sin^2 t + \frac{\cos^2 t}{\sin^2 t} \cdot \sin^2 t$

$\sin^2 t + \cos^2 t$

7. $\frac{\csc^2 t - \cot^2 t}{\sin^2 t}$

$\frac{1}{\sin^2 t} - \frac{\cos^2 t}{\sin^2 t} = \frac{1-\cos^2 t}{\sin^2 t}$

$\frac{\frac{1-\cos^2 t}{\sin^2 t}}{\sin^2 t} = \frac{1-\cos^2 t}{\sin^2 t} \cdot \frac{1}{\sin^2 t}$

$= \frac{1-\cos^2 t}{\sin^4 t}$

Identity: $\sin^2 t + \cos^2 t = 1$

$\sin^2 t = 1 - \cos^2 t$

$= \frac{\sin^2 t}{\sin^4 t} = \frac{1}{\sin^2 t} = \boxed{\csc^2 t}$

9. $\sin t = \boxed{.3251}$

$\csc t = \frac{1}{\sin t} = \frac{1}{.3251} = \boxed{3.076}$

$\cot^2 t = \csc^2 t - 1$

$\cot^2 t = (3.076)^2 - 1 = 8.462$

$\sqrt{\cot^2 t} = \sqrt{8.462}$

$\cot t = \boxed{2.909}$

$\cot t = \frac{1}{\tan t}$

$\tan t = \frac{1}{\cot t}$

$\tan t = \frac{1}{2.909}$

$\tan t = \boxed{.34376}$

$\tan t = \frac{\sin t}{\cos t}$

$\Rightarrow \cos t = \frac{\sin t}{\tan t}$

$\cos t = \frac{.3251}{.34376} = \boxed{.9457}$

$(.3437)^2 + 1 = \sec^2 t$

$.118 + 1 = \sec^2 t$

$\sqrt{1.118} = \sqrt{\sec^2 t}$

$\sec t = \boxed{1.0574}$

11. $\tan t = 3.6294$

$\tan^2 t + 1 = \sec^2 t$

$(3.6294)^2 + 1 = \sec^2 t$

$\sqrt{14.17} = \sqrt{\sec^2 t}$

$\sec t = 3.7646$

$\sec t = \frac{1}{\cos t} \Rightarrow \cos t = \frac{1}{\sec t}$

$\cos t = \frac{1}{3.7646} = .2656$

$\tan t = \frac{\sin t}{\cos t}$

$3.6294 = \frac{\sin t}{.2656}$

$\Rightarrow \sin t = .9640$

$\cot t = \frac{1}{\tan t} = \frac{1}{3.6294} = .2755$

$\csc t = \frac{1}{\sin t} = \frac{1}{.9640} = 1.037$

13. $\csc t = 6.2474$

$\csc t = \frac{1}{\sin t}$

$\sin t = \frac{1}{\csc t}$

$\sin t = \frac{1}{6.2474} = .1601$

$1 + \cot^2 t = \csc^2 t$

$\cot^2 t = \csc^2 t - 1$

$\cot^2 t = (6.2474)^2 - 1$

$\sqrt{\cot^2 t} = \sqrt{38.03}$

$\cot t = 6.167$

$6.167 = \frac{1}{\tan t}$

$\tan t = \frac{1}{6.167} = .1622$

$.1622 = \frac{.1601}{\cos t}$

$\cos t = \frac{.1601}{.1622}$

$\cos t = .987$

$\sec t = \frac{1}{\cos t} = \frac{1}{.987} = 1.013$

15. $(\sin t + \cos t)(\sin t - \cos t)$

$\sin^2 t + \sin t \cos t - \sin t \cos t - \cos^2 t$

$\sin^2 t - \cos^2 t$

17. $\frac{\sin t}{\tan t} = \frac{\sin t}{\frac{\sin t}{\cos t}} = \sin t \cdot \frac{\cos t}{\sin t} = \cos t$

19. $\left(\frac{4\cos^2 t}{\sin^2 t}\right)\left(\frac{\sin t}{4\cos t}\right)^2$

$\left(\frac{4\cancel{\cos^2 t}}{\cancel{\sin^2 t}}\right)\cdot\frac{\cancel{\sin^2 t}}{16\cancel{\cos^2 t}} = \frac{4}{16} = \boxed{\frac{1}{4}}$

21. $\frac{\cos^2 t + 4\cos t + 4}{\cos t + 2} = \frac{(\cos t + 2)^2}{\cancel{\cos t + 2}} = \boxed{\cos t + 2}$

$(\cos t + 2)^2$

23. $\frac{1}{\cos t} - \sin t \tan t$

$\frac{1}{\cos t} - \sin t \cdot \frac{\sin t}{\cos t} = \frac{1}{\cos t} - \frac{\sin^2 t}{\cos t}$

$= \frac{1-\sin^2 t}{\cos t} = \frac{\cancel{\cos^2 t}^{\cos t}}{\cancel{\cos t}} = \boxed{\cos t}$

25. $\sqrt{\sin^3 t \cos t} \cdot \sqrt{\cos t}$

$\sqrt{\sin^3 t \cdot \cos^2 t}$

$\boxed{|\sin t \cdot \cos t|\sqrt{\sin t}}$

6.5 day 2 #26, 27, 30, 33-47 odd, 55, 59, 61

26. $f(t) = \sin t$

$f(-t) = \sin(-t)$

$f(-t) = -\sin(t)$ odd

30. $f(t) = t \sin t$

$f(-t) = -t \sin(-t)$

$f(-t) = -t \cdot -\sin(t)$

$f(-t) = +t \sin t$ even

27. $f(t) = \cos(t)$

$f(-t) = \cos t$ even!

33. $\cos t = -.5 \quad \pi < t < \frac{3\pi}{2}$

find $\sin t$.

$\sin^2 t + \cos^2 t = 1$

$\sin^2 t + (-.5)^2 = 1$

$\sqrt{\sin^2 t} = \sqrt{\frac{3}{4}}$ * we know its negative b/c it lies in the 3rd quad. (-,-)

$\sin t = \boxed{\frac{-\sqrt{3}}{2}}$

35. $\cos t = 1/2 \quad 0 < t < \pi/2$

$\sin^2 t + (1/2)^2 = 1$

$\sin^2 t = 1 - 1/4$

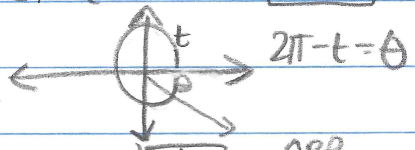
$\sqrt{\sin^2 t} = \sqrt{3/4}$ * (+) because in 1st quadrant

$\sin t = \boxed{\frac{\sqrt{3}}{2}}$

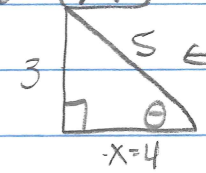
37-43 odd $\sin t = 3/5$

37. $\sin(-t) = -\sin(t) = \boxed{-3/5}$ negative identities

39. $\sin(2\pi - t) = \boxed{-3/5}$ in 4th quadrant (+,-)



41. $\tan t = \boxed{3/4} = \frac{opp}{adj}$



← By Pyth theorem

on 4th quad.

43. $\tan(2\pi - t) = \boxed{-3/4}$ $\tan = \frac{-\sin\theta}{\cos\theta}$

$\tan t = 3/4$

45-49 odd $\cos t = -2/5$ $\pi < t < 3\pi/2$ ← 3rd quad

45. $\sin t$ $(-2/5)^2 + \sin^2 t = 1$

$\sin^2 t = 1 - 4/25$

$\sqrt{\sin^2 t} = \sqrt{21/25}$

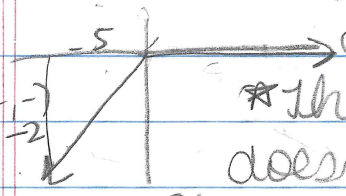
$\sin t = \frac{\sqrt{21}}{5}$

$\Rightarrow$ 3rd quad: $\sin t = \boxed{-\frac{\sqrt{21}}{5}}$

47. $\cos(2\pi - t) = \boxed{2/5}$

$\pi < t < \frac{5\pi}{2}$

$\cos t = -\frac{2}{5}$



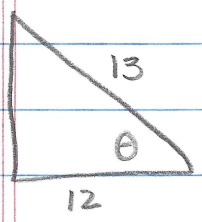
on 3rd quad.

*The cosine doesn't change

$\cos t = \boxed{-2/5}$

$\cos(-t)$ because $2\pi - t$ is coterminal

55. $\sin t = 5/13$ $\cos t = 12/13$



possible

$(5/13)^2 + (12/13)^2 = 1$

$.1479 + .852 = 1$ ✓

$1 = 1$ ✓

59. $\sin t = 1$ $\tan t = 1 = \frac{\sin\theta}{\cos\theta} = \frac{1}{1}$

$(1)^2 + (1)^2 \neq 1$

$2 \neq 1$ not possible

61. Cosecant $\theta = \csc\theta = \csc(\theta \pm 2\pi)$ sine

Secant $\theta = \sec\theta = \sec(\theta \pm 2\pi)$ cosine

Cotangent $\theta = \cot\theta = \cot(\theta \pm \pi)$ tan

> correspondo! same period