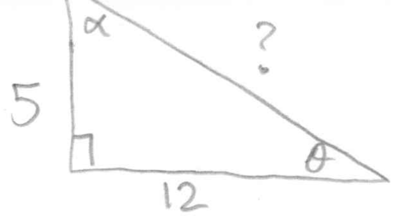
HW 9



$\Rightarrow 5^2+12^2=?^2$

$\Rightarrow 25+144=?^2$

$\Rightarrow ?=\sqrt{169}=13$

§9.3 #24

$$\sin(2\theta)=2\sin(\theta)\cos(\theta)$$
$$=2\left(\frac{5}{\sqrt{13}}\right)\left(\frac{12}{\sqrt{13}}\right)$$

$$\cos(2\theta)=\cos^2(\theta)-\sin^2(\theta)$$
$$=\left(\frac{12}{\sqrt{13}}\right)^2-\left(\frac{5}{\sqrt{13}}\right)^2$$

$$\tan(2\theta)=\frac{\sin(2\theta)}{\cos(2\theta)}=\frac{2\left(\frac{5}{\sqrt{13}}\right)\left(\frac{12}{\sqrt{13}}\right)}{\left(\frac{12}{\sqrt{13}}\right)^2-\left(\frac{5}{\sqrt{13}}\right)^2}$$

#28 Using identity for $\cos(2\theta)$,

$$\begin{array}{r}28\\ \times 2\\ \hline 56\end{array}$$

$$\cos^2(28^\circ)-\sin^2(28^\circ)=\cos(2(28)^\circ)$$
$$=\cos(56^\circ)$$

#33 Using identity for $\sin(2\theta)$,

$$6\sin(5x)\cos(5x)=3(2\sin(5x)\cos(5x))$$
$$=3\sin(2(5x))$$
$$=3\sin(10x)$$

#34 Start w/ left:

$$(\sin(t)-\cos(t))^2 = \sin^2(t) - 2\sin(t)\cos(t) + \cos^2(t)$$

$$= (\sin^2(t)+\cos^2(t)) - 2\sin(t)\cos(t)$$

$$= 1 - \sin(2t)$$

#40 $\sin^4(8x) = \sin^2(8x)\sin^2(8x)$

reduction formula $\rightarrow$ $= \left(\frac{1-\cos(16x)}{2}\right)\left(\frac{1-\cos(16x)}{2}\right)$

$$= \frac{1-2\cos(16x)+\cos^2(16x)}{4}$$ reduction formula

$$= \frac{1-2\cos(16x)+\frac{1+\cos(32x)}{2}}{4}$$

#55 Start w/ right:

$$\frac{2\tan(x)}{1+\tan^2(x)} = \frac{\frac{2\sin(x)}{\cos(x)}}{1+\frac{\sin^2(x)}{\cos^2(x)}}$$

$$= \frac{\frac{2\sin(x)}{\cos(x)}}{\frac{\overbrace{\cos^2(x)+\sin^2(x)}^{=1}}{\cos^2(x)}}$$

$$= \frac{2\sin(x)}{\cancel{\cos(x)}} \cdot \frac{\cos^2(x)}{1}$$

$$= 2\sin(x)\cos(x)$$

$$= \sin(2x)$$