



November 16

SWBAT:



Use the double angle formulas  
to simplify and evaluate trig  
expressions



Rewrite  $\sin(u + u)$

$$\sin(u+v) = \sin(u)\cos(v) + \cos(u)\sin(v)$$

$$\sin(u+u) = \sin(u)\cos(u) + \cos(u)\sin(u)$$

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

Double-Angle Formulas

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

Rewrite  
 $10\sin x \cos x$   
using the double  
angle formulas

$$\begin{aligned} 10\sin x \cos x \\ &= 5(2\sin x \cos x) \\ &= 5(\sin 2x) \end{aligned}$$

$$10\sin x \cos x = 5\sin 2x$$

### Double-Angle Formulas:

$$\begin{aligned}\cos 2u &= \cos^2 u - \sin^2 u & \cos 2u &= 1 - \sin^2 u \\ \cos 2u &= 2\cos^2 u - 1\end{aligned}$$

$$\tan 2u = \frac{2 \tan u}{1 - \tan^2 u}$$

Rewrite

$$3 + 6 \sin x \cos x$$

$$\begin{aligned}3(1 + 2 \sin x \cos x) \\ = 3(1 + \sin 2u)\end{aligned}$$

### Double-Angle Formulas:

$$\sin 2u = 2 \sin u \cos u$$

$$\begin{aligned}\cos 2u &= \cos^2 u - \sin^2 u & \cos 2u &= 1 - \sin^2 u \\ \cos 2u &= 2\cos^2 u - 1\end{aligned}$$

Rewrite

$$8\cos^2 u - 4$$

$$4(\underline{2\cos^2 u - 1}) = 4\cos 2u$$

$$7 \tan 2u$$

$$\tan 2u = \frac{2 \tan u}{1 - \tan^2 u}$$

$$\frac{7}{1} \left( \frac{2 \tan u}{1 - \tan^2 u} \right) = \frac{14 \tan u}{1 - \tan^2 u}$$

## Double-Angle Formulas:

$$\cos 2u = \cos^2 u - \sin^2 u$$

$$\cos 2u = 2\cos^2 u - 1$$

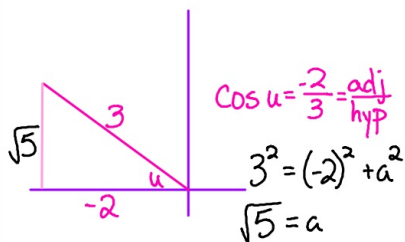
$$\cos u = -\frac{2}{3}$$

$$\frac{\pi}{2} < u < \pi$$

find  $\sin(2u)$

$\cos(2u)$

$\tan(2u)$



$$\cos(u) = -\frac{2}{3}$$

$$\sin(u) = \frac{\sqrt{5}}{3}$$

$$\tan(u) = -\frac{\sqrt{5}}{2}$$

$$\sin 2u = 2\sin u \cos u$$

$$\sin 2u = 2\left(\frac{\sqrt{5}}{3}\right)\left(-\frac{2}{3}\right)$$

$$\sin 2u = -\frac{4\sqrt{5}}{9}$$

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

$$\cos 2u = 1 - 2\left(\frac{\sqrt{5}}{3}\right)^2$$

$$\cos 2u = 1 - 2\left(\frac{5}{9}\right) = 1 - \frac{10}{9} = \frac{9}{9} - \frac{10}{9} = -\frac{1}{9}$$

$$\tan 2u = \frac{2\tan u}{1 - \tan^2 u}$$

$$\tan 2u = \frac{2\left(-\frac{\sqrt{5}}{2}\right)}{1 - \left(-\frac{\sqrt{5}}{2}\right)^2}$$

$$\tan 2u = \frac{-\frac{2\sqrt{5}}{2}}{1 - \frac{5}{4}} = \frac{-\sqrt{5}}{-\frac{1}{4}} = -\sqrt{5} \cdot \left(-\frac{4}{1}\right) = 4\sqrt{5}$$