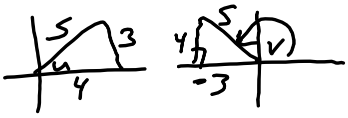
HW 7-1 Worksheet 7A

Do the warm-up at the top of our notes

1. -sin x
2. sin x
3. 0
4. $\frac{\sqrt{3}}{2}$
5. $\frac{\sqrt{3}}{3}$
6. -7/24
7. 0
8. $-2\sin\alpha\sin\beta$



⑥ $\tan(u+v) = \dfrac{\tan u + \tan v}{1 - \tan u \tan v}$

$= \dfrac{\left[\left(\frac{3}{4}\right) + \left(-\frac{4}{3}\right)\right]}{\left[1 - \left(\frac{3}{4}\right)\left(-\frac{4}{3}\right)\right]} \quad \frac{4(3)}{1}$

$= \dfrac{9 - 16}{12 + 12} = -\dfrac{7}{24}$

⑦ $\cos(u-v) = \cos u\cos v + \sin u \sin v$

$= \left(\frac{4}{5}\right)\left(\frac{-3}{5}\right) + \left(\frac{3}{5}\right)\left(\frac{4}{5}\right)$

$= \frac{-12}{25} + \frac{12}{25} = \frac{0}{25} = 0$

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④ $\sin\frac{4\pi}{9}\cos\frac{2\pi}{9} + \cos\frac{4\pi}{9}\sin\frac{2\pi}{9} = \sin(x+y)$

$= \sin\left(\frac{4\pi}{9} + \frac{2\pi}{9}\right)$ II

$= \sin\left(\frac{6\pi}{9}\right) = \sin\left(\frac{2\pi}{3}\right)$

$= +\frac{\sqrt{3}}{2}$

Double Angles

Pre-Calc

Unit 7 Day2

$(-1, 0)$

Warm up: Verify the identity $\cos(\pi + \theta) = -\cos\theta$

$\cos\pi\cos\theta - \sin\pi\sin\theta = -\cos\theta$

$(-1)(\cos\theta - 0(\sin\theta)) =$

$-\cos\theta = -\cos\theta$ ✓

If we double an angle of measure x, the new angle will have measure 2x. Double-angle identities give trigonometric function values of 2x in terms of function values of x.

Using the sum formula from yesterday, evaluate sin(x + x).

$\sin 2x = \sin(x + x)$ $\quad mn + nm = 2mn$

$= \sin x \cos x + \cos x \sin x$

$= 2 \sin x \cos x$

Therefore, $\boxed{\sin 2x = 2 \sin x \cos x}$

Let's try, cos 2x

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

$= \cos x \cos x - \sin x \sin x$

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

Therefore $\boxed{\cos 2x = \cos^2 x - \sin^2 x}$

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Using the identity $\boxed{\sin^2 x + \cos^2 x = 1}$, we can derive two other formulas for cos 2x

Substitute $\sin^2 x = 1 - \cos^2 x$

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

$= \cos^2 x - (1 - \cos^2 x)$

$= \cos^2 x - 1 + \cos^2 x$

$= 2\cos^2 x - 1$

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

Substitute $\cos^2 x = 1 - \sin^2 x$

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

$= 1 - \sin^2 x - \sin^2 x$

$= 1 - 2\sin^2 x$

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

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1. If $\sin A = \frac{2}{5}$, find $\cos 2A$.

$\cos 2A = 1 - 2\sin^2 A$
$= 1 - 2\left(\frac{2}{5}\right)^2$
$= 1 - 2\left(\frac{4}{25}\right)$
$= 1 - \frac{8}{25} = \frac{25}{25} - \frac{8}{25}$
$= \frac{17}{25}$

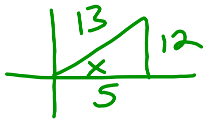
2. If $\cos \theta = \frac{7}{25}$, find $\cos 2\theta$.

$\cos 2\theta = 2\cos^2\theta - 1$
$= 2\left(\frac{7}{25}\right)^2 - 1$
$= 2\left(\frac{49}{625}\right) - 1$
$= \frac{98}{625} - \frac{625}{625}$
$= -\frac{527}{625}$

$49 \cdot 2 = 98$

3. If x is a positive ~~acute~~ angle and $\cos x = \frac{5}{13}$, find $\sin 2x$.

$\sin 2x = 2\sin x\cos x$
$= 2\left(\frac{12}{13}\right)\left(\frac{5}{13}\right)$
$= \frac{120}{169}$



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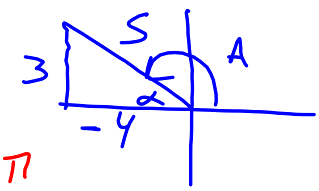
4. Find $\sin 2A$ if $\sin A = \frac{3}{5}$ and angle A is obtuse.

$\sin 2A = 2\sin A\cos A$
$= 2\left(\frac{3}{5}\right)\left(-\frac{4}{5}\right)$
$= \frac{-24}{25}$

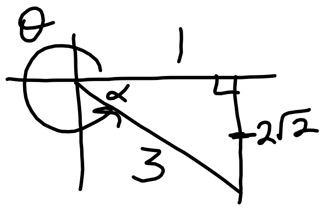


$\frac{\pi}{2} < A < \pi$
$\pi < 2A < 2\pi$
III or IV

5. If $\cos\theta = \frac{1}{3}$ and $\frac{3\pi}{2} < \theta < 2\pi$ (IV). Find

a. $\cos 2\theta$ $= 2\cos^2\theta - 1$
$= 2\left(\frac{1}{3}\right)^2 - 1$
$= 2\left(\frac{1}{9}\right) - 1$
$= \frac{2}{9} - \frac{9}{9} = \frac{-7}{9}$

b. $\sin 2\theta$
$= 2\sin\theta\cos\theta$
$= 2\left(\frac{-2\sqrt{2}}{3}\right)\left(\frac{1}{3}\right)$
$= \frac{-4\sqrt{2}}{9}$



$1^2 + b^2 = 3^2$
$b^2 = 9 - 1$
$b^2 = 8$
$b = \sqrt{8} = \sqrt{4 \cdot 2} = 2\sqrt{2}$

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Homework 7-2

Worksheet 7.1 1-10 all

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