

Worksheet 7.1

1. $\frac{63}{65}$

2. $-\frac{56}{65}$

3. $-\frac{16}{63}$

4. $\frac{7}{25}$

5. $-161/289$

6. $-\frac{336}{625}$

7. $\frac{1}{2}$

8. $\frac{24}{25}$

9. $\sin(-2\theta)$

10. $\cos(7x)$

$\sin(x+y)$

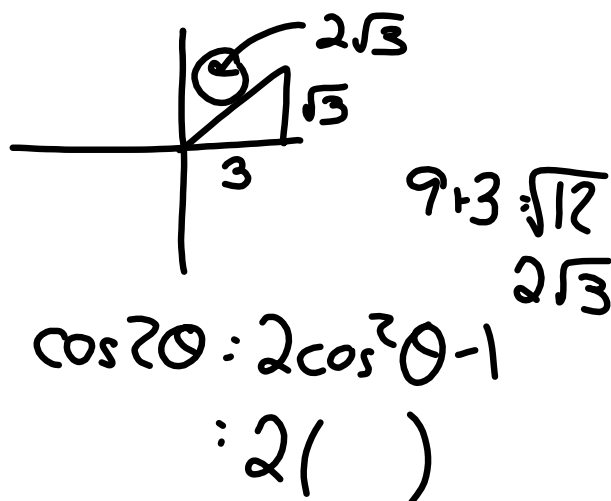
$\cos(x-y)$

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$$\frac{\tan \theta + \tan \beta}{1 - \tan \theta \tan \beta}$$

$$\frac{\frac{4.12}{1} \left(-\frac{3}{4} \right) + \left(\frac{5}{12} \right) \frac{4.12}{1}}{\frac{4.12}{1} \left(-\left(-\frac{3}{4} \right) \right) - \left(\frac{5}{12} \right) \frac{4.12}{1}} = \frac{-36 + 20}{48 + 15}$$

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Half Angles

Pre-Calc
Unit 7 Day3

Functions of the Half Angle

 $\pm$ depends on the quadrant

$$\sin \frac{1}{2}A = \pm \sqrt{\frac{1 - \cos A}{2}}$$

$$\cos \frac{1}{2}A = \pm \sqrt{\frac{1 + \cos A}{2}}$$

Determining positive or negative values of $\frac{1}{2}$ angles

Domain of Angle	Domain of $\frac{1}{2}$ Angle	Quadrant of $\frac{1}{2}$ Angle	Sign of Function of $\frac{1}{2}$ Angle
Q I $0 < A < \frac{\pi}{2}$	Q I $0 < \frac{1}{2}A < \frac{\pi}{4}$	I	$+$ $\sin \frac{1}{2}A > 0$ $+$ $\cos \frac{1}{2}A > 0$
Q II $\frac{\pi}{2} < A < \pi$	Q I $\frac{\pi}{4} < \frac{1}{2}A < \frac{\pi}{2}$	I	$+$ $\sin \frac{1}{2}A > 0$ $+$ $\cos \frac{1}{2}A > 0$
Q III $\pi < A < \frac{3\pi}{2}$	Q II $\frac{\pi}{2} < \frac{1}{2}A < \frac{3\pi}{4}$	II	$+$ $\sin \frac{1}{2}A > 0$ $-$ $\cos \frac{1}{2}A < 0$
Q IV $\frac{3\pi}{2} < A < 2\pi$	Q II $\frac{3\pi}{4} < \frac{1}{2}A < \pi$	II	$+$ $\sin \frac{1}{2}A > 0$ $-$ $\cos \frac{1}{2}A < 0$

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Examples:

1. If $\sin \theta = \frac{4}{5}$ and θ is a positive acute angle, find $\sin \frac{\theta}{2}$.

Q1

$$\sin \frac{1}{2}\theta : \sqrt{\frac{1-\cos \theta}{2}}$$


$$: \sqrt{\frac{1-\frac{3}{5}}{2}} \text{ mult by 5} : \sqrt{\frac{5-3}{10}} = \sqrt{\frac{1}{5}} = \frac{1}{\sqrt{5}} = \frac{\sqrt{5}}{5}$$

2. If $\cos \theta = \frac{1}{2}$ and $\frac{3\pi}{2} < \theta < 2\pi$, find $\cos \frac{1}{2}\theta$

Q1V

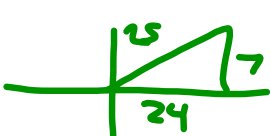
$$: -\sqrt{\frac{1+\frac{1}{2}}{2}} : -\sqrt{\frac{2+1}{4}} : -\sqrt{\frac{3}{4}} : -\frac{\sqrt{3}}{2}$$

mult by 2

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3. Find $\sin \frac{1}{2}\theta$, if $\tan \theta = \frac{7}{24}$ and $0 < \theta < \frac{\pi}{2}$

Q1

$$: \sqrt{\frac{1-\frac{24}{25}}{2}} : \sqrt{\frac{25-24}{50}}$$


$$: \sqrt{\frac{1}{50}} : \frac{1}{5\sqrt{2}} : \frac{\sqrt{2}}{10}$$

mult by 25

4. If $\cos x = \frac{1}{9}$, find the positive value of $\sin \frac{1}{2}x$

$$: \sqrt{\frac{1-\frac{1}{9}}{2}} : \sqrt{\frac{9-1}{18}} : \sqrt{\frac{4}{9}} : \frac{2}{3}$$

$\sqrt{\frac{8}{18}}$

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Use the half-angle identities to evaluate exactly.

Q1

$$5. \sin\left(\frac{\pi}{12}\right) : \sin\left(\frac{1}{2} \cdot \frac{\pi}{6}\right) : \sqrt{\frac{1 - \frac{\sqrt{3}}{2}}{2}} : \sqrt{\frac{2 - \sqrt{3}}{4}}$$

$$\frac{\pi}{12} : \frac{1}{2}\left(\frac{\pi}{6}\right)$$

$$\cos \frac{\pi}{6} : \frac{\sqrt{3}}{2}$$

$$: \frac{\sqrt{2 - \sqrt{3}}}{2}$$

$$6. \cos\left(\frac{5\pi}{8}\right)$$

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Find the exact value of each.

$$7. \tan \theta = -\frac{\sqrt{3}}{3} \text{ where } \frac{\pi}{2} \leq \theta < \pi$$

$$\sin 2\theta$$

$$\cos \frac{\theta}{2}$$

$$\cos 2\theta$$

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HW 7-3

WORKSHEET 7.1

#11-20

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