

FRIDAY June 3, 2016

Lesson #20

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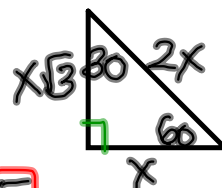
Aim: How do we find the cosine of difference/ sum of two angles?

Do Now: If $A=60^\circ$ and $B=0$ which statement is true

$$1) \cos(A-B) = \cos A - \cos B$$

$$\cos(60-0) = \cos 60 - \cos 0$$

$$\boxed{0.5} \neq 0.5 - 1 = \boxed{-0.5}$$



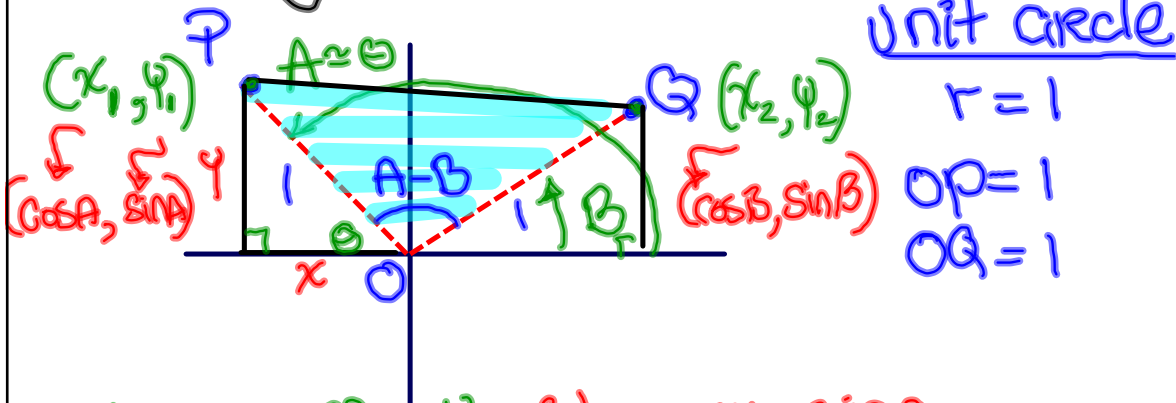
$$2) \cos(A-B) = \cos A \cos B + \sin A \sin B$$

$$\cos(60-0) = \cos 60 \cos 0 + \sin 60 \sin 0$$

$$0.5 = (0.5)(1) + \left(\frac{\sqrt{3}}{2}\right)(0)$$

$$0.5 = 0.5 \checkmark$$

I- Cosine of the difference of two angles. $\cos(A-B) =$



(y) $\sin A = \frac{\text{opp}}{\text{hyp}} = \frac{y}{1}$ solve for $y = \sin A$

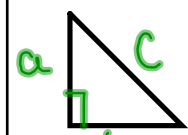
(x) $\cos A = \frac{\text{adj}}{\text{hyp}} = \frac{x}{1}$ solve for $x = \cos A$

① Let's use the distance formula.

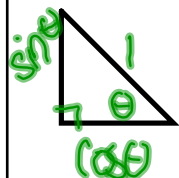
$$d^2 = (x_1 - x_2)^2 + (y_1 - y_2)^2$$

$$d^2 = (\cos A - \cos B)^2 + (\sin A - \sin B)^2$$

$$a^2 + b^2 = c^2$$



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



$$\cos A - \cos B$$

$$\cos A - \cos B$$

$$-\cos A \cos B + \cos^2 B$$

$$-\cos A \cos B + \cos^2 A$$

$$\sin A - \sin B$$

$$\sin A - \sin B$$

$$\sin^2 A + \sin^2 B - 2 \sin A \sin B$$

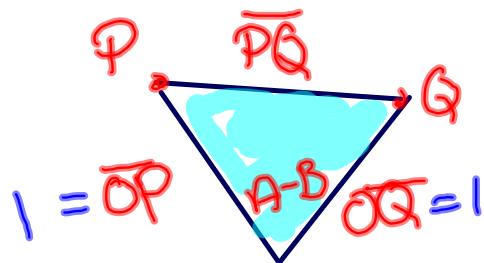
$$\cos^2 B + \cos^2 A - 2 \cos A \cos B$$

$$\sin^2 B + \sin^2 A - 2 \sin A \sin B$$

$$1 + 1 - 2 \cos A \cos B - 2 \sin A \sin B$$

$$\cos(A-B) = 2 - 2(\cos A \cos B + \sin A \sin B)$$

② Let's use Law of Cosines



$$\cos(A-B) =$$

$$\textcircled{O} \quad PQ^2 = OP^2 + OQ^2 - 2(OP)(OQ) \cos(A-B)$$

unit circle

$$PQ^2 = 1 + 1 - 2(1)(1) \cos(A-B)$$

$$PQ^2 = 2 - 2 \cos(A-B)$$

③ Let's bring them together

$$\cancel{2} - \cancel{2} \cos(A-B) = \cancel{2} - \cancel{2} (\cos A \cos B + \sin A \sin B)$$

$$\frac{\cos 15^\circ}{\cos(45-30)}$$