

Ch. 12 BOARD PROBLEMS

SOLVE USING SUM / DIFFERENCE FORMULAS

① $\tan 285^\circ$

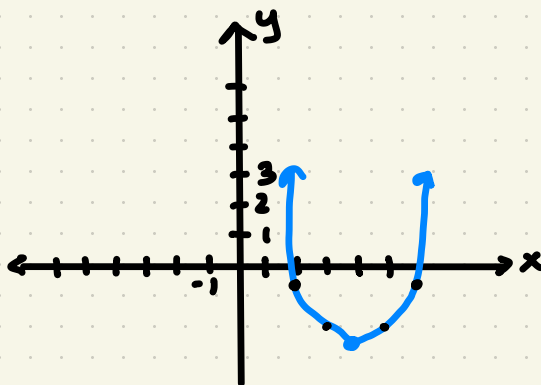
② $\cos 165^\circ$

③ $\sin 195^\circ$

PROVE

$$\textcircled{4} \frac{\tan \theta + \sin \theta}{\cot \theta + \cos \theta} = \frac{\tan \theta (\sec \theta + 1)}{\csc \theta + 1}$$

4. PUT GRAPH
INTO VERTEX
FORM AND
STANDARD FORM
FIND x-intercepts.



5) FIND $F(G(3))$, $G(x) = x^2 - 2$, $F(x) = 3x + 1$

Ch. 12 - DOUBLE & $\frac{1}{2}$ ANGLE IDENTITIES

FIND $\sin 2A$

$$\sin 2A = \sin(A+A) =$$

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

EX. 1 FIND $\sin 2\theta$ AND $\cos 2\theta$
GIVEN $\sin \theta = \frac{1}{2}$ IN FIRST
QUADRANT.

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

EX 3 $\tan 90^\circ = \tan 2(45^\circ)$
=

PRACTICE

① PROVE $\tan 60^\circ = \tan 2(30^\circ)$

② VERIFY $\cos(200) = \cos 2(100)$
(USE A CALCULATOR)

HALF-ANGLE IDENTITY

Change $\cos 2A = 1 - 2 \sin^2 A \Rightarrow \sin\left(\frac{B}{2}\right)$

FIND $\cos\left(\frac{B}{2}\right)$

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

TAN $\frac{1}{2}$ ANGLE IDENTITIES.

$$\tan\left(\frac{B}{2}\right) = \frac{\sin\left(\frac{B}{2}\right)}{\cos\left(\frac{B}{2}\right)} =$$

THE QUADRANT IN WHICH THE $\left(\frac{B}{2}\right)$ ANGLE IS FOUND WILL DETERMINE SIGN (+ or -)

$$(1) \tan\left(\frac{B}{2}\right) = \pm \sqrt{\frac{1 - \cos B}{1 + \cos B}}$$

$$(2) \tan\left(\frac{B}{2}\right) = \frac{1 - \cos B}{\sin B}$$

$$(3) \tan\left(\frac{B}{2}\right) = \frac{\sin B}{1 + \cos B}$$

EX 4

PROVE.

$$\sin 15^\circ = \sin \frac{1}{2}(30)$$

=

=

EX 5

FIND $\sin 15^\circ$ USING $\frac{1}{2}$ angle identity
LEAVE AS SIMPLIFIED RADICALS.

PRACTICE PROBLEMS

USE A CALCULATOR TO VERIFY.

$$\textcircled{1} \sin 22.5^\circ = \sin\left(\frac{45}{2}\right)$$

$$\textcircled{2} \cos 18^\circ = \cos\left(\frac{36}{2}\right)$$

$$\textcircled{3} \tan 54^\circ = \tan\left(\frac{108^\circ}{2}\right)$$

USE $\frac{1}{2}$ ANGLE IDENTITY TO SOLVE. (LEAVE IN RADICAL FORM)

$$\textcircled{4} \cos 22.5^\circ =$$

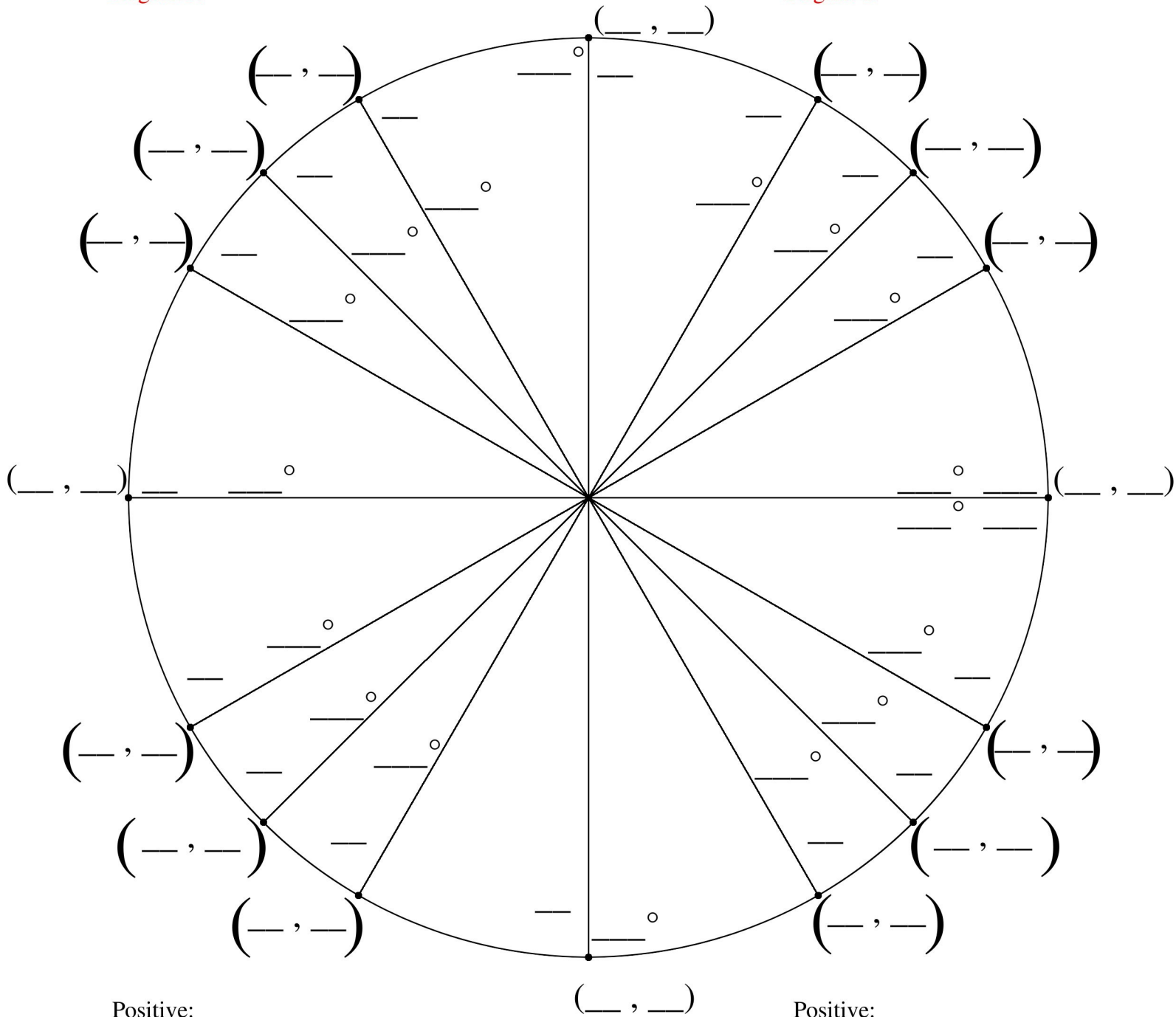
$$\textcircled{5} \sin(-15^\circ) =$$

$$\textcircled{6} \tan(22.5^\circ) =$$

Fill in The Unit Circle

Positive:
Negative:

Positive:
Negative:



Positive:
Negative:

Positive:
Negative: