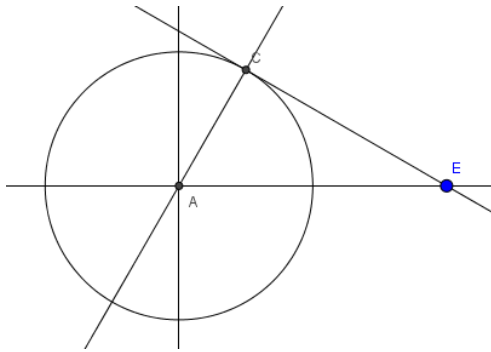


Practice Test, Unit 4 Assessment

1. Form proper responses for questions asked for each sketch. (You may attempt all)

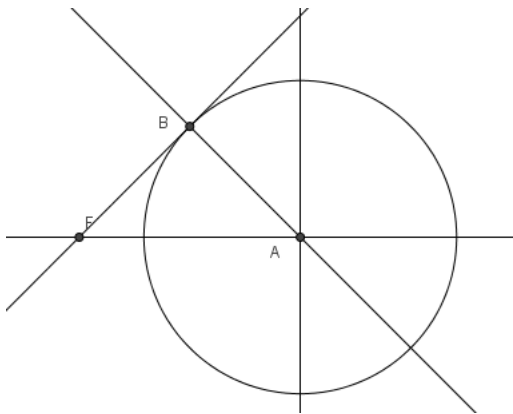
Sketch A



A is the origin and the radius of circle A is 2 and $m\angle CAE = 60^\circ$ and \overrightarrow{CE} is a tangent line of circle A passes through C. Find

- (1) $m\angle AEC$
- (2) Coordinates of E?
- (3) the equation of \overrightarrow{CE} and \overrightarrow{AC}

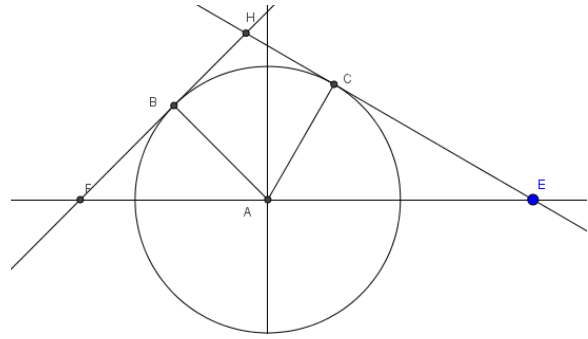
Sketch B



A is the origin and the radius of circle A is 2 and $m\angle FAB = 45^\circ$ and \overrightarrow{FB} is a tangent line of circle A passes through B. Find

- (1) $m\angle AFB$
- (2) Coordinates of F?
- (3) the equation of \overrightarrow{FB} and \overrightarrow{AB}

Sketch C



A is the origin and the radius of circle A is 2 and $m\angle CAE = 60^\circ$, $m\angle FAB = 45^\circ$. If \overrightarrow{CE} is a tangent line of circle A passes through C and \overrightarrow{FB} is a tangent line of circle A passes through B, and H is the intersection of these two tangent lines (as shown in the sketch). Find

- (1) Coordinates of H?
- (2) $m\angle FHE$?
- (3) Area of $\triangle FHE$
- (4) the length of BC

2. Find the assigned trigonometric values based on the equation (pick 2)

(a) Find $\sin \theta$ if $3(1 + \sin \theta) = 2 \cos^2 \theta$

(b) Find $\tan \theta$ if $\frac{2 \sec^2 \theta}{5} = 1 + \tan \theta$

(c) Find $\csc \theta$ if $\frac{2 \cos \theta + 1}{\cos \theta + 3} = \frac{1}{2}$

3. (pick two, from different groups)

Group A: sine and cosine functions.

Group B: tangent and cotangent functions.

Group C: secant and cosecant functions.

Graph the following functions for two whole periods and

➔ For sine and cosine functions, identify also the period, amplitude, range, phase shift, and neutral line.

➔ For tangent and cotangent functions, identify also the period, and the vertical asymptotes.

Practice Test, Unit 4 Assessment

➔ For secant and cosecant functions, identify the periods, local minimums, maximums and vertical asymptotes, ranges.

(a) $f(x) = \pi \sin\left(\frac{2\pi}{3}x - \frac{\pi}{4}\right) + \frac{\pi}{3}$

(b) $f(x) = 4\cos\left(\frac{x}{2} + \frac{\pi}{4}\right) - 2$

(c) $f(x) = 3\tan\left(\frac{x}{3} + \frac{\pi}{6}\right) - 2$

(d) $f(x) = -\frac{3}{2}\cot\left(\frac{3}{2}\pi x + \pi\right) - 2$

(e) $f(x) = 2\sec\left(\frac{3}{2}x - 3\pi\right) + 1$

(f) $f(x) = 3\csc(3x + \pi) + 2$

4. (pick 1) Find the trigonometric ratios

(a) Given $\cot \phi = 4$ and ϕ is at the 3rd quadrant, find $\sin \phi$

(b) Given $\csc \phi = -2$ and ϕ is at the 4th quadrant, Find $\cot \phi$

(c) $\csc \phi = \frac{7}{6}$ and ϕ is at the 2nd quadrant, Find $\cos \phi$

5. (Pick 1) Verify the following identities:

(a) $\sin x - \sin x \cos^2 x = \sin^3 x$

(b) $1 - 2\cos^2 x = \frac{\tan^2 x - 1}{\tan^2 x + 1}$

(c) $\frac{1}{\tan x} + \tan x = \frac{1}{\sin x \cos x}$

6. Evaluate each expressions:

(a) $\cos\left(\arcsin\left(\frac{5}{6}\right)\right)$

(b) $\sec\left(\arccos\left(-\frac{1}{2}\right) + \arcsin\left(\frac{\sqrt{3}}{2}\right)\right)$

7. Rewrite the following trigonometric expressions to algebraic expressions. All angles in the following expressions are in the first quadrant.

a. $\tan(\arccos x)$

b. $\sec\left(\arctan\left(\frac{y}{x}\right)\right)$

8. Solve the following trigonometric equations

(a) $4\cos^3 x = \cos x$

(b) $4\sin^3 x - \sin x = 3$

(c) $3\sec^3 x + 3\sec^2 x - 4\sec x - 4 = 0$