13.1-13.2 Review

Advanced Algebra with Trig
13.1 – 13.2 Review

Name: Key
Period:

Evaluate the six trigonometric functions of the angle θ.

1.

$\sin\theta = \frac{4}{2\sqrt{13}} \cdot \frac{\sqrt{13}}{\sqrt{13}} = \frac{4\sqrt{13}}{2 \cdot 13} = \boxed{\frac{2\sqrt{13}}{13}}$

$\cos\theta = \frac{6}{2\sqrt{13}} \cdot \frac{\sqrt{13}}{\sqrt{13}} = \frac{6\sqrt{13}}{2 \cdot 13} = \boxed{\frac{3\sqrt{13}}{13}}$
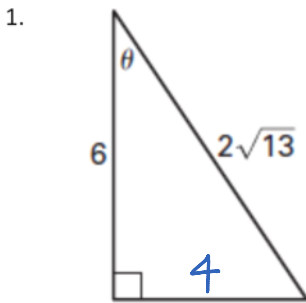
$\tan\theta = \frac{4}{6} = \boxed{\frac{2}{3}}$

$\csc\theta = \frac{2\sqrt{13}}{4} = \boxed{\frac{\sqrt{13}}{2}}$

$\sec\theta = \frac{2\sqrt{13}}{6} = \boxed{\frac{\sqrt{13}}{3}}$

$\cot\theta = \frac{6}{4} = \boxed{\frac{3}{2}}$

$6^2 + x^2 = (2\sqrt{13})^2$
$36 + x^2 = 4 \cdot 13$
$x^2 = 16$
$x = 4$

2.
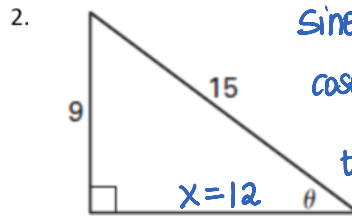
$\sin\theta = \frac{9}{15} = \boxed{\frac{3}{5}}$ $\csc\theta = \boxed{\frac{5}{3}}$

$\cos\theta = \frac{12}{15} = \boxed{\frac{4}{5}}$ $\sec\theta = \boxed{\frac{5}{4}}$

$\tan\theta = \frac{9}{12} = \boxed{\frac{3}{4}}$ $\cot\theta = \boxed{\frac{4}{3}}$

$9^2 + x^2 = 15^2$
$81 + x^2 = 225$
$x^2 = 144$
$x = 12$

Let θ be an acute angle of a right triangle. Find the value of the other five trigonometric functions of θ.

3. $\sin\theta = \frac{\sqrt{2}}{2}$

$x^2 + (\sqrt{2})^2 = 2^2$
$x^2 + 2 = 4$
$x^2 = 2$
$x = \sqrt{2}$

$\cos\theta = \boxed{\frac{\sqrt{2}}{2}}$ $\cot\theta = \boxed{1}$

$\tan\theta = \frac{\sqrt{2}}{\sqrt{2}} = \boxed{1}$

$\csc\theta = \frac{2}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{2\sqrt{2}}{2} = \boxed{\sqrt{2}}$

$\sec\theta = \boxed{\sqrt{2}}$

4. $\tan\theta = \frac{5}{8}$

$5^2 + 8^2 = x^2$
$\sqrt{89} = \sqrt{x^2}$

$\sin\theta = \frac{5}{\sqrt{89}} \cdot \frac{\sqrt{89}}{\sqrt{89}} = \boxed{\frac{5\sqrt{89}}{89}}$ $\csc\theta = \boxed{\frac{\sqrt{89}}{5}}$

$\cos\theta = \frac{8}{\sqrt{89}} = \boxed{\frac{8\sqrt{89}}{89}}$ $\sec\theta = \boxed{\frac{\sqrt{89}}{8}}$

$\cot\theta = \boxed{\frac{8}{5}}$

5. $\sec\theta = \sqrt{5}$

$\text{hyp} = \frac{\sqrt{5}}{1}$ (adj)

$1^2 + x^2 = (\sqrt{5})^2$
$1 + x^2 = 5$
$x^2 = 4$

$\sin\theta = \frac{2}{\sqrt{5}} = \boxed{\frac{2\sqrt{5}}{5}}$ $\tan\theta = \frac{2}{1} = \boxed{2}$

$\cos\theta = \frac{1}{\sqrt{5}} = \boxed{\frac{\sqrt{5}}{5}}$ $\csc\theta = \boxed{\frac{\sqrt{5}}{2}}$

$\cot\theta = \boxed{\frac{1}{2}}$

Find the exact values of x and y.
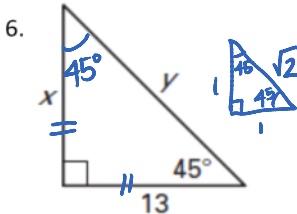
6.

$x = \boxed{13}$

$\frac{13}{1} = \frac{y}{\sqrt{2}}$ $y = \boxed{13\sqrt{2}}$

7.

$\frac{4}{\sqrt{3}} = \frac{x}{1}$ $\frac{4}{\sqrt{3}} = \frac{y}{2}$

$\sqrt{3}x = 4$ $\sqrt{3}y = 8$

$x = \frac{4}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \boxed{\frac{4\sqrt{3}}{3}}$ $y = \frac{8}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \boxed{\frac{8\sqrt{3}}{3}}$

8.
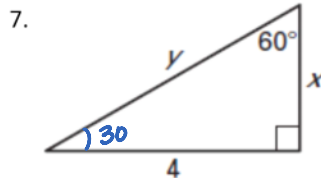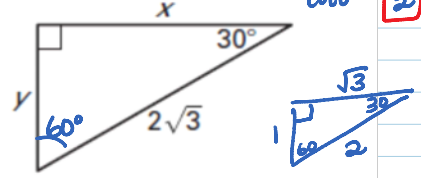
$y = \boxed{\sqrt{3}}$ (half the hypotenuse)

$\frac{x}{\sqrt{3}} = \frac{2\sqrt{3}}{2} \Rightarrow x = \sqrt{9}$ $x = \boxed{3}$

Solve $\triangle DEF$ using the diagram and the given measurements.

Calc in DEGREE MODE!

9. $E = 53^\circ, d = 13$
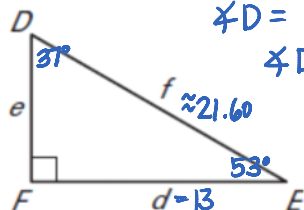
$\angle D = 180 - (90 + 53)$
$\angle D = \boxed{37^\circ}$

$\cos 53^\circ = \frac{13}{f}$

$f\cos 53 = 13$

$f = \frac{13}{\cos 53^\circ}$

$f \approx \boxed{21.60}$

$\tan 53^\circ = \frac{e}{13}$

$13\tan 53^\circ = e$

$e \approx \boxed{17.25}$

$cos53°$

$f \approx \boxed{21.60}$

10. A person casts the shadow shown. What is the approximate height of the person?

DEGREE MODE!

h

—16°

├—21 ft—┤

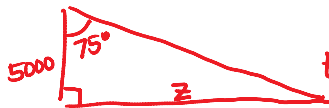$tan16° = \frac{h}{21}$

$21\,tan16° = h$
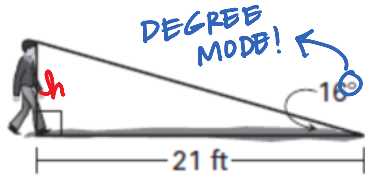
$h = \boxed{6.02\,ft}$

11. A hiker at the top of a mountain sees a farm and an airport in the distance.
   a. What is the distance d from the hiker to the farm? 10,313.33 ft
   b. What is the distance y from the farm to the airport? 9640.01 ft

-15°
29°
61 + 14 = 75°
29 - 15 = 14°
90 - 29 = 61°
61°
5000
d
5000 ft
X   Farm   y   Airport
Not drawn to scale
z

61°
5000
d
X
$cos61° = \frac{5000}{d}$
$d = \frac{5000}{cos61}$
$d = 10,313.33$
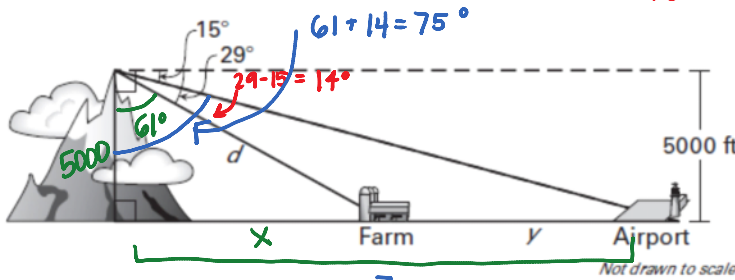
75°
5000
z
$tan75° = \frac{z}{5000}$
$z = 18,660.25\,ft$

$z = x + y$
$18,660.25 = 9020.24 + y$
$y = 9640.01$

$tan61° = \frac{x}{5000}$
$5000\,tan61 = x$
$x = 9020.24$

12. Draw an angle with the given measure in standard position.
   a. 135°
   b. $\frac{\pi}{4} \times \frac{180°}{\pi} = 45°$
   c. $-\frac{\pi}{3} \times \frac{180°}{\pi} = -60°$
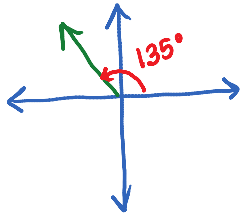
135°
$\frac{\pi}{4}$
$-\frac{\pi}{3}$
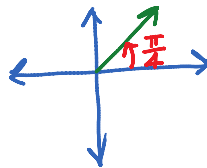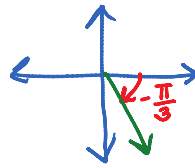
13. Find one positive angle and one negative angle that are coterminal with the given angle.
   a. 90°

   90°   90°
   +360   -360
   ─────   ─────
   450°   -270°

   b. -60°

   -60   -60
   +360   -360
   ─────   ─────
   300°   -420°

   c. $\frac{3\pi}{4}$

   $2\pi \cdot \frac{4}{4} = \frac{8\pi}{4}$

   $\frac{3\pi}{4} + \frac{8\pi}{4} = \frac{11\pi}{4}$

   $\frac{3\pi}{4} - \frac{8\pi}{4} = \frac{-5\pi}{4}$

   d. $-\frac{7\pi}{6}$

   $2\pi \cdot \frac{6}{6} = \frac{12\pi}{6}$

   $-\frac{7\pi}{6} + \frac{12\pi}{6} = \boxed{\frac{5\pi}{6}}$

   $-\frac{7\pi}{6} - \frac{12\pi}{6} = \boxed{\frac{-19\pi}{6}}$

14. Convert the degree measure to radians or the radian measure to degrees.
   a. $120° \times \frac{\pi}{180°} = \boxed{\frac{2\pi}{3}}$
   b. $-225° \times \frac{\pi}{180°} = \boxed{-\frac{5\pi}{4}}$
   c. $-\frac{2\pi}{3} \cdot \frac{180}{\pi} = \boxed{-120°}$
   d. $\frac{5\pi}{4} \times \frac{180°}{\pi} = \boxed{225°}$