Complete the table of circular function values below for the 5 common angles in the first quadrant and on the positive $x-$ and $y-$axes.

SCORE: _____ / 6 PTS (1 POINT DEDUCTED FOR EACH ERROR)

θ (in radians)	$\sin\theta$	$\cos\theta$
0	0	1
$\frac{\pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$
$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$
$\frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$
$\frac{\pi}{2}$	1	0

Use the table above to fill in the blanks below. Simplify all answers (including rationalizing denominators). Write "UNDEFINED" if the expression has no value.

SCORE: _____ / 4 PTS

[a] $\csc\frac{\pi}{2} =$ 1 $\quad \frac{1}{\sin\frac{\pi}{2}} = \frac{1}{1}$

[b] $\cot 0 =$ UNDEFINED $\quad \frac{\cos 0}{\sin 0} = \frac{1}{0}$

[c] $\sec\frac{\pi}{3} =$ 2 $\quad \frac{1}{\cos\frac{\pi}{3}} = \frac{1}{\frac{1}{2}}$

[d] $\tan\frac{\pi}{6} =$ $\frac{\sqrt{3}}{3}$ $\quad \frac{\sin\frac{\pi}{6}}{\cos\frac{\pi}{6}} = \frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}}$

Suppose $\sin t = -\frac{15}{17}$ and $\cos t = \frac{8}{17}$. Fill in the blanks below. Simplify all answers.

SCORE: _____ / 4 PTS

[a] $\sec t =$ $\frac{17}{8}$ $\quad \frac{1}{\cos t} = \frac{1}{\frac{8}{17}}$

[b] $\sec(-t) =$ $\frac{17}{8}$ $= \sec t$

[c] $\cot t =$ $-\frac{8}{15}$ $\quad \frac{\cos t}{\sin t} = \frac{\frac{8}{17}}{\frac{-15}{17}}$

[d] $\sin(-t) =$ $\frac{15}{17}$ $= -\sin t$

Fill in the blanks below. Simplify all answers (including rationalizing denominators).
Write "UNDEFINED" if the expression has no value.

SCORE: _____ / 5 PTS

[a] $-\frac{16\pi}{3}$ is co-terminal with $\frac{2}{3}\pi$ (**NOTE**: Your answer must be between 0 and 2π) $-5\frac{1}{3}\pi + 3(2\pi)$

[b] $\sin\left(-\frac{16\pi}{3}\right) = \frac{\sqrt{3}}{2}$ LIKE $\sin\frac{2\pi}{3}$ AND POSITIVE SINCE IN Q_2 (WHERE $y>0$)

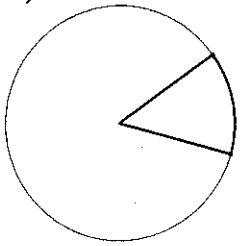
[c] The complement of $\frac{2\pi}{7}$ radians is $\frac{3\pi}{14}$ $\frac{\pi}{2} - \frac{2\pi}{7}$

[d] 72 degrees = $\frac{2\pi}{5}$ radians $72 * \frac{\pi}{180}$

[e] $\frac{7\pi}{30}$ radians = 42 degrees $\frac{7\pi}{30} * \frac{180}{\pi}$

In the diagram of a central angle on the right,
the radius of the circle is 9 mm and the intercepted arc has length 12 mm. (NOTE: The diagram is **NOT** drawn to scale.)

SCORE: _____ / 5 PTS



[a] The central angle is $\frac{4}{3}$ radians. $s = r\theta \rightarrow r = \frac{s}{\theta} = \frac{12\text{mm}}{9\text{mm}}$

[b] The area of the intercepted sector is 54mm^2. $A = \frac{1}{2}r^2\theta = \frac{1}{2}(9\text{mm})^2\left(\frac{4}{3}\right)$

[c] If an object is moving around the circle at a linear speed of 63 mm/s,

its angular speed is 7 RADIANS/SECOND. $v = r\omega \rightarrow \omega = \frac{v}{r} = \frac{63\text{mm/s}}{9\text{mm}}$

(specify the units)