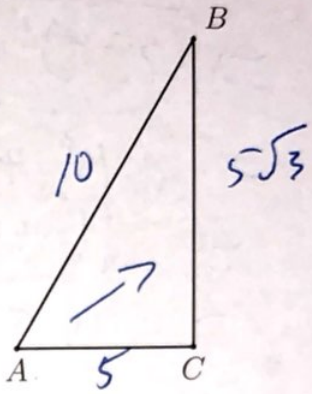
BECA / Dr. Huson / Geometry
Unit 10: Trigonometry
12 April 2022

Name: Solutions

10.7 Trigonometric identities **HSG.SRT.C.8**

1. Given right $\triangle ABC$ with $AC = 5, BC = 5\sqrt{3}, AB = 10, m\angle C = 90°$. Express each trig ratio as a fraction, then as a decimal to the nearest thousandth. (1a is an example)



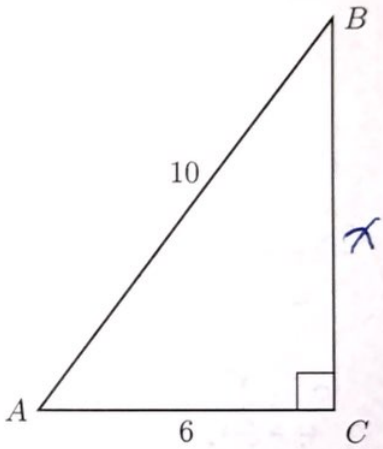
(a) $\sin A = \frac{5\sqrt{3}}{10} = \frac{\sqrt{3}}{2}$

(b) $\cos A = \frac{5}{10} = \frac{1}{2}$

(c) $\sin B = \frac{5}{10} = \frac{1}{2}$

(d) $m\angle A = \cos^{-1}\left(\frac{1}{2}\right) = 60°$

2. Right triangle $\triangle ABC$ is shown with base $AC = 6$ and hypotenuse $AB = 10$ as marked.



(a) Write down $\cos A$. $= \frac{6}{10} = \frac{3}{5}$

(b) Find the length of side BC.

$6^2 + x^2 = 10^2$ $x^2 = 64$

$36 + x^2 = 100$ $x = 8$

(c) Write down $\tan A$. $= \frac{8}{6} = \frac{4}{3}$

(d) Write down $\sin A$. $= \frac{8}{10} = 0.8 = \frac{4}{5}$

(e) Find the angle measures of $\angle A$ and $\angle B$.

$m\angle A = \cos^{-1}\left(\frac{6}{10}\right) = 53.130\ldots \approx 53.1°$

$m\angle B = 90 - 53.13\ldots$
$= 36.87\ldots$
≈ 36.9

3. Are the lines parallel, perpendicular, or neither? Justify your answer. (you must use the values of the slopes in your justification)

$y = 4x + 1$ $m_1 = 4$ $y = \frac{1}{4}x - 4$ $m_2 = \frac{1}{4}$

Not parallel $m_1 \neq m_2$

Not perpendicular $(m_1)(m_2) \neq -1$

Neither

4. Given $P(4,7)$ and $Q(5,0)$, find the length of $\overline{PQ}$, expressed as a simplified radical.

Use: $l = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$= \sqrt{(5-4)^2 + (0-7)^2}$

$= \sqrt{1^2 + (-7)^2}$

$= \sqrt{1 + 49}$

$= \sqrt{50} = \sqrt{25}\sqrt{2} = 5\sqrt{2}$

5. A translation $T_{x,y}$ maps $A(-1,12) \to A'(5,-2)$.

(a) Write down the translation.

$T_{+6,-14}$

(b) Apply the same translation to $B(-3,8)$. $\to B'(3,-6)$

6. In the diagram below, $\overline{PQ}$ has endpoints with coordinates $P(-2,5)$ and $Q(4,-1)$. Find the equation of the perpendicular bisector of $\overline{PQ}$ and plot it on the grid.

$M = \left(\frac{-2+4}{2}, \frac{5+(-1)}{2}\right) = (1,2)$

$m = \frac{-1-5}{4-(-2)} = -1 \qquad m_\perp = +1$

$\perp$ bisector: $y - 2 = 1(x-1)$