Part 5. Math Practice Test – Trigonometry

This practice test is based off the Alexander College Math Placement Test Study Guide, but is not comprehensive of that study guide. The study guide can be found at https://alexandercollege.ca/admissions-and-registration/placement-testing/. It is highly encouraged you read through the study guide in addition to this test.

Do not use a calculator

1) Convert between radians and degrees and vise versa

   a. Convert $30°$ into radians

   b. Convert $\frac{\pi}{6}$ radians into degrees

   c. Convert $56°$ into radians (answer will not simplify perfectly)

2) Draw and label the unit circle:

3) Solve the following trigonometric function values using their graphs

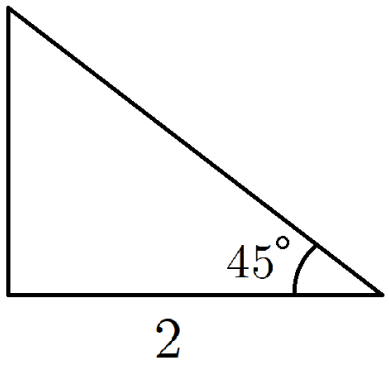
a. $\sin(\pi)$

b. $\cos\left(\frac{\pi}{2}\right)$

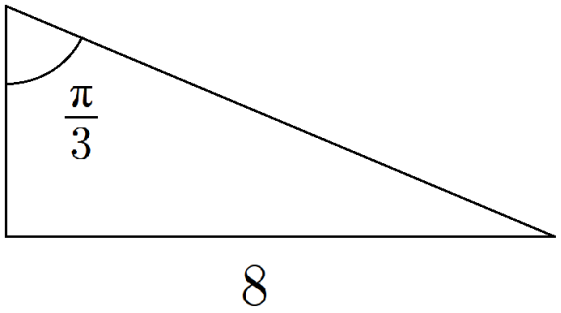
c. $\tan(0)$

4) Solve the following right triangles (give all angles and side lengths):

a.



b.



5) Solve the following word problems:

   a. A surveyor stands in front of a cliff and aims a distance finder at the very top. The angle of the distance finder with the ground is 60 degrees. The distance to the top of the cliff is 20 metres. How far from the cliff is the surveyor?

b. A hiker travels 10 kilometres in a straight line. They then turn 30 degrees to the left and walk another 5 kilometres. What is the distance to their starting point from where they are now?

6) Sketch the following functions:

a. Each of $\cos(x)$, $\sin(x)$, and $\tan(x)$

b. $\sin(x + \pi) - 1$

c. $3\cos\left(\frac{1}{2}x\right)$

7) Answer the following questions:

a. Are $75°$ and $105°$ supplementary angles?

b. Are $\frac{\pi}{3}$ and $\frac{\pi}{6}$ complimentary angles?

c. Suppose for some θ we have $\sin(\theta) = \frac{1}{2}$ and $\cos(\theta) = \frac{\sqrt{3}}{2}$. Find $\sin(2\theta)$.

d. Suppose for some θ we have $\sin(\theta) = \frac{1}{2}$ and $\cos(\theta) = \frac{\sqrt{3}}{2}$. Find $\tan\left(\frac{\theta}{2}\right)$.

8) Solve the following equations on $x \in [0, 2\pi]$:

a. $\sin(2x) = -1$

b. $\sin(x) = \cos(x - \frac{\pi}{2})$

c. $\sin^2(x) = \frac{1}{2}\sin(x)$

9) Evaluate the following expressions:

a. $\arcsin\left(\frac{1}{\sqrt{2}}\right)$

b. $\cos^{-1}\left(\frac{1}{2}\right)$

c. $\arctan(1)$

10) Sketch the graphs of each of the following functions

a. $\arcsin(x)$

b. $\cos^{-1}(x)$

c. $\arctan(x)$

11) Find $\sin(\theta)$ in the following triangle: