Instructor: Cheryl Jaeger Balm                    **Sections covered:** 4.7, 4.8, 5.1-5.3
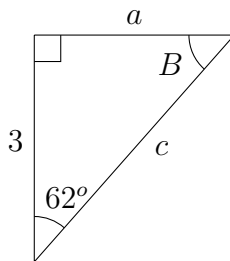
**These are *sample* topics and problems to help you study for Exam 2. This list is *not* meant to be exhaustive.**

1. Know the **inverse trig functions** $\sin^{-1}\theta$, $\cos^{-1}\theta$ and $\tan^{-1}\theta$, including the domain and range of each.

   - Find $\tan(\tan^{-1}(7))$
   - Find $\cos^{-1}\left(\cos\left(-\dfrac{3\pi}{4}\right)\right)$
   - Find $\sin(\cos^{-1}(0))$
   - Find $\cot(\sin^{-1}(2))$
   - Find $\sin^{-1}\left(\cos\left(\dfrac{11\pi}{4}\right)\right)$

2. Know how to **solve right triangles**

   - Solve the triangle below by finding $a$, $B$ and $c$. Round your answers to two decimal places.



3. Know all basic **trig identities**, including those coming from the Pythagorean theorem, reciprocals, quotients, cofunctions and even/odd functions and know how to use these identities.

4. Know how to **simplify** trig equations.

   - Simplify $\sin(x)\cot(-x)$

5. Know how to **factor** trig equations.

   - Factor $\csc^2 x - \cot x - 3$

6. Know how to **verify** trig equations. Choose the most complicated side of the equation and simplify/manipulate it to look like the other side using algebraic techniques.

   - Verify $\sec^2\left(\dfrac{\pi}{2} - x\right) - 1 = \cot^2(x)$.

7. Know how to **solve** trig equations by finding the *solution set* on the interval $[0, 2\pi)$ and by finding the *general solution*.

   - Find all solutions to $\cos(9\theta) = \frac{1}{2}$ on $[0, 2\pi)$.
   - Find the general solution to $7\cos\theta = -3$.

8. **Simple harmonic motion**

   - A weight bounces up and down on the end of a spring so that it's movement is modeled by simple harmonic motion. The distance from its lowest point to its highest point is 3 feet and it returns to its highest point every 10 seconds. Write an equation that describes the motion of the weight if it is at its highest point at $t = 0$. Find the period, amplitude and frequency of your model.

   - A weight bounces up and down on the end of a spring and its movement is modeled by $y = -\dfrac{1}{2}\cos(10t)$. Find the period and the frequency of the oscillation of the weight.