MATH 1440: Mathematics for the Biological Sciences Date: _____

Name: _____ Student ID: _____

Quiz 8

Write the solutions to the questions below in the space provided, and write your final answer in the box provided. You must justify your answer and show your work neatly to receive full credit. Partial credit will be given, but only if you show your work neatly!

1. (3 points) Calculate the following values. *Please give an exact answer.*

   (a) $\sin(60^\circ) =$ _____

   (b) $\cos(150^\circ) =$ _____

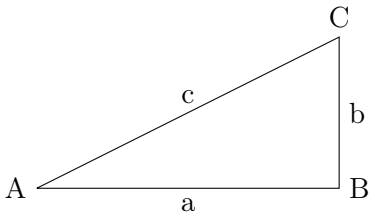
   (c) $\tan(315^\circ) =$ _____

   (d) $\csc(270^\circ) =$ _____

   (e) $\sec(-45^\circ) =$ _____

   (f) $\cot(240^\circ) =$ _____

2. (3 points) At the peak of their jump, a long jumper is $b = 3.82$ meters above the ground. If their trajectory is takes them linearly towards the ground with an angle of $A = 27^\circ$, how far will they fly through the air before hitting the sand, c? *Figure not drawn to scale. Please include units and give your final answer to the nearest tenth.*



Final Answer:

3. (2 points) In what quadrant or quadrants are the following conditions met?

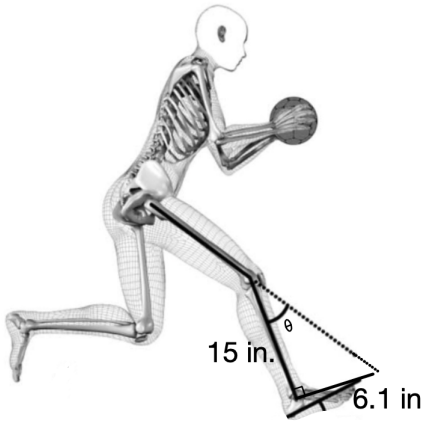
   (a) $\sin(\theta) < 0$ and $\cot(\theta) > 0$

   Final Answer:

   (b) $\cos(\theta) > 0$ and $\sec(\theta) > 0$

   Final Answer:

4. (2 points) In their recent paper in the British Journal of Sports Medicine, Kristianslund et al explore risk factors for anterior cruciate ligament, or ACL, tears. One factor that was shown to have *little* effect was knee flexion at the moment of impact. The angle the study measured is illustrated in the figure below. One participant has a 15 in. tibia (or shinbone) and 6.1 in. distance from the heal to the line from the hip to the knee. For this participant, what was the angle measured, θ?



Final Answer: