# 22F-DEMO-ABC EXAM1A (12/02/2022, 9:30AM - 10:00AM) (Sample Answer)
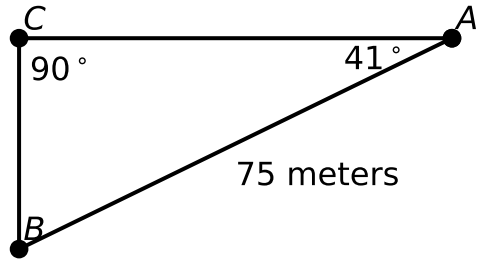
To get a full credit, **show your work for each question**. Put each final answer in a box like $\boxed{12}$.

1. (20 points) Convert $105°$ to radians. Express your result in terms of $\pi$ and reduce the fraction to the lowest term.

   **Solution:**
   $$105° \times \frac{\pi}{180°} = \boxed{\frac{7\pi}{12}}$$

2. (20 points) Find the length of $BC$ to the nearest **tenth** of a meter where $AB = 75m$.



   **Solution:**
   $$\sin(41°) = \frac{BC}{75}$$
   $$BC = 75 \cdot \sin(41°) = 49.204\ldots \approx \boxed{49.2m}$$

3. (20 points) Find a cofunction with the same value as $\csc \frac{2\pi}{5}$. Write your answer in radians.

   **Solution:**
   $$\csc\left(\frac{2\pi}{5}\right) = \sec\left(\frac{\pi}{2} - \frac{2\pi}{5}\right) = \boxed{\sec\left(\frac{\pi}{10}\right)}$$

4. (20 points) Solve the following system of equations algebraically. Write your answer as a **point** like $(1, 9)$.

   $$6x + 5y = -8$$
   $$3x + 4y = -7$$

   **Solution:** Remove a variable $x$.
   Since $LCM(6, 3) = 6$, we multply 1 and $-2$ to get $6x$ and $-6x$ respectively.

   $$1\,(6x + 5y) = 1 \cdot (-8) \qquad 6x + 5y = -8$$
   $$-2\,(3x + 4y) = -2 \cdot (-7) \qquad -6x - 8y = 14$$

   Add two equations.
   $$-3y = 6$$
   $$y = -2$$

   Evaluate $6x + 5y = -8$ with $y = -2$.
   $$6x + 5\,(-2) = -8$$
   $$6x - 10 = -8$$
   $$6x = -8 + 10$$
   $$6x = 2$$
   $$x = \frac{1}{3}$$

   Therefore
   $$\left(\frac{1}{3}, -2\right)$$