3a

Saturday, July 27, 2024 8:15 AM

1.

$A = \sqrt{A_x^2 + A_y^2} = 7.2$

$B = \sqrt{B_x^2 + B_y^2} = 5.4$

$\alpha = \arctan \frac{A_y}{A_x} = \arctan \frac{6}{4} = 56.3^\circ$

$\beta = \arctan \left| \frac{B_y}{B_x} \right| = \arctan \left(\frac{2}{5} \right) = 21.8^\circ$

$\vec{C} = \vec{A} + \vec{B}$

$\vec{C} = 9\hat{i} + 4\hat{j}$

$C = \sqrt{9^2 + 4^2} = \sqrt{97}$

$\theta = \arctan \frac{|C_y|}{|C_x|} = \arctan \frac{4}{9} = 24^\circ$

2.

$C_x = A_x + B_x = -4.3 + 2 = -2.3$

$C_y = A_y + B_y = 2.5$

$C = \sqrt{C_x^2 + C_y^2} = 3.4$

$\theta = \arctan \frac{|C_x|}{|C_y|} = \frac{2.3}{2.5} = 42.6^\circ$ left of $y-$ axis

3.

$t = \sqrt{\frac{2H}{g}}$ for both balls

4.

$t = \sqrt{\frac{2H}{g}}$ $t = 0.49s$

$D = v_0 \sqrt{\frac{2H}{g}}$ $0.25\,m$

$v_f = \sqrt{v_0^2 + 2gH}$