Key Questions for Unit 1: Dynamics

**Lesson 1: Relative Motion**

1. A ladybug with a velocity of 10.0 mm/s [W] crawls on a chair that is being pulled [W 50° N] at 40.0 mm/s. What is the velocity of the ladybug relative to the ground?

VLC = 10 mm/s = velocity of ladybug relative to chair

VCG = 40 mm/s = velocity of chair relative to ground

VLG = velocity of ladybug relative to chair

VCG

VLG

*a*

130o

VLC

vLG2 = 102 + 402 – 2(10)(40)cos130o

vLG2 = 1700 – 800cos130o

vLG ≈ 47 mm/s [N 81o W]

47/sin130o = 10/sin*a*

sin*a ≈* 0.163

*a* ≈ 9o