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$\qquad$ Period: $\qquad$ Worksheet V

Directions: Use separate paper to show ALL of YOUR WORK. Do not try to fit in the space below the problem. Staple this sheet to the work and turn it in when complete. 5 pts each.

1. A car of 2500 kg heading west at $6 \mathrm{~m} / \mathrm{s}$ collides with a 3500 kg car heading north at $12 \mathrm{~m} / \mathrm{s}$. What is the final speed and angle at which the mangled mess travels? [Inelastic collision] [ $7.43 \mathrm{~m} / \mathrm{s} @ 19.65^{\circ} \mathrm{W}$ of N ]
2. Car " A " has a mass of 2000 kg heading west and collides (partially elastically) with Car " B " with a mass of 3000 kg heading north at $14 \mathrm{~m} / \mathrm{s}$. If after the collision, the final speed of the $2,000 \mathrm{~kg}$ car is $25 \mathrm{~m} / \mathrm{s}$ at $23^{0}$ north of west. Assuming momentum is conserved, what should be the resultant northbound car's northerly speed? Are you able to determine its westerly speed after collision? Why. What is missing to find the initial speed of Car "A," the westbound car? [ $7.49 \mathrm{~m} / \mathrm{s}=$ north component of car B, individual answer, individual answer ]
3. A 75 kg jogger jogging at $6 \mathrm{~m} / \mathrm{s}$ north hits a 150 kg walker traveling $3 \mathrm{~m} / \mathrm{s}$ west. If the jogger continues north at $1.5 \mathrm{~m} / \mathrm{s}$, what is the final speed and angle of the walker? [ $3.75 \mathrm{~m} / \mathrm{s} @ 37^{\circ} \mathrm{N}$ of W ]
4. In the game of curling, the red team's stone is traveling at $8 \mathrm{~m} / \mathrm{s}$, hits the blue team's stone (at rest), and leaves at an angle of $30^{\circ}$ to the left of its original direction, while the blue team's stone leaves at $30^{\circ}$ to the right of red teams stone's original direction. What is the final speed of each stone? [ $4.61 \mathrm{~m} / \mathrm{s}$ ]
5. A car (A) of unknown mass heading west at $6 \mathrm{~m} / \mathrm{s}$ collides with a 3500 kg car (B) heading north at $12 \mathrm{~m} / \mathrm{s}$. What is the car's mass (A) if the final velocity of car (B) is $10 \mathrm{~m} / \mathrm{s}$ and the angle is 25 degrees West of North? [ 2465.3 kg ]
6. A 2600 kg car heading East at $15.0 \mathrm{~m} / \mathrm{s}$ collides with a 3500 kg car at rest but with its transmission in neutral (so it will roll when hit). After the collision, both objects have velocities directed $30^{\circ}$ on either side of the original line of motion of the 2600 kg car. What are the final speeds of the two objects? Is this collision Elastic or Inelastic? Prove with work, not a guess.
[ $6.435 \mathrm{~m} / \mathrm{s}, 8.66 \mathrm{~m} / \mathrm{s}$, Inelastic ]
