Physics 12 – 1D Kinematics Worksheet

Name: _____ Date: _____

Constant acceleration in one dimension (use sign convention; no components).

Assume uniform acceleration unless stated otherwise. Show full work on separate paper.

1. A motorcycle starts from rest and accelerates uniformly over a distance of 650 m until it reaches a speed of 120 km/h. How long does this acceleration take?

2. A skier glides across a nearly frictionless flat surface at 14.0 m/s. She begins braking using her edges, causing a uniform deceleration of 2.40 m/s². How far does she travel before coming to a stop?

3. A spacecraft is drifting at −6.0 m/s (toward a docking bay). Small thrusters fire for 18 s, after which the craft is moving at +4.5 m/s (away from the docking bay). What is the spacecraft's acceleration during the burn?

4. A stone is thrown straight upward from a balcony with an initial velocity of 8.5 m/s. The balcony is 22 m above the ground. How long does it take for the stone to reach the ground? (Use g = 9.8 m/s².)

5. A student on a longboard rolls down a gentle hill with a constant acceleration of 1.9 m/s². At one point she passes an observer at 3.2 m/s. How fast is she moving 4.0 m farther down the hill?

6. A loaded transport truck travelling at 32 m/s can decelerate at 4.5 m/s² on a dry road. How far in advance must the driver begin braking to stop safely?

7. A diver drops a weighted marker into a lake from a height of 55 m. Assume negligible air resistance. How long does it take for the marker to hit the water? (Use g = 9.8 m/s².)

8. A sprinter accelerates uniformly from 2.0 m/s to 9.0 m/s over a distance of 17 m. Determine the sprinter's acceleration and the time this acceleration takes.

9. A train travelling at 95 km/h enters a section of track where it must slow to 55 km/h for a curve. If the train can decelerate at 0.600 m/s², how long does it take to reduce its speed, and how much track does it cover while slowing?

Physics 12 – 1D Kinematics Worksheet (continued)

Name: _____ Date: _____

10. A cart on a straight track is pushed so that it accelerates from 1.2 m/s to 5.8 m/s in 3.4 s. During this interval, it travels 12.5 m. What was the cart's constant acceleration, and what additional distance would it travel in the next 1.0 s if the same acceleration continued?

Answer Key (no worked solutions)

Name: _____ Date: _____

1. t = 39.00 s
2. d = 40.8 m
3. a = 0.583 m/s²
4. t = 3.16 s
5. v = 5.04 m/s
6. d = 113.8 m
7. t = 3.35 s
8. a = 2.26 m/s²; t = 3.09 s
9. t = 18.52 s; d = 385.8 m
10. a = 1.35 m/s²; next 1.0 s: Δd = 6.48 m

Note: Answers rounded to appropriate significant figures.