Name: _____   Block: _____

Motion #1

1. A racecar, traveling at constant speed, makes one lap around a circular track of radius $100\,\mathrm{m}$. When the car has traveled halfway around the track, what is the magnitude of its displacement from the starting point?

2. An elevator is moving upward with a speed of $11\,\frac{\mathrm{m}}{\mathrm{s}}$. Three seconds later, the elevator is still moving upward, but its speed has been reduced to $5.0\frac{\mathrm{m}}{\mathrm{s}}$. What is the average acceleration of the elevator during the $3.0\,\mathrm{s}$ interval?

$\boxed{-2\,\frac{\mathrm{m}}{\mathrm{s^2}}}$

3. A car, starting from rest, accelerates in a straight-line path at a constant rate of $2.5\,\frac{\mathrm{m}}{\mathrm{s^2}}$. How far will the car travel in 12 seconds?

$\boxed{180\,\mathrm{m}}$

4. A body initially at rest is accelerated at a constant rate for 5.0 seconds in the positive x direction. If the final speed of the body is $20.0\,\frac{\mathrm{m}}{\mathrm{s}}$, what was the body's acceleration?

$\boxed{4\,\frac{\mathrm{m}}{\mathrm{s^2}}}$

Use the following to answer questions 5–6:

An object starts from rest and accelerates uniformly in a straight line in the positive x direction. After 10. seconds, its speed is $70.\,\frac{\mathrm{m}}{\mathrm{s}}$.

5. Determine the acceleration of the object.

$\boxed{7\,\frac{\mathrm{m}}{\mathrm{s^2}}}$

6. How far does the object travel during those first 10 seconds?

$\boxed{350\,\mathrm{m}}$

7. A racecar has a speed of $80 \frac{m}{s}$ when the driver releases a drag parachute. If the parachute causes a deceleration of $-4 \frac{m}{s^2}$, how far will the car travel before it stops?

$\boxed{800\,\mathrm{m}}$

8. A brick is dropped from rest from a height of 4.9 m. How long does it take for the brick to reach the ground?

$\boxed{1\,\mathrm{s}}$

9. A ball is dropped from rest from a tower and strikes the ground 125 m below. Approximately how many seconds does it take for the ball to strike the ground after being dropped? (Neglect air resistance.)

$\boxed{5.05\,\mathrm{s}}$

10. Water drips from rest from a leaf that is 20 meters above the ground. Neglecting air resistance, what is the speed of each water drop when it hits the ground?

$\boxed{19.8\,\frac{m}{s}}$

11. What is the maximum height that will be reached by a stone thrown straight up with an initial speed of $35 \frac{m}{s}$?

$\boxed{62.5\,\mathrm{m}}$

Use the following to answer questions 12–13:

A ball is shot straight up from the surface of the earth with an initial speed of $19.6 \frac{m}{s}$. Neglect any effects due to air resistance.

12. What is the maximum height that the ball will reach?

$\boxed{19.6\,\mathrm{m}}$

13. How much time elapses between the throwing of the ball and its return to the original launch point?

$\boxed{4\,\mathrm{s}}$