Name:_____ Score: 20

Regents Physics

Worksheet 1.1.5 – Freefall (20 points)

Show all work – multiple choice answers MUST be proven for full credit!

1. A person drops a stone from the top of a 45 meter high building.

    a. Determine the time that it will take for the stone to reach the ground.

[3.0 s]

    b. Determine the final speed of the stone AS IT HITS the ground (not AFTER it hits the ground).

[29 m/s]

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2. A man throws a rock directly upward with an initial speed of 15 meters per second.

    a. Determine the time that it takes for the rock to reach its maximum height.

[1.5 s]

    b. Determine the maximum height that the rock will reach.

[11.5 m]

3. An object that is dropped from a helicopter takes 15 seconds to reach the ground.

    a. Determine height from which the object was dropped.

[1103 m]

    b. Determine the speed with which the object hit the ground.

[147 m/s]

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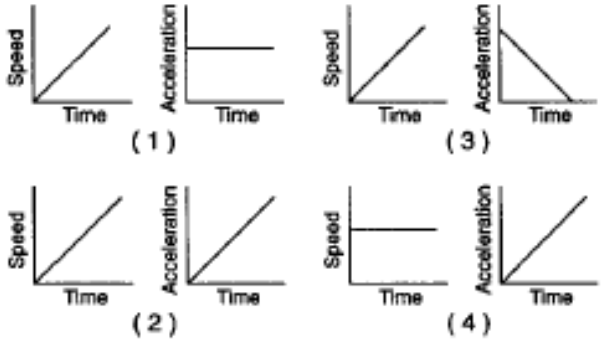
4. As an object falls freely near the surface of the Earth, its acceleration

    (1) decreases
    (2) increases
    (3) remains the same

Proof: Explain.

5. Which of the following sets of graphs describe an object in freefall near the surface of the Earth?



Proof: Explain.

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6. An object starts from rest and falls freely. What will the velocity of this object be after it has fallen for 0.050 minutes?

(1) 9.8 m/s
(2) 20. m/s
(3) 29. m/s
(4) 88. m/s

Proof: Show calculation.

7. Starting from rest, object A falls freely for 2.0 seconds while object B falls for 4.0 seconds. Compared with object A, object B falls

(1) one half as far
(2) twice as far
(3) three times as far
(4) four times as far

Proof: Show calculation for each object.

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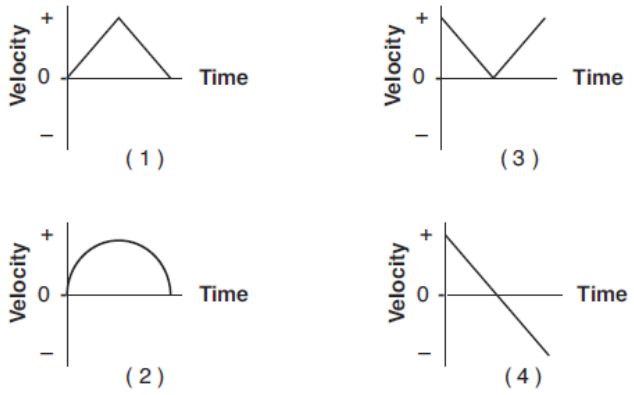
8. A student throws a baseball vertically upward and then catches it. If vertically upward is considered to be the positive direction, which graph best represents the relationship between velocity and time for the baseball? [Neglect friction]



Proof: Explain.