

Name: Key Recitation Instructor: \_\_\_\_\_

$$x = x_0 + v_0t + \frac{1}{2}at^2 \quad v = v_0 + at \quad v^2 = v_0^2 + 2a(x - x_0) \quad g = 9.8 \text{ m/s}^2$$

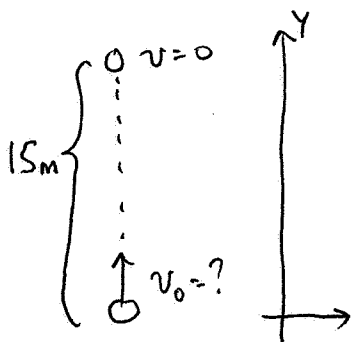
**Multiple Choice:** A bullet is dropped into a river from a very high bridge. At the same time, another bullet is fired from a gun, straight **upward**. Neglecting air resistance, the speed just before striking the water (circle one) (5 pts):

- a.) is greater for the dropped bullet
- b.) is greater for the bullet fired from the gun
- c.) is the same for both bullets
- d.) depends on how high the bridge is
- e.) need more information.

**Show all work:** A young girl throws a baseball straight into the air. The ball reaches a maximum height of 15 m above where she releases the ball from her hand.

a) What was the speed of the baseball when she released it? (8 pts)

b) She catches the ball at the same height she released the ball; how much time does the ball spend in flight. Neglect effects of air resistance (7 pts)



$$\begin{aligned} y_0 &= 0 \\ y &= 15\text{m} \\ v_0 &=? \\ v &= 0 \\ a &= -9.8 \text{ m/s}^2 \\ t &=? \end{aligned}$$

$$\begin{aligned} \text{a) } v^2 &= v_0^2 + 2a(y - y_0) \\ 0 &= \cancel{v_0^2}^2 - 2(9.8)(15) \end{aligned}$$

$$v_0 = \sqrt{2(9.8)(15)} = 17 \text{ m/s}$$

b) time to get to 15m

$$v = v_0 + at$$

$$0 = 17.1 - 9.8t$$

$$t = \frac{17.1}{9.8} = 1.75 \text{ s}$$

$$\text{Total time} = 2t = 3.5 \text{ s}$$

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