

Mr. Singh shoots a basketball from the 3 point line. When the ball releases from his hand its 3 feet in the air. The equation is  $h = -1/8d^2 + d + 3$  where  $h$  is the height in feet and  $d$  is the distance in meters

- a) How far has the ball travelled when it hits the ground?
- b) What is the horizontal distance when the ball is at 3 ft above the ground?

$$h = -\frac{1}{8}x^2 + x + 3$$

$$h=0$$

$$a) x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-1 \pm \sqrt{(-1)^2 - 4(-1/8)(3)}}{2(-1/8)}$$

$$= \frac{-1 \pm \sqrt{1 + 1.5}}{-0.25}$$

$$= \frac{-1 \pm \sqrt{2.5}}{-0.25}$$

$$\rightarrow \frac{-1 + \sqrt{2.5}}{-0.25} \quad \& \quad \frac{-1 - \sqrt{2.5}}{-0.25}$$

$$= -2.3 \quad \quad \quad \boxed{= 10.3}$$

Since distance cannot be negative,  
 Mr. Singh ~~threw~~<sup>shot</sup> the basketball and  
 it travelled 10ft when it hit the ground.

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$$b) \text{ 3 ft above ground. } \Rightarrow \boxed{h=3}$$

$$3 = -\frac{1}{8}x^2 + x + 3$$

$$\Rightarrow -\frac{1}{8}x^2 + x + 3 - 3$$

$$\Rightarrow -\frac{1}{8}x^2 + x$$

$$\frac{-1 \pm \sqrt{(-1)^2 - 4(-1/8)(0)}}{2(-1/8)}$$

$$= \frac{-1 \pm \sqrt{1-0}}{-0.25}$$

$$\rightarrow \frac{-1 \pm \sqrt{1}}{-0.25}$$

$$\frac{-1 + 1}{-0.25} \quad \& \quad \frac{-1 - 1}{-0.25}$$

$$= 0 \quad \quad \quad = 8$$

Horizontal distance is 0m & 8m when  
 the ball is 3ft above the ground.