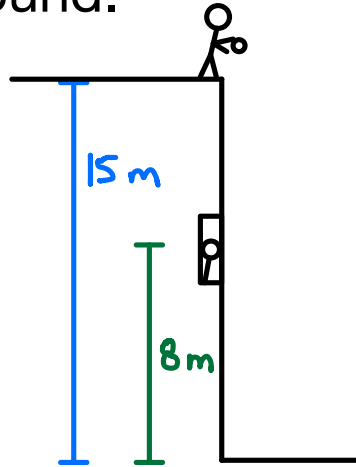
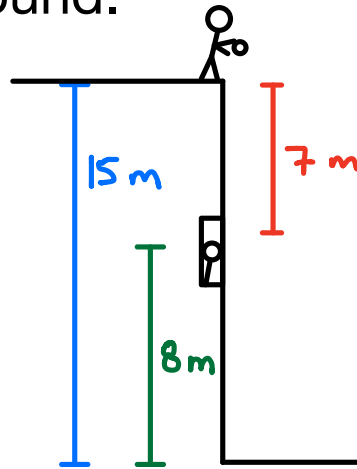


You drop a rock from the top of a 15 m high building. Your friend is looking out a window 8 m above the ground.



- How long will it be before your friends see the rock pass him?
- At what speed does the rock pass your friend?
- At what speed does the rock impact the ground?

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a)

$$d = +7 \text{ m}$$

$$a = +9.8 \text{ m/s}^2$$

$$v_i = 0$$

$$t = ?$$

$$d = v_i t + \frac{1}{2} a t^2$$

$$t = \sqrt{\frac{2d}{a}} = \sqrt{\frac{2(7)}{9.8}} = \boxed{1.20 \text{ s}}$$

b)

$$d = +7 \text{ m}$$

$$a = +9.8 \text{ m/s}^2$$

$$v_i = 0$$

$$t = 1.20 \text{ s}$$

$$v_f = ?$$

$$v_f^2 = v_i^2 + 2ad$$

$$v_f = \sqrt{2ad}$$

$$= \sqrt{2(9.8)(7)} = \boxed{11.7 \frac{\text{m}}{\text{s}}}$$

c)



$$d = +15 \text{ m}$$

$$a = +9.8 \text{ m/s}^2$$

$$v_i = 0$$

$$v_f = ?$$

$$v_f^2 = v_i^2 + 2ad$$

$$v_f = \sqrt{2ad}$$

$$= \sqrt{2(9.8)(15)} = \boxed{17.1 \frac{\text{m}}{\text{s}}}$$