

AP Physics - 2D Motion - Review Probs

Note Title

9/14/2007

- 1) A bomber is flying in level flight above level ground. It drops a bomb. Assuming no air friction, what is the bomb's trajectory...
...from a ground observer's point of view?

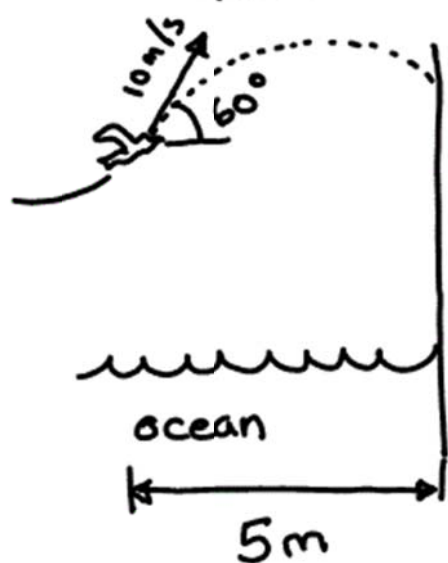


...from the bomber's point of view?

↓
straight down!
(the bomb will stay directly below the airplane until it hits the ground)

2) A kittiwake (a small version of a seagull) is looking to redecorate its rookery near Whittier, Alaska. The rookery is a sheer vertical cliff several hundred meters tall, which plunges into the waters of Prince William Sound.

If the kittiwake pulls up at a 60° angle at 10 m/s just prior to launching its "paint", and the bird launches while 5 m away from the wall, what will be the foul projectile's final velocity?



cliff
face



$$\frac{v_{cx}}{\cos 60^\circ} = \frac{v_{cx}}{10}$$

$$v_{cx} = 5 \text{ m/s} = v_{fx} = \bar{v}_x$$

$$\frac{v_{cy}}{\sin 60^\circ} = \frac{v_{cy}}{10}$$

$$v_{cy} = 8.66 \text{ m/s}$$

	x	y
G:	$\Delta x = 5 \text{ m}$ $\bar{v}_x = 5 \text{ m/s}$	G: $v_{cy} = 8.66 \text{ m/s}$ $a_y = -9.8 \text{ m/s}^2$
U:	t	t = 1 s
E:	$\bar{v}_x = \frac{\Delta x}{t}$ $t = \frac{\Delta x}{\bar{v}_x} = \frac{5}{5}$ t = 1 s	U: $v_{fy} = ?$ E: $v_{fy} = v_{cy} + a_y t$ $v_{fy} = (8.66) + (-9.8)(1)$ $v_{fy} = -1.14 \text{ m/s}$

$$v_{fx} = 5 \text{ m/s}$$

$$v_{fy} = -1.14 \text{ m/s}$$



$$\therefore v_f = 5.18 \text{ m/s @ } -13^\circ$$