

1. You are a pyro-technician. You have just launched an aerial shell, containing a firework, from a mortar shoot. The path of the aerial shell can be modeled by the equation $h(t) = -1.2(t - 7)^2 + 170$, where h is the height of the firework in meters, and t is the time, in seconds.

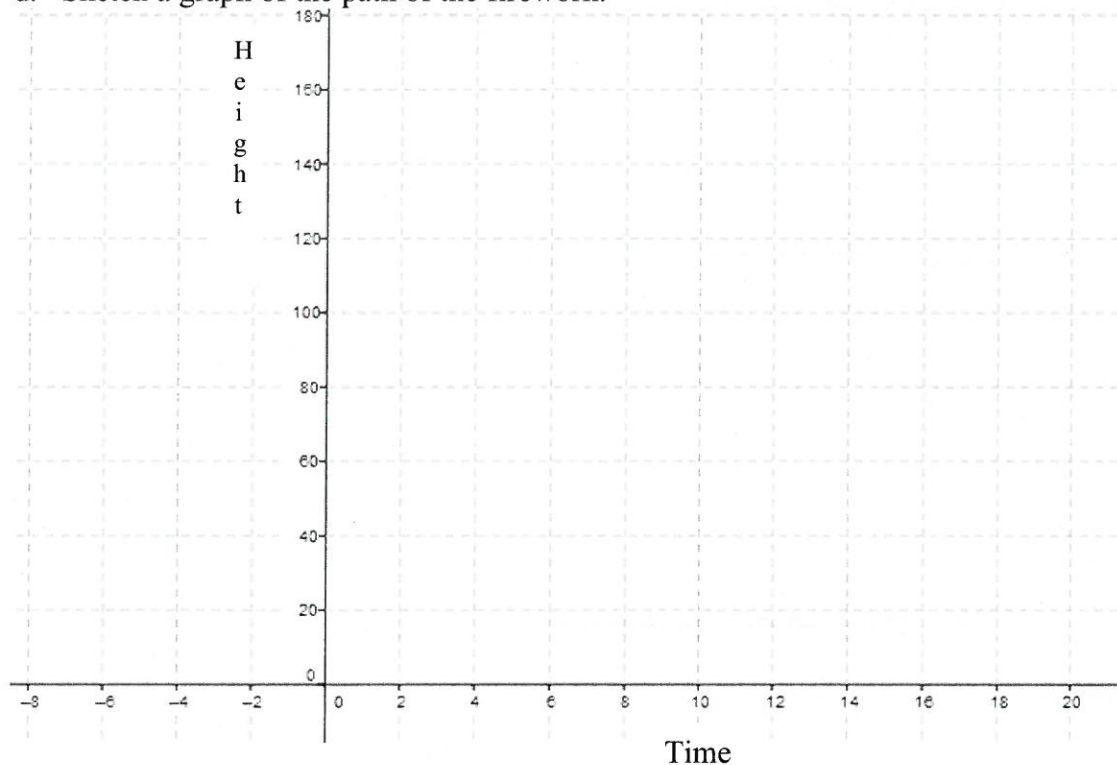
- a. What is the vertex in this situation, and what does it represent?

- b. What was the initial height of the firework?

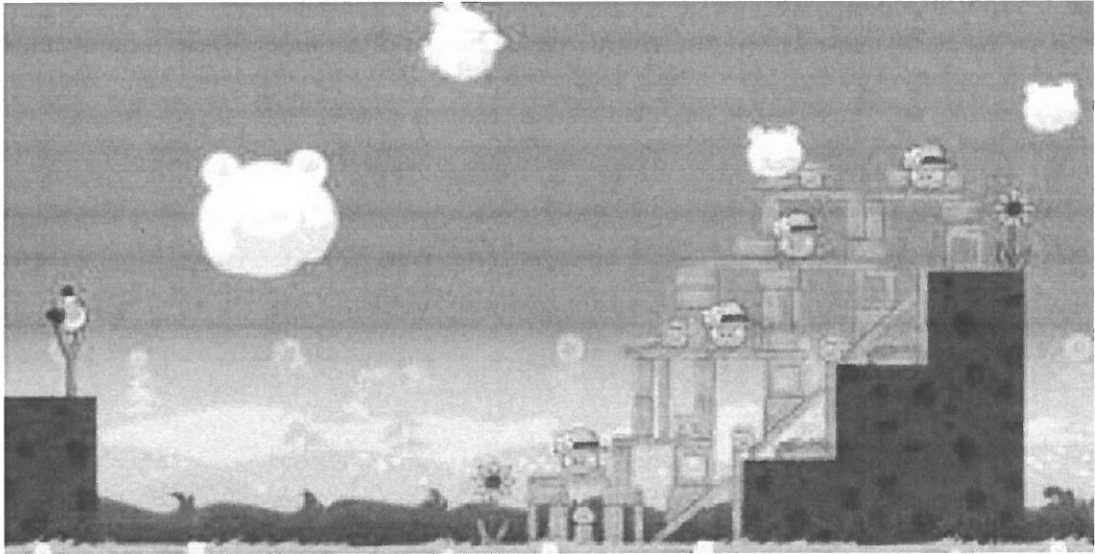
- c. When did the aerial shell of the firework hit the ground?



d. Sketch a graph of the path of the firework.



2. In the game Angry Birds, the path of the bird can be modeled by the equation $h(x) = -0.5(x - 8)^2 + 100$ where h is the height of the angry bird in feet, and x is the distance in feet.



- a. What is the vertex in this situation, and what does it represent?
- b. What was the initial height of the angry bird?
- c. At what distance will the angry bird hit the ground if it did not hit anything?
- d. If the closest pig is 26 feet away, will the angry bird hit the pig?

1. You are a pyro-technician. You have just launched an aerial shell, containing a firework, from a mortar shoot. The path of the aerial shell can be modeled by the equation $h(t) = -1.2(t - 7)^2 + 170$, where h is the height of the firework in meters, and t is the time, in seconds *after launch*

- a. What is the vertex in this situation, and what does it represent?

$V(7, 170)$: max height \rightarrow the firework reaches max height at 170m after 7sec

- b. What was the initial height of the firework?

$$h(0) = -1.2(0-7)^2 + 170$$

$$= 111.2 \text{ meters}$$

- c. When did the aerial shell of the firework hit the ground?

$$0 = -1.2(t-7)^2 + 170$$

$$-170 = -1.2(t-7)^2$$

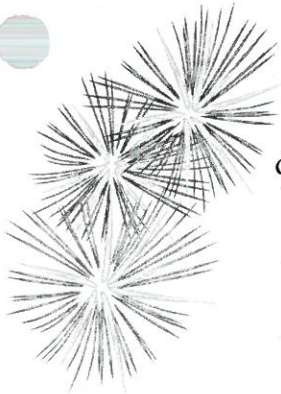
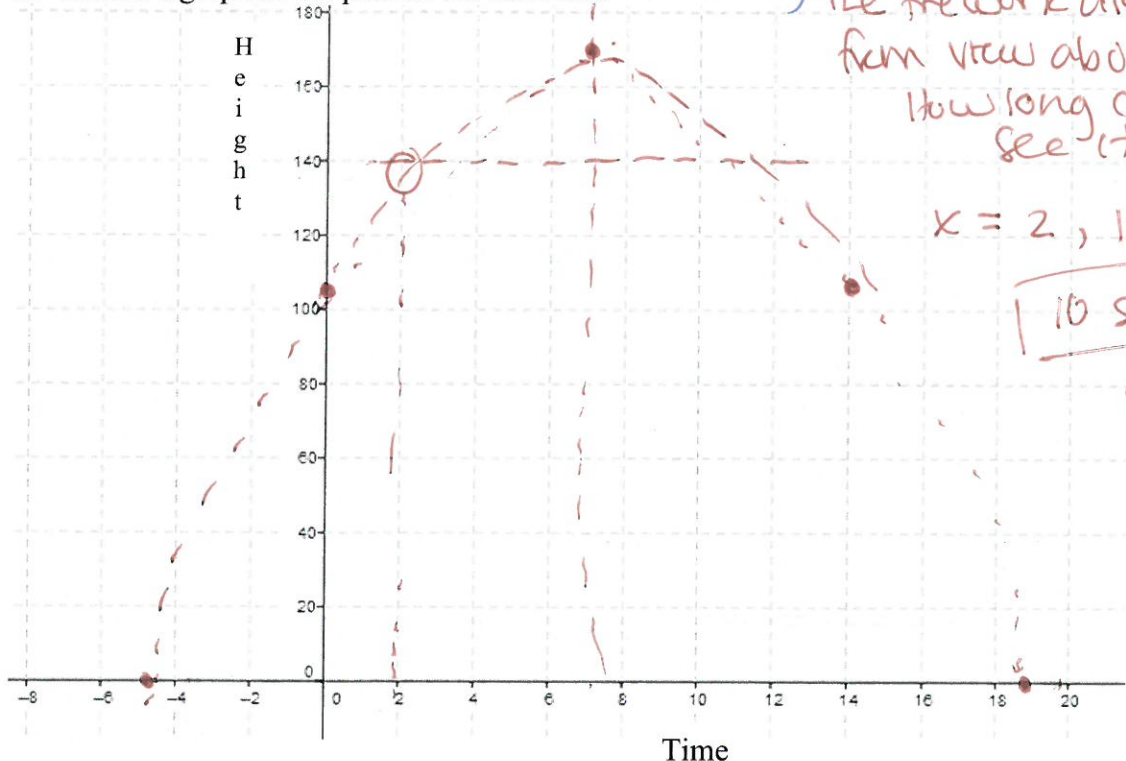
$$\sqrt{141.6} = \sqrt{(t-7)^2}$$

$$\pm 11.902 = t-7$$

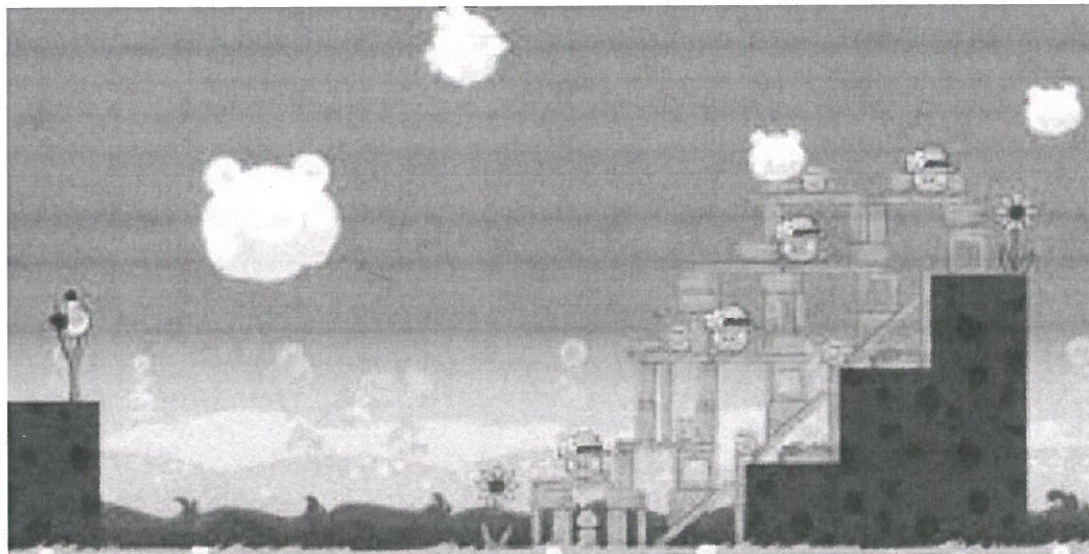
$$t = 7 \pm 11.902 \rightarrow \begin{matrix} 18.902 \\ -4.902 \end{matrix}$$

After 18.902 seconds

- d. Sketch a graph of the path of the firework.



2. In the game Angry Birds, the path of the bird can be modeled by the equation $h(x) = -0.5(x - 8)^2 + 100$ where h is the height of the angry bird in feet, and x is the distance in feet.



- a. What is the vertex in this situation, and what does it represent?

$(8, 100)$ The max: when the bird is landed 8 feet away horizontally, it is at its highest, which is 100 ft.

- b. What was the initial height of the angry bird?

$h(0) = 68 \text{ ft.}$

- c. At what distance will the angry bird hit the ground if it did not hit anything?

$$0 = -0.5(x - 8)^2 + 100$$

$$-100 = -0.5(x - 8)^2$$

$$\sqrt{200} = \sqrt{(x - 8)^2}$$

$$\pm 10\sqrt{2} = x - 8$$

$$x = 8 \pm 10\sqrt{2} \rightarrow 22.1421$$

$$\rightarrow -6.1421$$

22.1421 feet from the slingshot

- d. If the closest pig is 26 feet away, will the angry bird hit the pig?

NO... it will hit the ground before the pig.