

Angled Fireballs

Background:

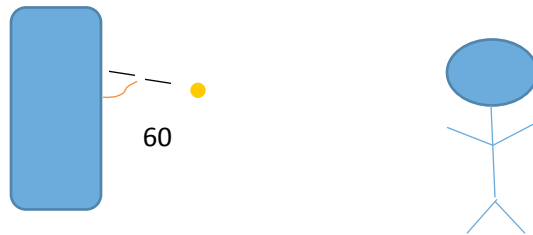
Katniss was attempting to return to her pond when suddenly she is attacked by a flurry of fireballs:

“Whatever vague plan I had conceived regarding returning to my pond is wiped from my mind as I zigzag and dive and leap to avoid the fireballs. Each one is only the size of an apple, but packs tremendous power on contact.” (P.172)

“My muscles react, only not fast enough this time. The fireball crashes into the ground at my side, but not before it skids across my right calf” (P. 176)

Fireballs were continuously shooting out at her at different angles. Katniss had to dodge them. The bigger the angle the higher the fireballs shoot out, the smaller the angle the lower the fireballs shoot out. Knowing the angle of the fireball is being shot at her could help her avoid them. Help her solve the puzzle by solving the following hypothetical problems:

- 1.) If a fireball was shot out at a 60 degree angle, what area would it hit her body?



- a.) Legs
- b.) Midsection
- c.) Head and Neck
- d.) The fireball wouldn't hit her at all

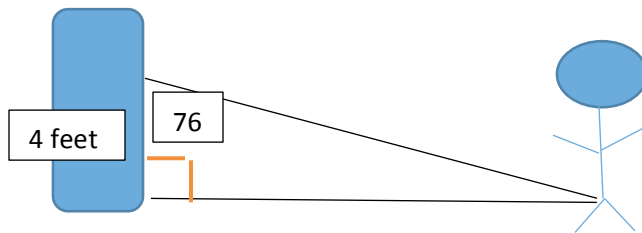
- 2.) If a fireball was shot out at a 115 degree angle, what area would it hit her body?

- a.) Legs
- b.) Midsection
- c.) Head and Neck
- d.) The fireball wouldn't hit her at all

3.) The fireball hit Katniss' calf, estimate the possible range of angles the fireball could have been shot out at?

- a.) 0-20 degrees
- b.) 20-40 degrees
- c.) 40-60 degrees
- d.) 60-80 degrees
- e.) 80-100 degrees

4.) Katniss, the angle of the fireballs, and the place where the fireballs shot out of make a right triangle.



In order to help her avoid her attacks, Katniss needs to figure out how far the shooter is from her. In the distance the shooter appear to be 4 feet tall. The angle the fireball is being shot is 76 degrees. How far is the shooter from Katniss? (Use tangent)

$$\tan 76 = \frac{x}{4}$$

$$x = 4 * \tan 76$$

5.) The shooter moves suddenly. Now, the distance of the shooter 4.5 feet tall. The angle the fireball is being shot is 82 degree. Now how far is the shooter from Katniss?

Angled Fireballs Answer Key

- 1.) a
- 2.) c
- 3.) c
- 4.) 16 ft
- 5.) 32 ft