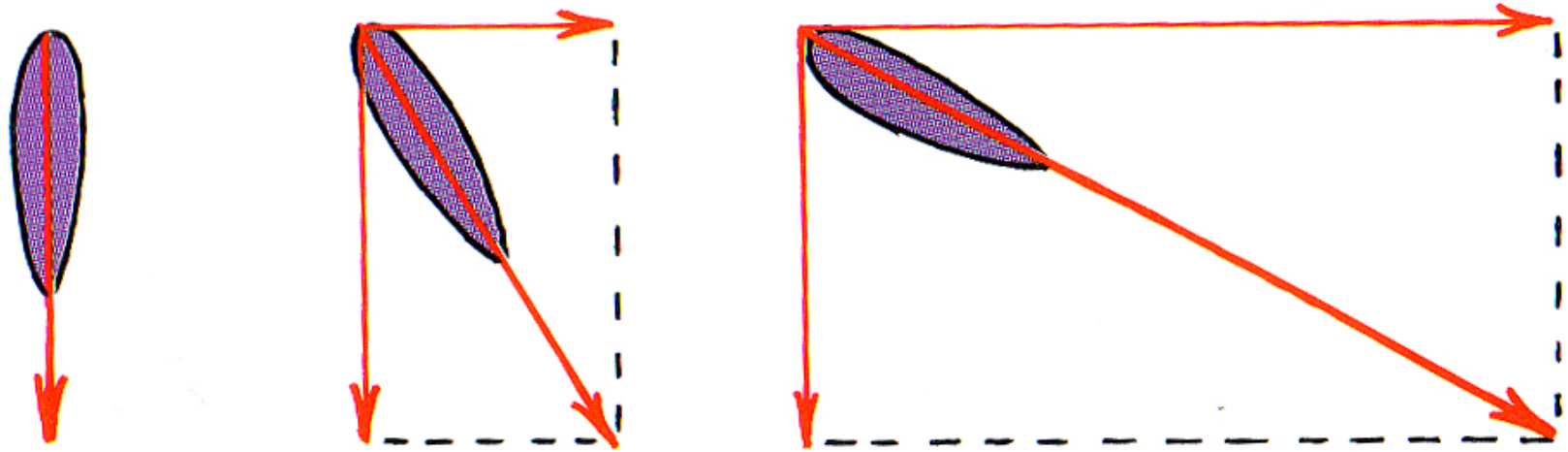
PRACTICE TRIG IDENTITIES

RESOLUTION

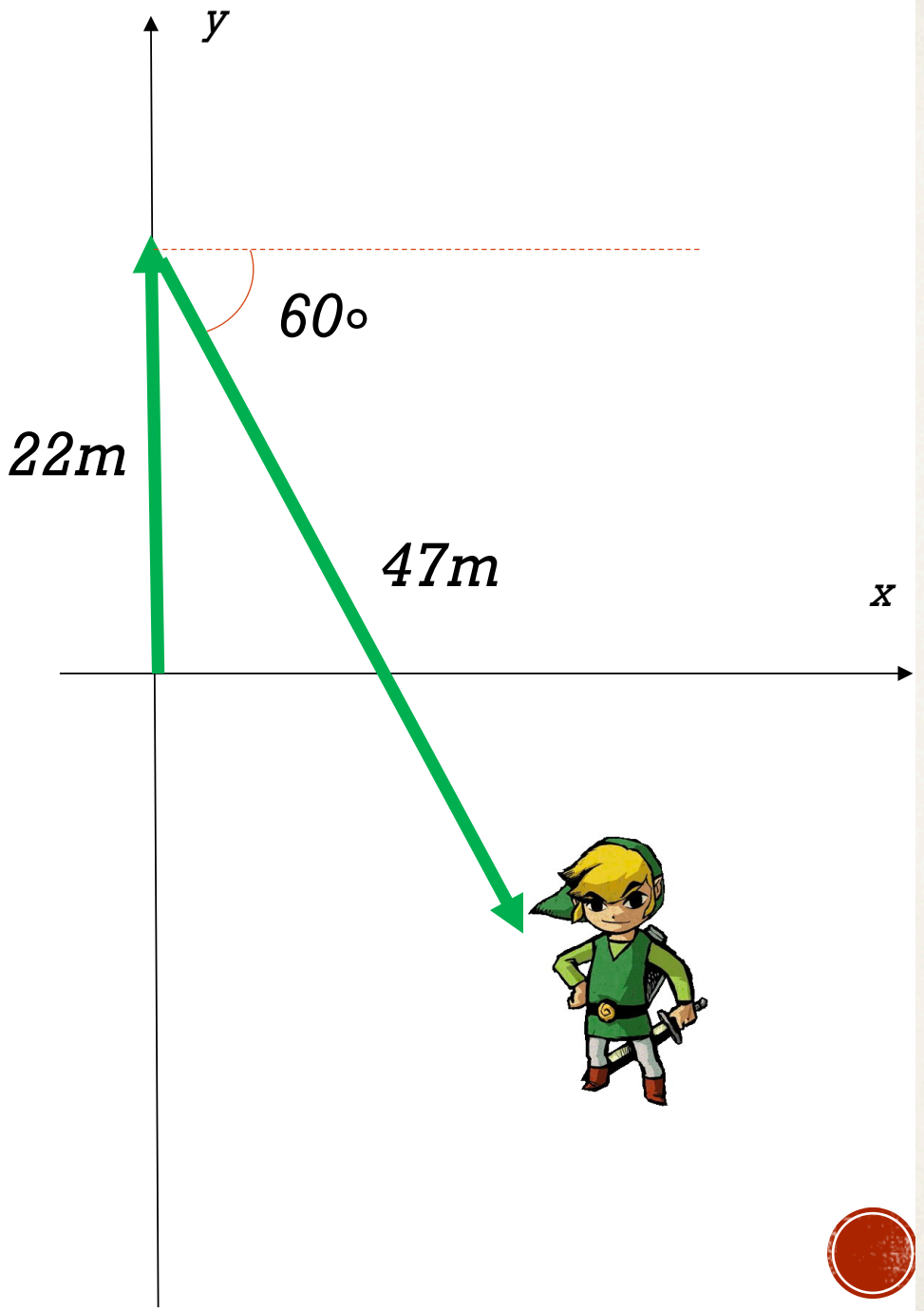
- **Any vector** drawn can be resolved into **vertical and horizontal components**

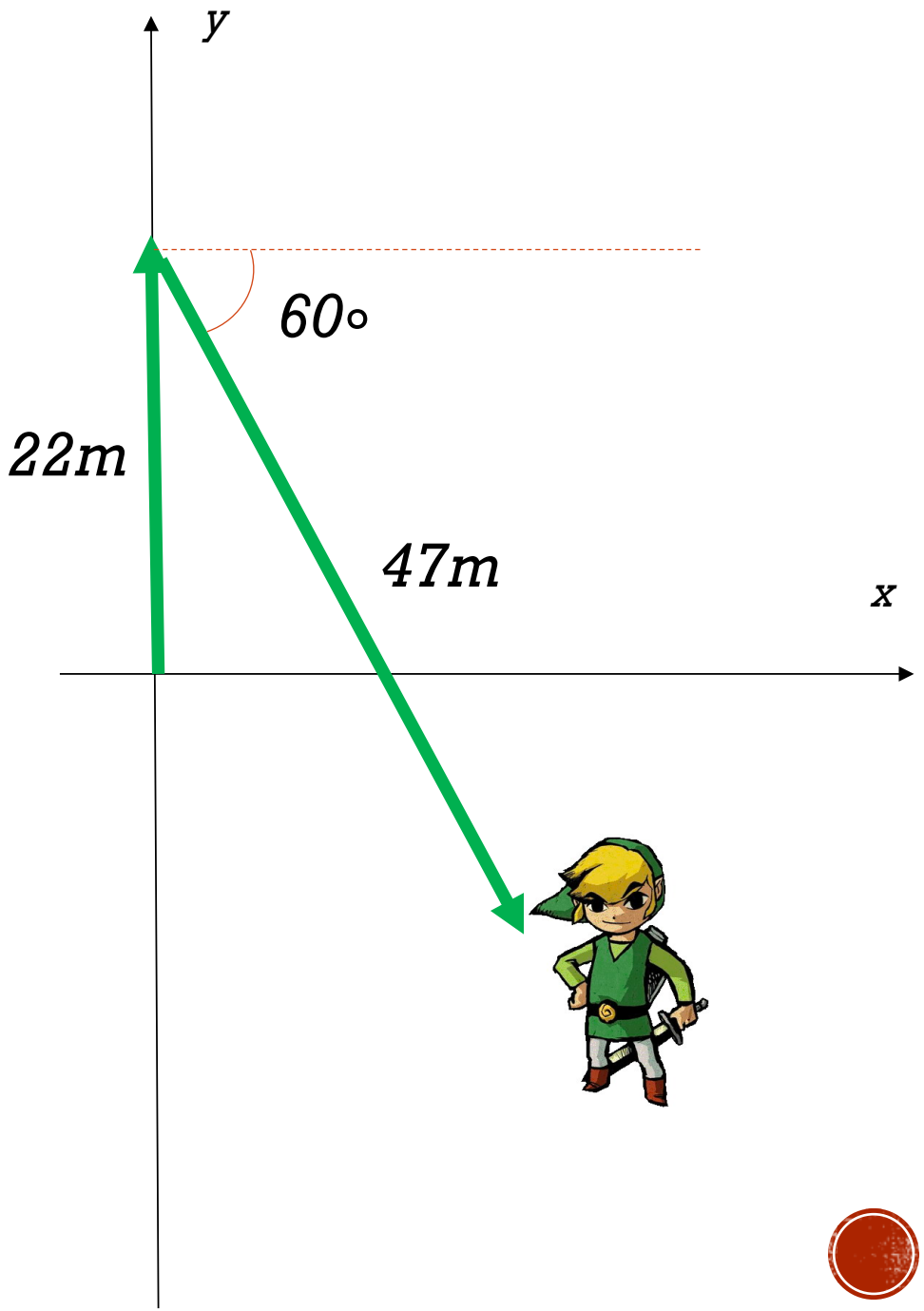


RESOLUTION

- You are in a water balloon fight and you lob a water balloon at a velocity of 2.0 m/s 30 degrees above the horizontal. What are the x and y components of this throw?

- Link goes out to Hyrule Field to do some treasure hunting.
- Link walks 22 m north to find a rupee
- He then runs 60 degrees south of east for 47 m to snag another rupee
- What is Link's displacement and direction?



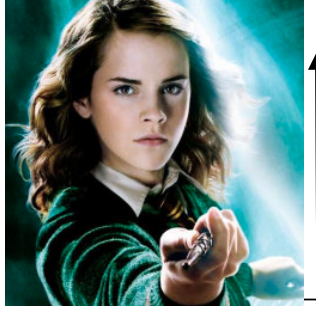

y
60°
22m
47m
x

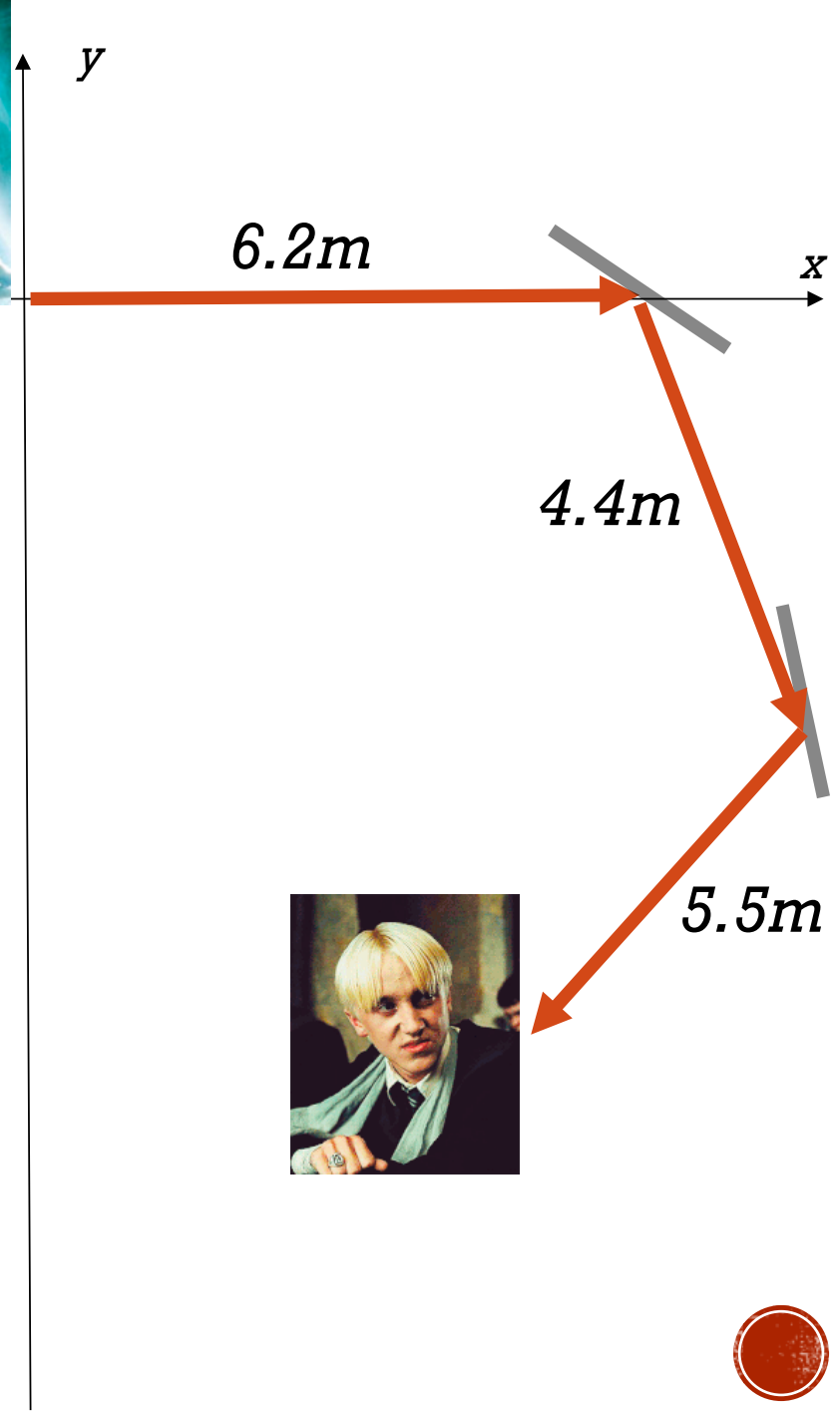
RULES FOR RESOLVING AND ADDING VECTORS

- Decompose all vectors into ***x* and *y* components**
- **Add the x components together** to get x component of resultant
  - **Same for y**
- To get **magnitude** and **direction** of resultant vector:
- $V = \sqrt{V_x^2 + V_y^2}$ $\theta = \tan^{-1}\left(\frac{V_y}{V_x}\right)$

- **Be aware of negative signs**! Any components that are moving toward the negative x or negative y get a negative sign.

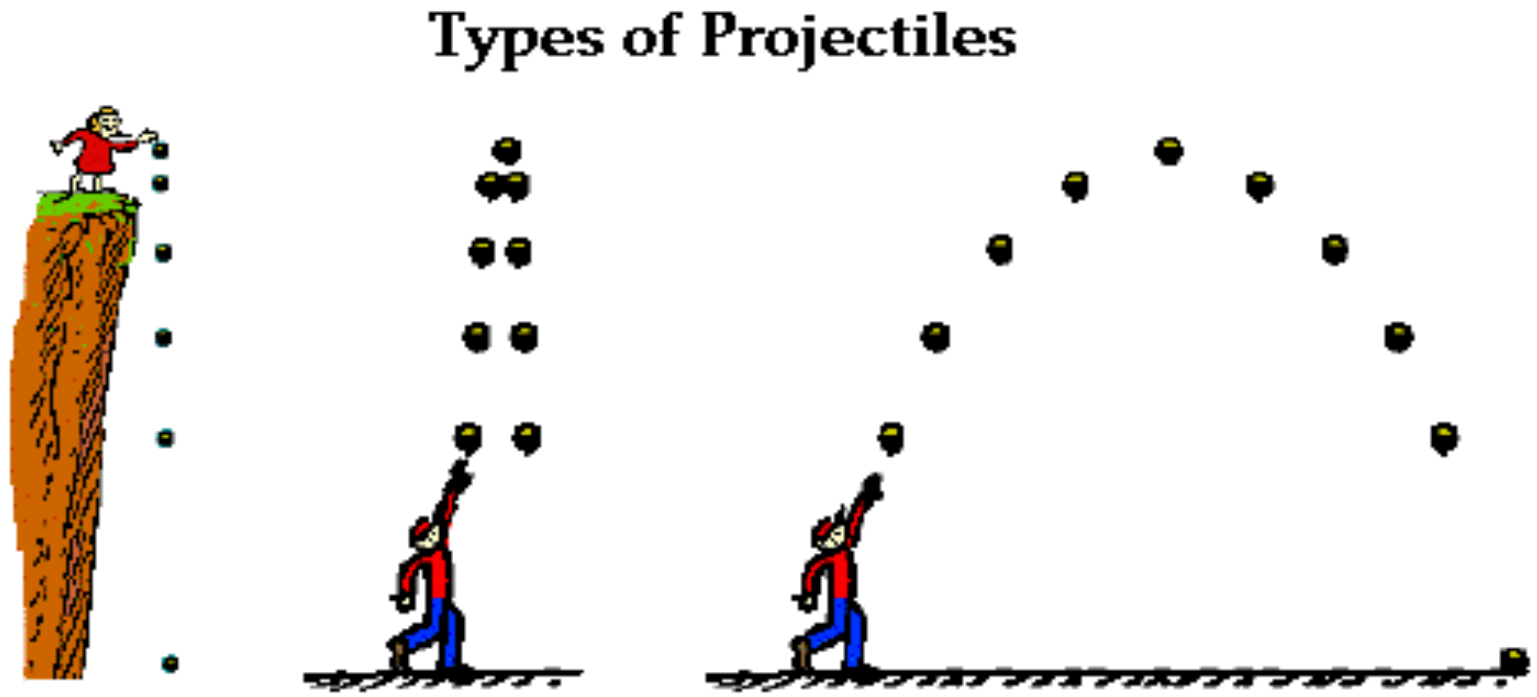
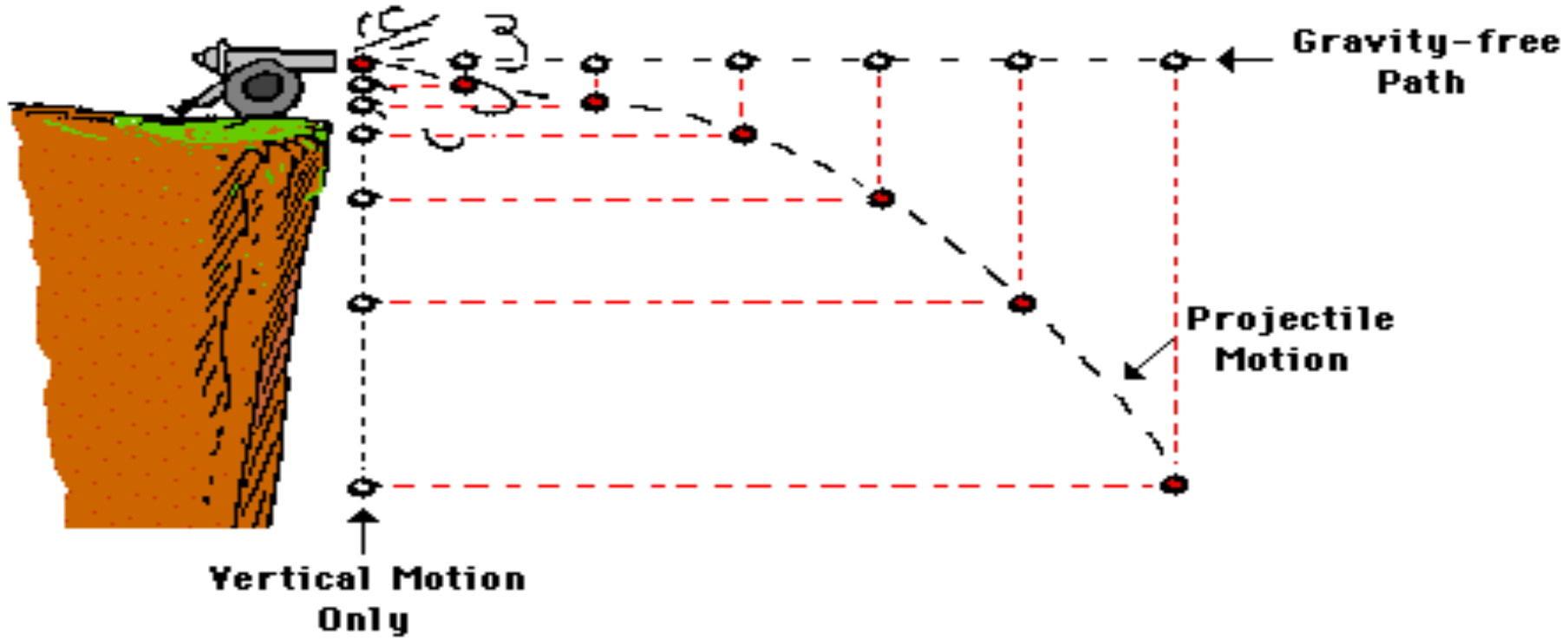
- Hermione, always being the clever one, uses mirrors to bounce her spell around the room to hit Draco in his awful bull cut.
- Her spell rockets due east for 6.2 m, bounces southeast (45 deg.) for 4.4 m, and reflects off a second mirror at 53 deg. South of west for 5.5 m).
- What is the total displacement of her spell?
- *9.6 m, 51 degrees south of east*





PROJECTILE MOTION

- A **projectile** is any object that moves through space, **acted on only by gravity** once it is in the air.



- Projectiles near the surface of the earth follow a **curved path**, due to the force of gravity.