



Name _____ Class _____ Date _____

AFTER THIS WORKSHEET YOU CAN

- ✓ Understand: Projectile Motion Setup
- ✓ Understand: Horizontal Motion
- ✓ Understand: Vertical Motion
- ✓ Understand: Time of Flight



Section A • Concept Check

• BEGINNER

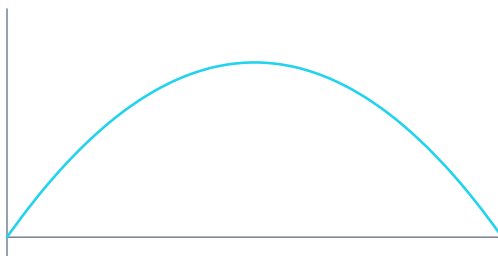
4 × 1 = 4

- 1 A ball is thrown horizontally at 8 m/s and falls for 4s. Find horizontal distance.

- 2 A projectile is launched straight up at 40 m/s ($g=10$). Find time to max height.

- 3 Find the max height for $v_{y0}=40$ m/s ($g=10$).

- 4 Find the time of flight for $v_{y0}=15$ m/s launched and landing at the same height ($g=10$).



A projectile follows a parabolic path



Section B • Problem Solving

• INTERMEDIATE

4 × 3 = 12

- 5 A projectile is launched at 20 m/s at 30° ($g=10$, $\sin(60^\circ)\sim 0.866$). Find its range.

- 6 Why does horizontal velocity remain constant during projectile motion (ignoring air resistance)?

- 7 A projectile is launched at 50 m/s straight up. Using $g=10$, find the total time of flight (up and back down).

- 8 At what angle does a projectile achieve maximum range (for a given launch speed)?



Section C · Challenge

• CHALLENGE

2 × 2 = 4

9 A ball is thrown horizontally at 12 m/s from a height that takes 2.5s to fall. Find horizontal distance.

10 Why does a projectile's path trace out a parabola?

Reflection — the most useful thing I learned: _____

A ___/4 B ___/12 C ___/4 **Total ___/20**

Teacher's Signature

Parent's Signature

✂ ANSWER KEY — FOLD OR CUT BEFORE HANDING OUT

1 = 32 m 2 = 4s 3 = 80 m 4 = 3s (using $2 \cdot v_{y0}/g$) | 5 = $R = 400 \cdot 0.866 / 10 \approx 34.6\text{m}$ 6 = Because there is no horizontal force acting on the projectile, so no horizontal acceleration occurs 7 = 10s (using $2 \cdot v_{y0}/g$) 8 = 45° | 9 = 30 m 10 = Because horizontal position increases linearly with time while vertical position depends on time squared, producing a parabolic curve