February 8, Week 4

Today: Chapter 3, Projectile Motion

Homework #1 now in boxes.

No New homework assignment this week.
Homework Solutions posted Thursday morning.
Chapter 2 practice problems on Mastering Physics.

Exam #1 Friday, February 10.

Practice Exam available on website.
Review Session, Thursday, 7:30 PM in room 114 of Regener Hall.

Projectile Motion

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Ignore air resistance again.

Projectile Equations

General Equations

$v_x = v_{o,x} + a_x t$	$v_y = v_{o,y} + a_y t$
$x = x_o + v_{o,x} t + \frac{1}{2} a_x t^2$	$y = y_o + v_{o,y} t + \frac{1}{2} a_y t^2$

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Gravity pulls straight down, so it causes acceleration in the y-direction only.

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$$a_x = 0, a_y = -g \quad \text{(Down is negative)}$$

Projectile Equations II

Substituting $a_x = 0$, $a_y = -g$ into our general equations, gives us the equations of motion for a projectile.

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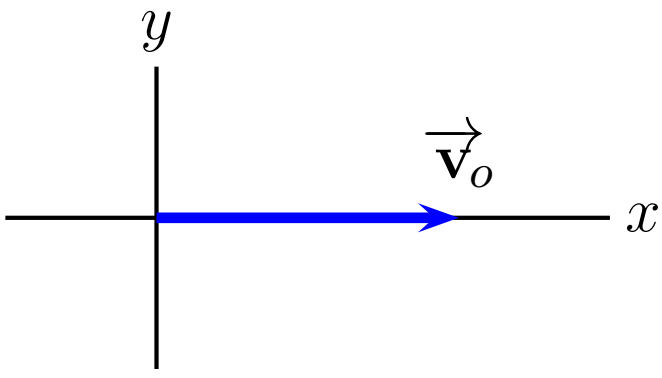
Horizontal Launch

The equations of motion simplify even further in the case the projectile is launched horizontally.



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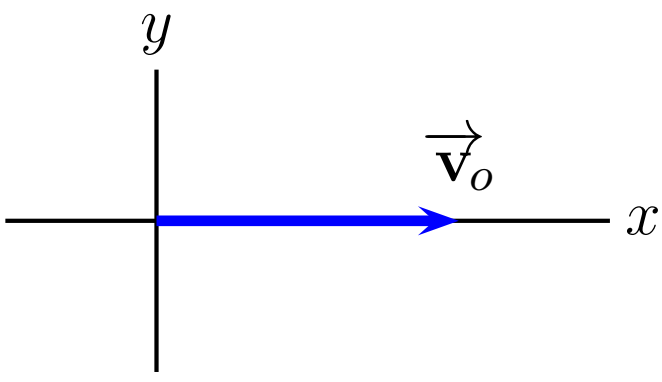

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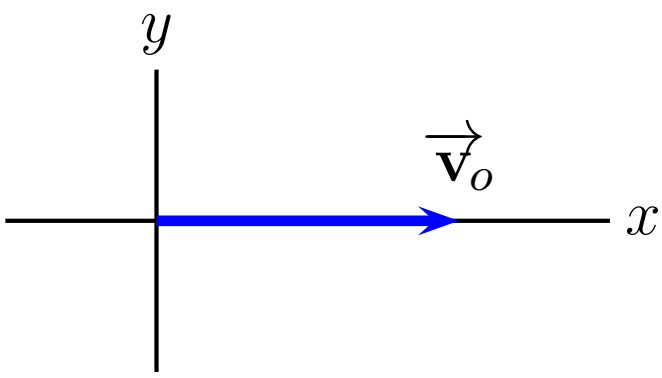

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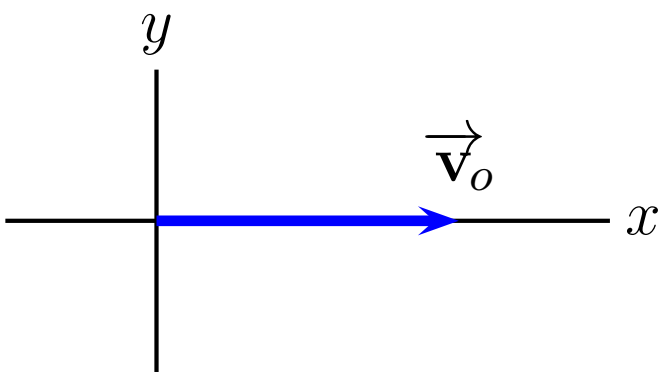

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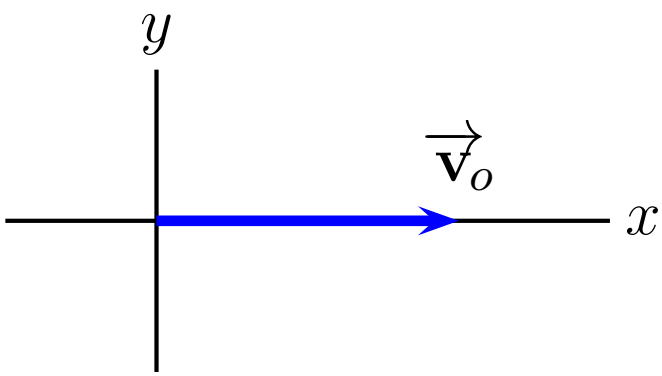

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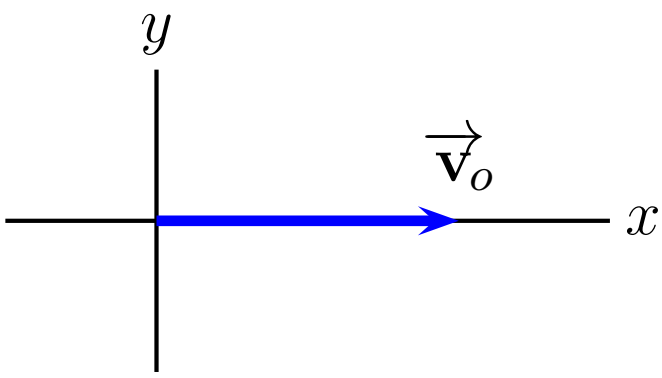

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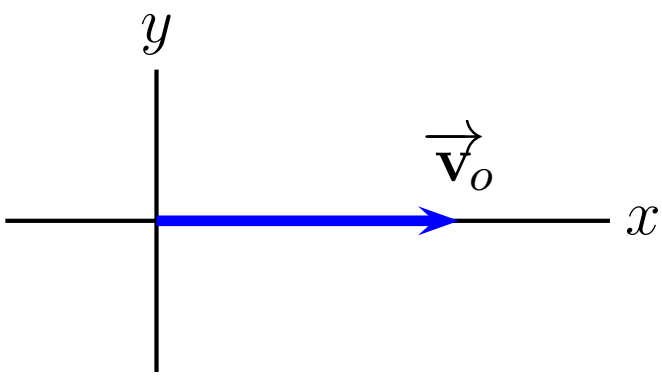

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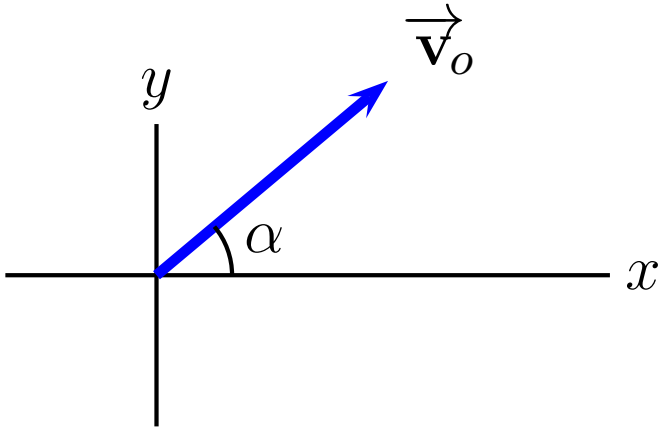
General Launch Angle



$v_o =$ launch speed

$\alpha =$ launch angle

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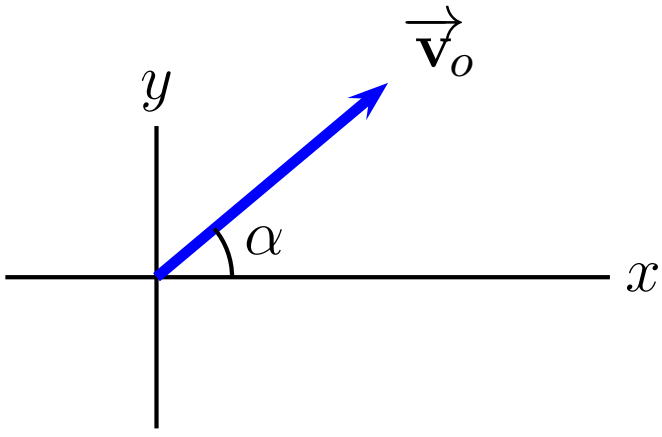

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No shortcuts here!

$$v_{o,x} = v_o \cos\alpha, \qquad v_{o,y} = v_o \sin\alpha$$

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