June 11, Week 2

Today: Finish Chapter 2, Constant Acceleration Problems and start Chapter 3, Vectors

Homework #2 now available on webpage

Please register your clicker. (There are 5 students without registered clickers.)

Example I

$$\boxed{x_f = x_i + (v_x)_i \Delta t + \frac{1}{2} a_x (\Delta t)^2}$$

$$\boxed{(v_x)_f = (v_x)_i + a_x \Delta t}$$

$$\boxed{(v_x)_f^2 = (v_x)_i^2 + 2 a_x \Delta x}$$

Example: Phyllis is traveling on a straight highway with a speed of $30.0\, m/s$ and wishes to pass Stanley who is in the car in front of her. Phyllis hits the gas causing a constant acceleration of $1.25\, m/s^2$. After going $150\, m$, phyllis is a safe distance in front of Stanley, so she decelerates back down to $30.0\, m/s$ in $5.0\, s$. How long did it take and what total distance did Phyllis cover while passing Stanley? Assume Phyllis stayed in the same lane the whole time.

Example II

$$\boxed{y_f = y_i + (v_y)_i \, \Delta t + \frac{1}{2} a_y \, (\Delta t)^2}$$

$$\boxed{(v_y)_f = (v_y)_i + a_y \Delta t}$$

$$\boxed{(v_y)_f^2 = (v_y)_i^2 + 2 a_y \Delta y}$$

Example: A man is in a hot-air balloon which takes off and rises with a constant $2.5\,m/s$ speed. Just after take off, the man notices that he forgot his camera. A “friend” throws the camera up to him with a speed of $15\,m/s$. If the man is $2\,m$ above the camera when it is thrown, how high will he be when he caches his camera?

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Magnitude Direction given as angle

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Scalars - Any physical quantity without an associated direction.

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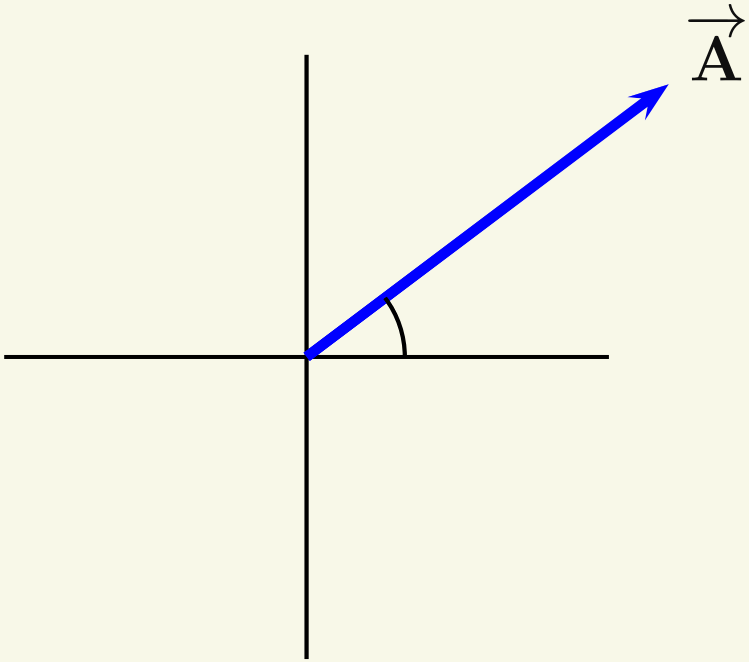

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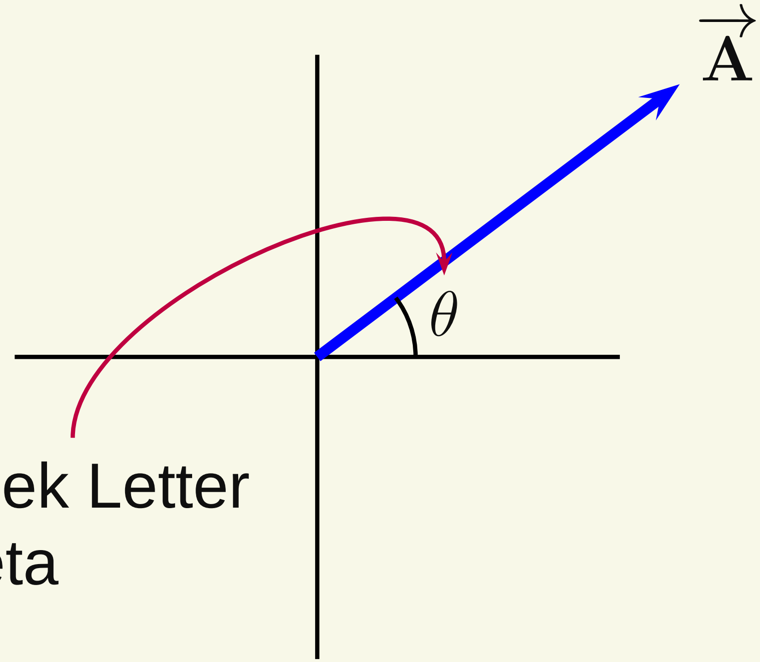

Greek Letter Theta

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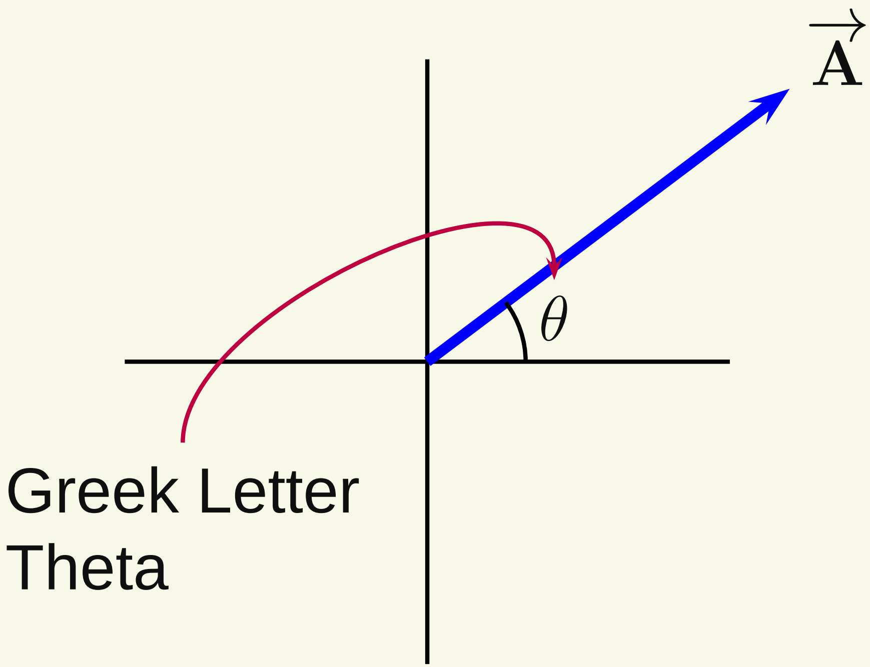

standard angle - From the positive x-axis

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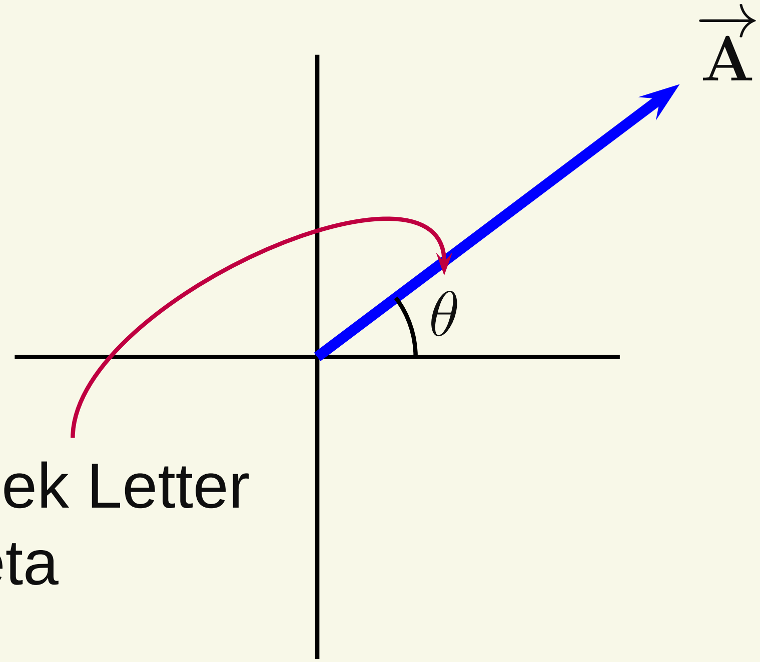

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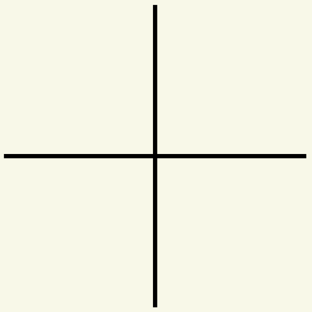

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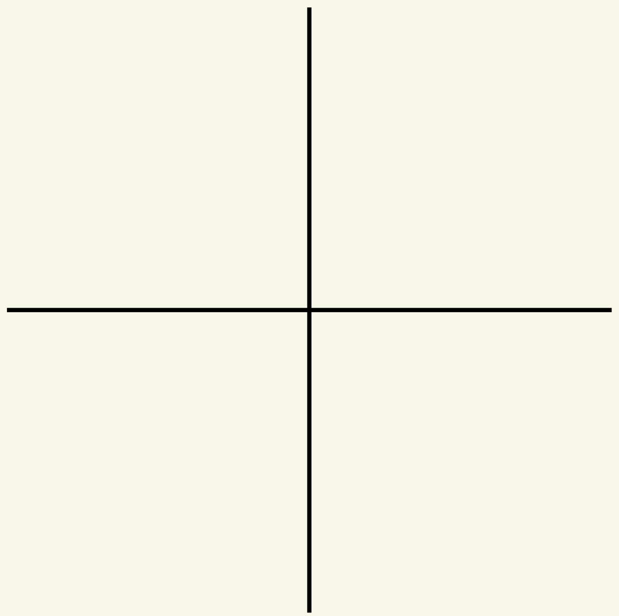

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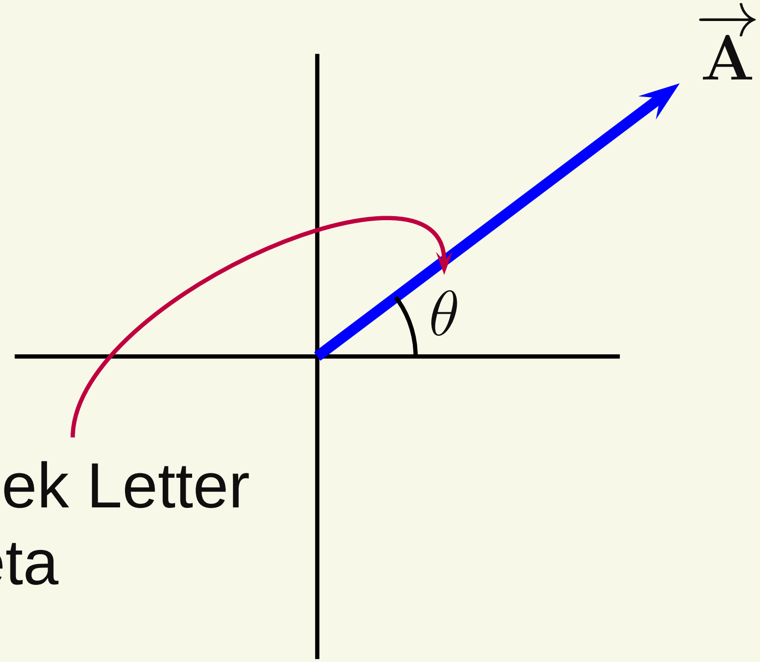

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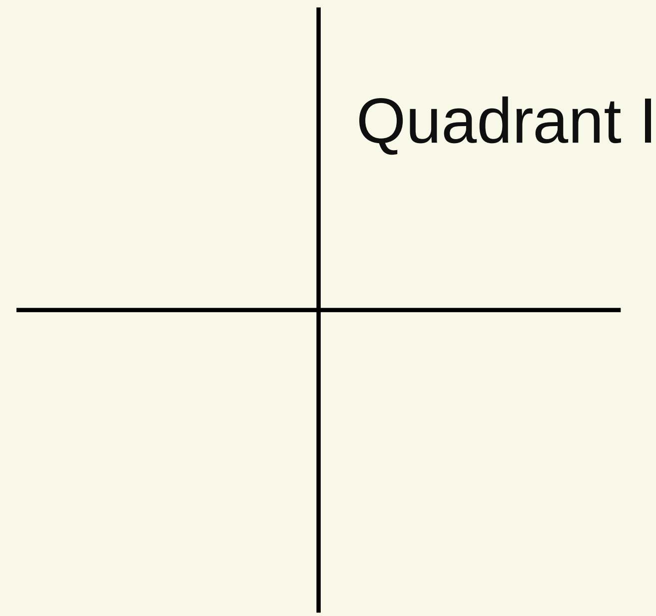

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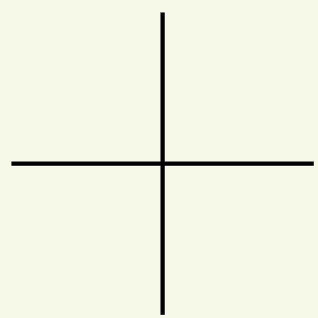

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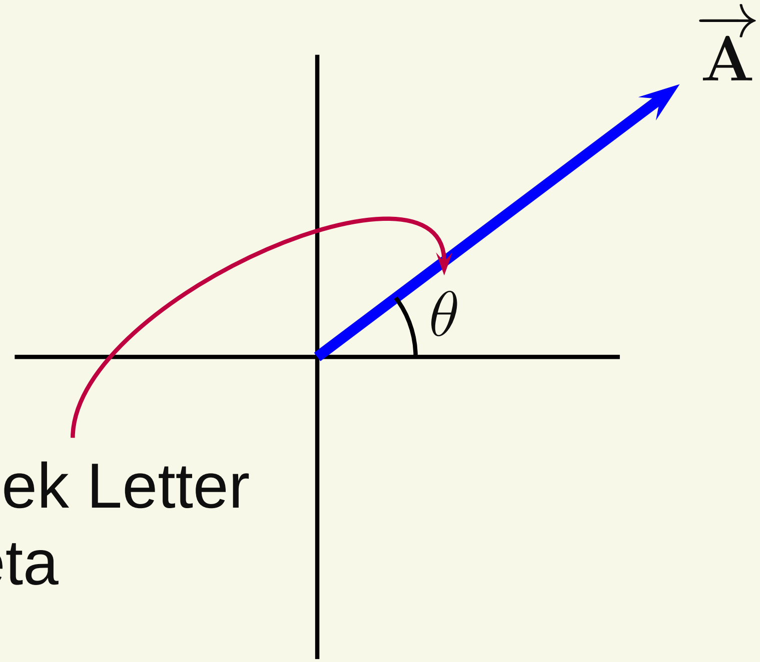

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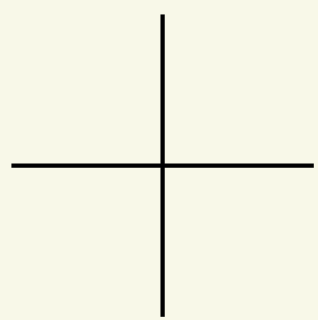

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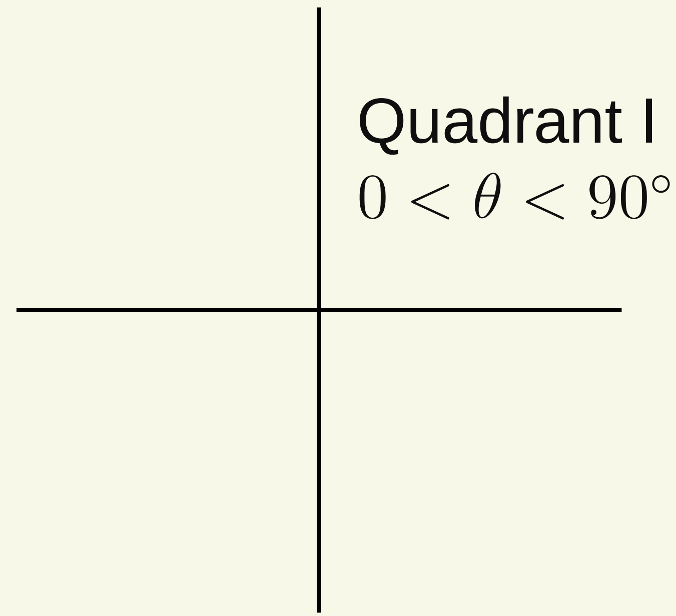

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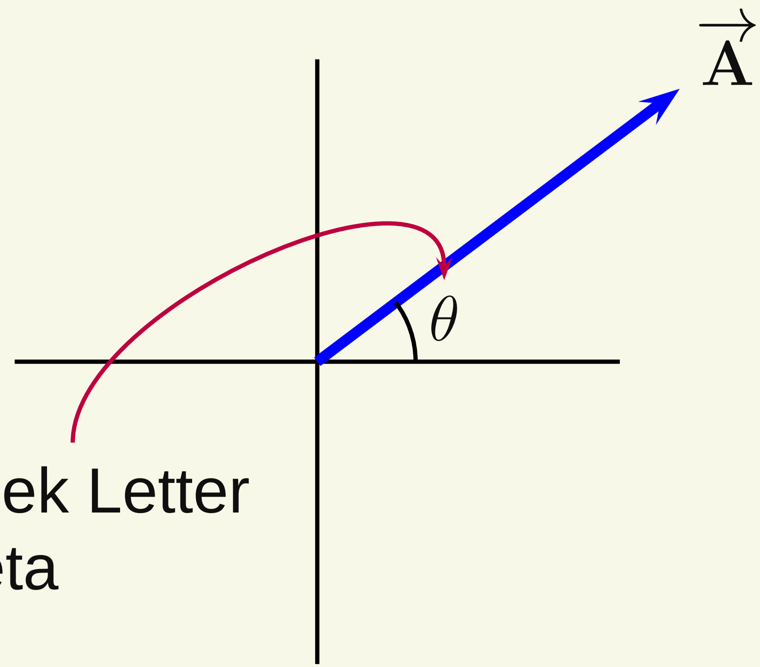

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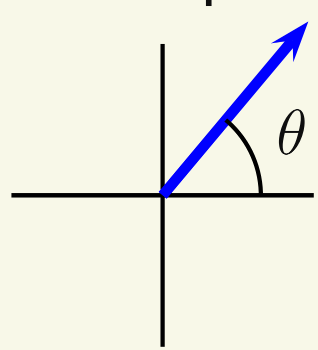

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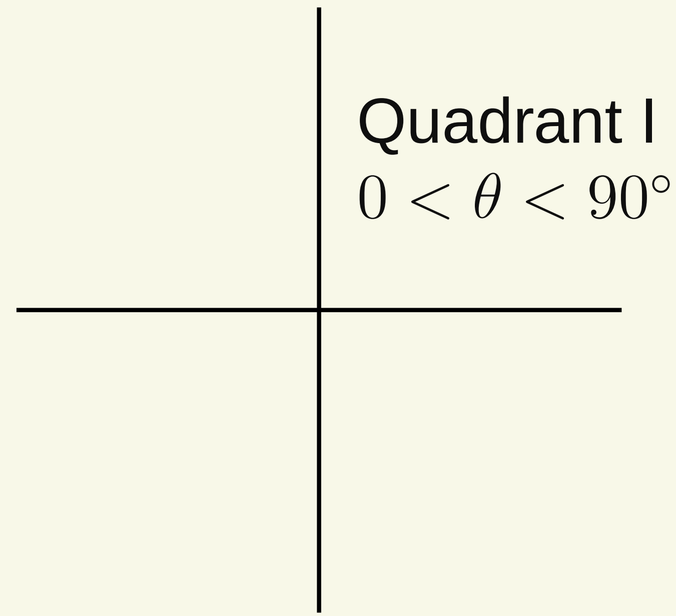

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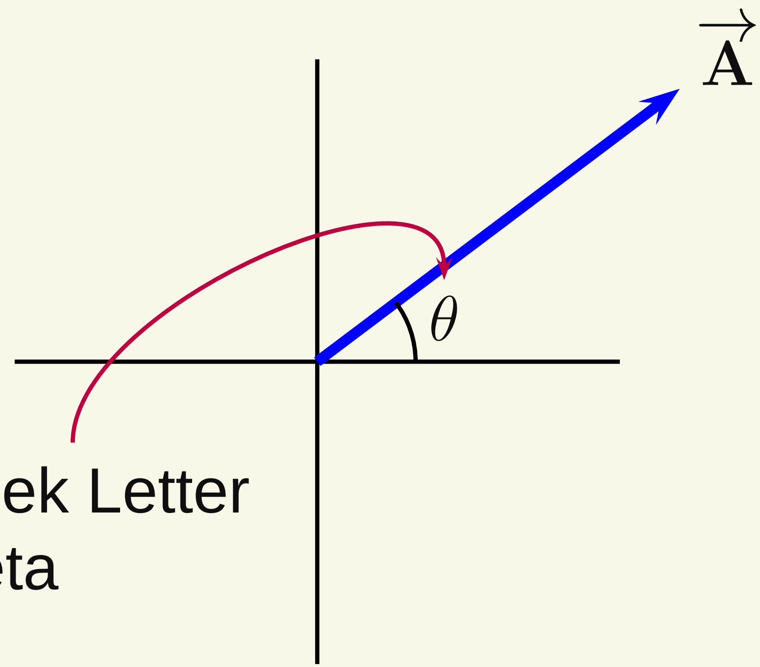

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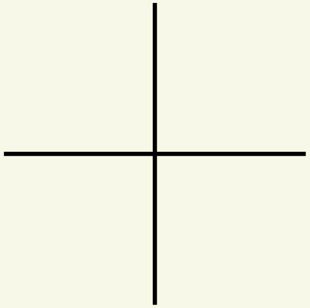

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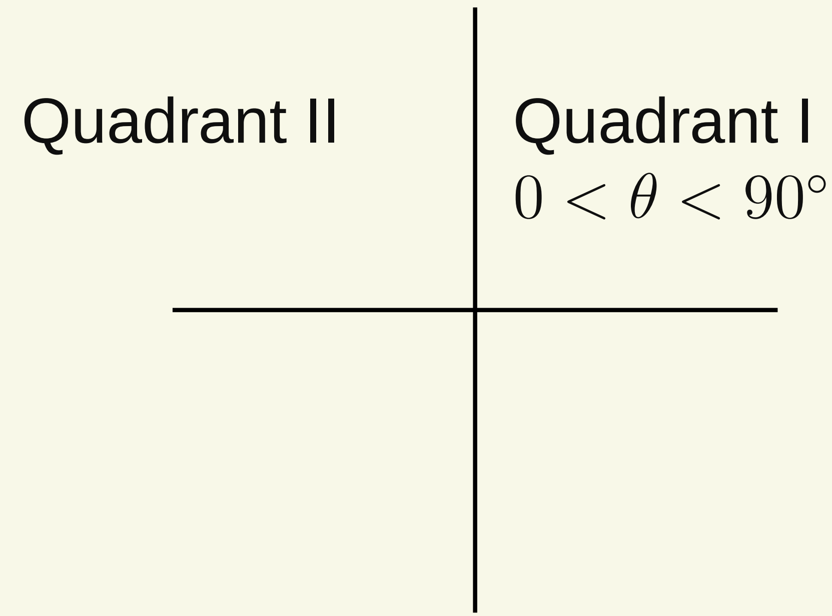

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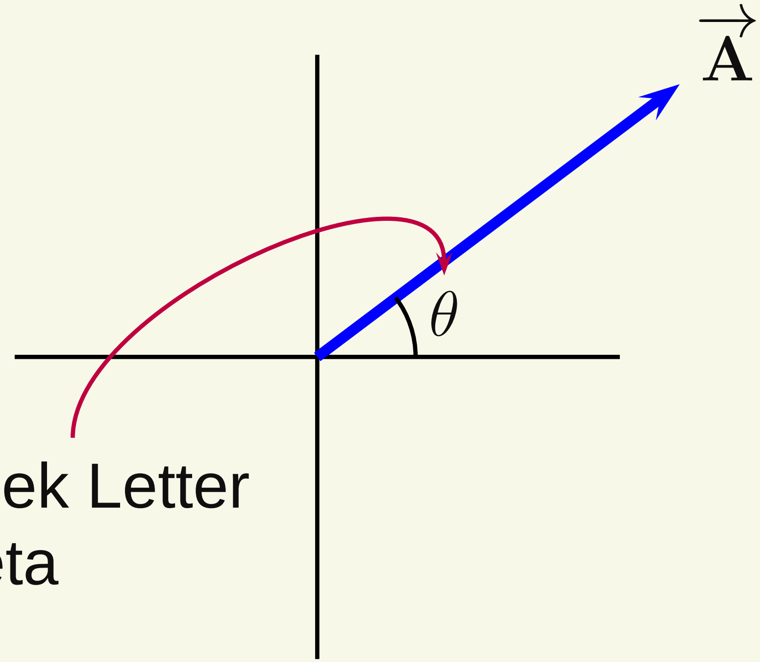

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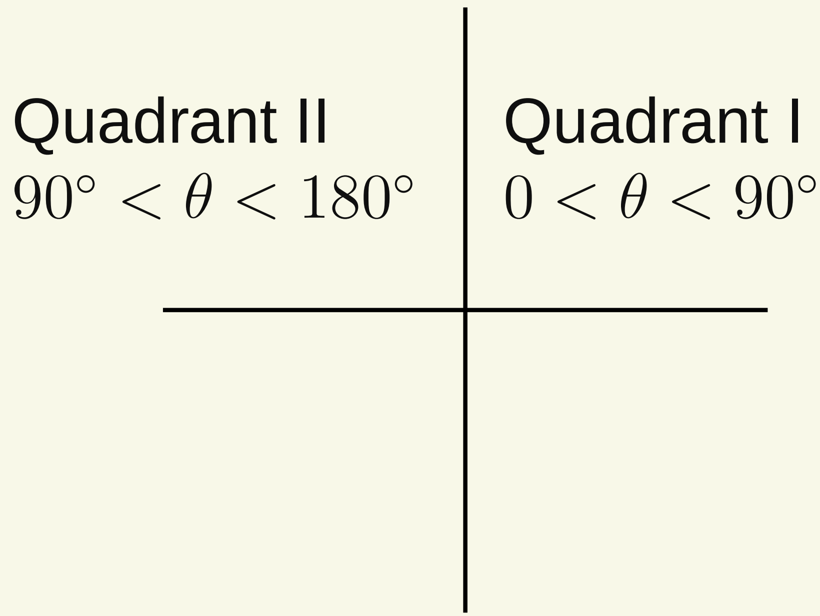

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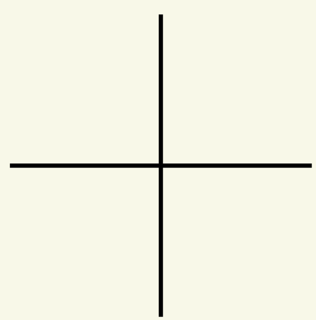

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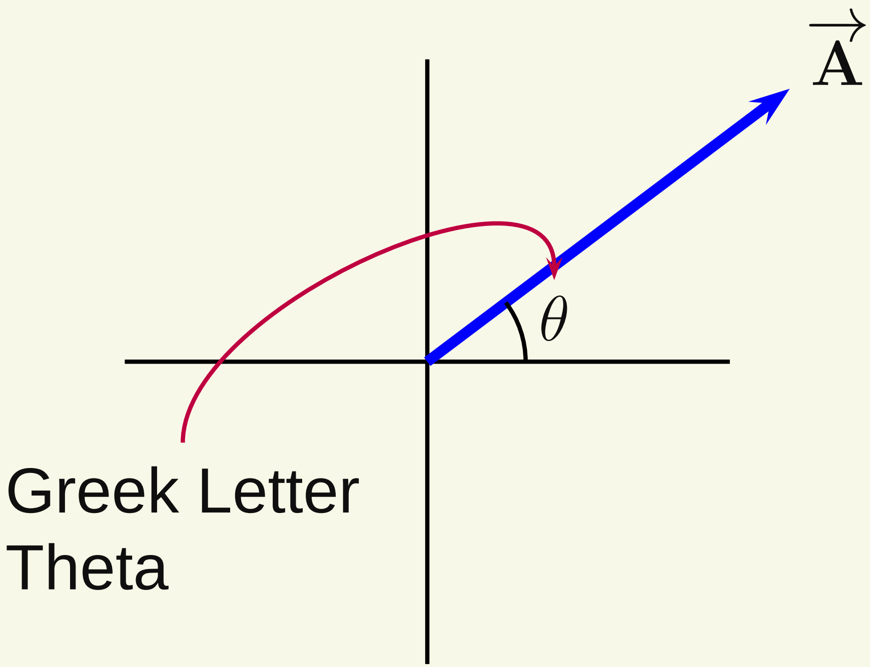

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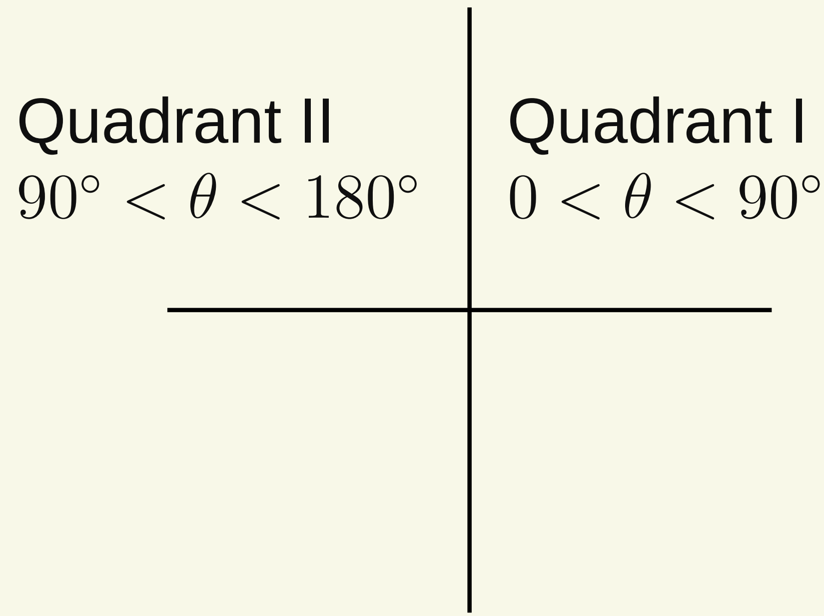

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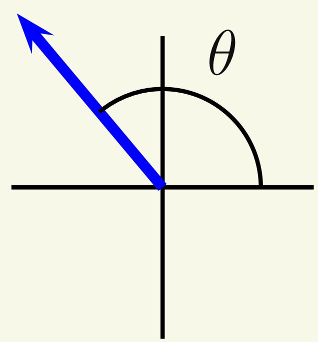

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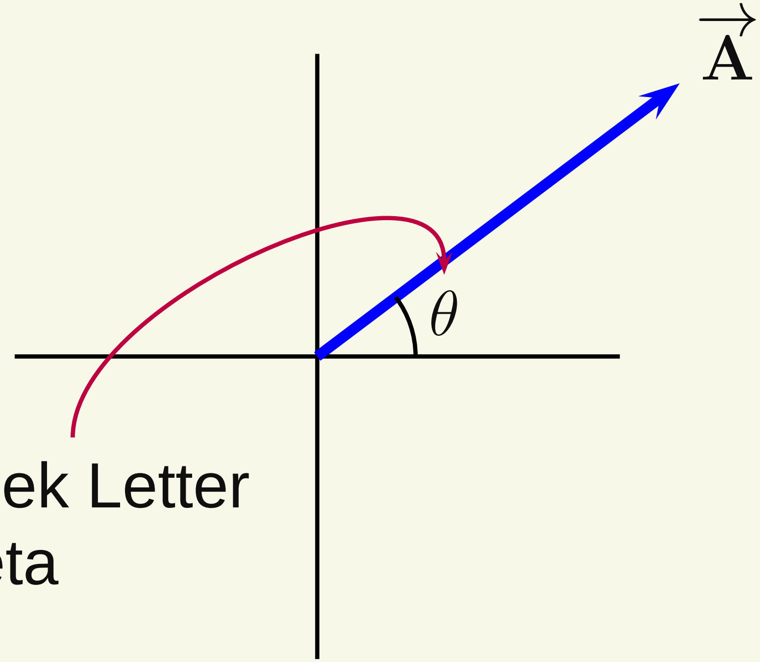

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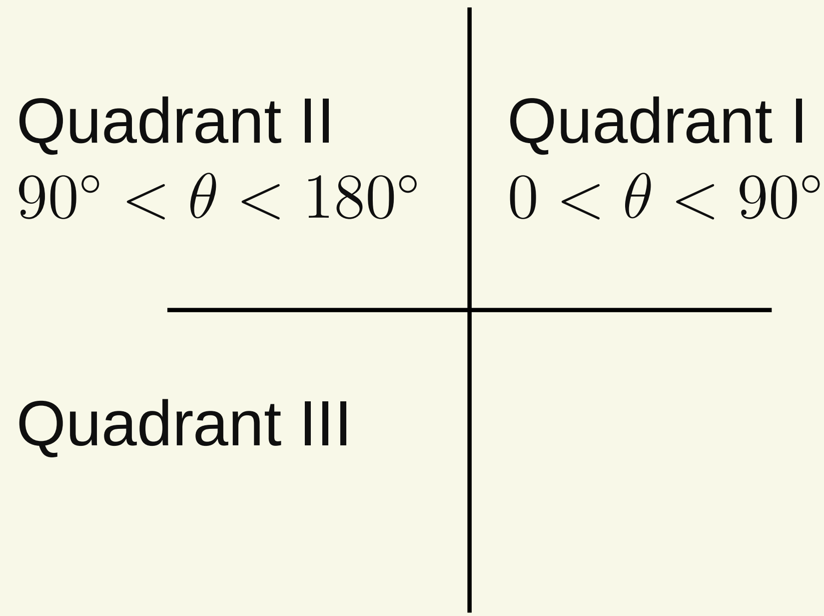

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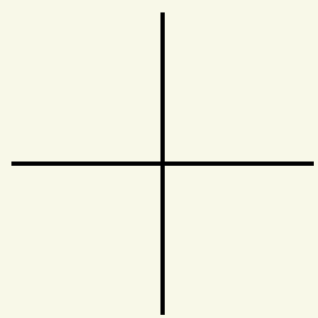

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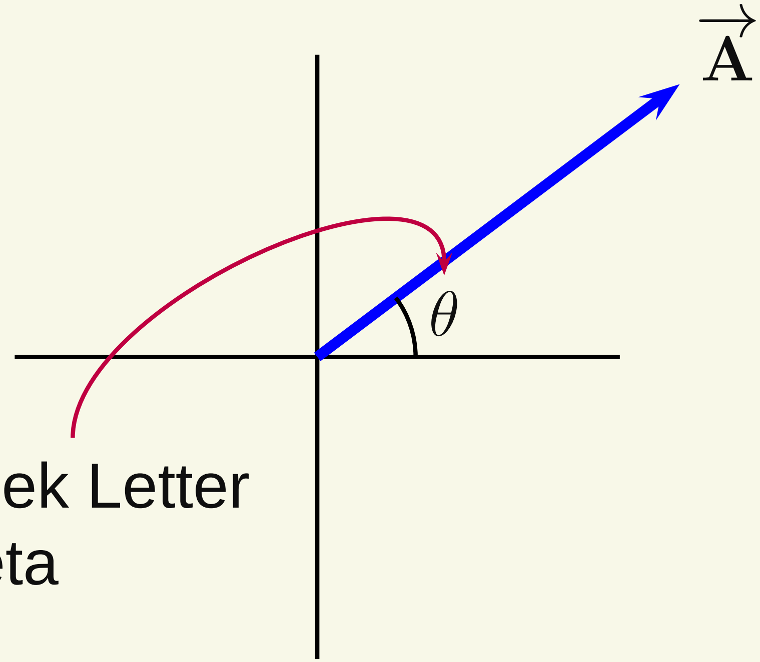

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Standard Angle Review

Quadrant II

$90° < \theta < 180°$

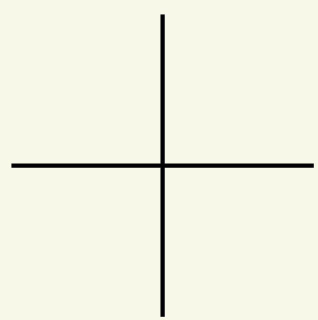
Quadrant I

$0 < \theta < 90°$

Quadrant III

$180° < \theta < 270°$

Example



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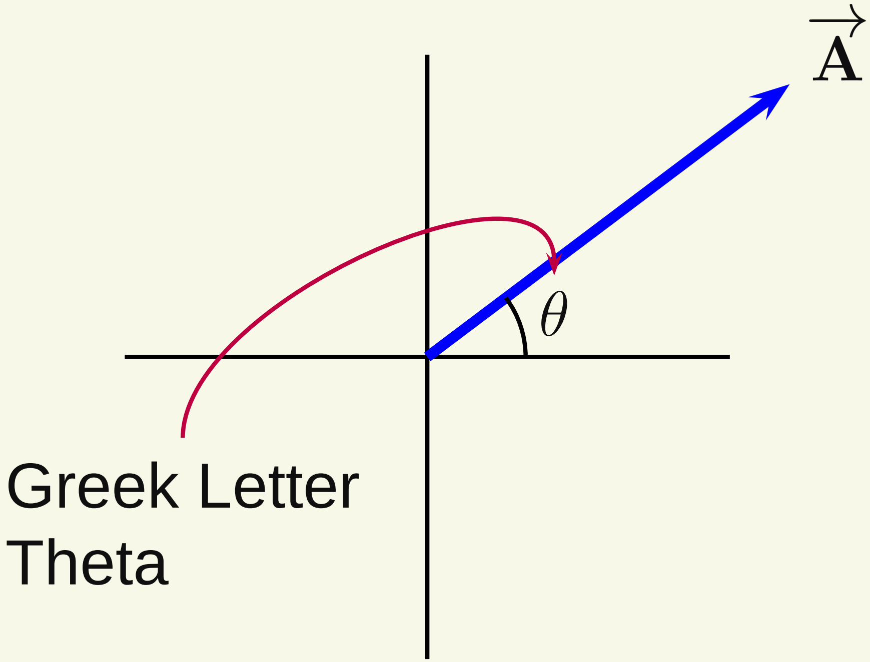

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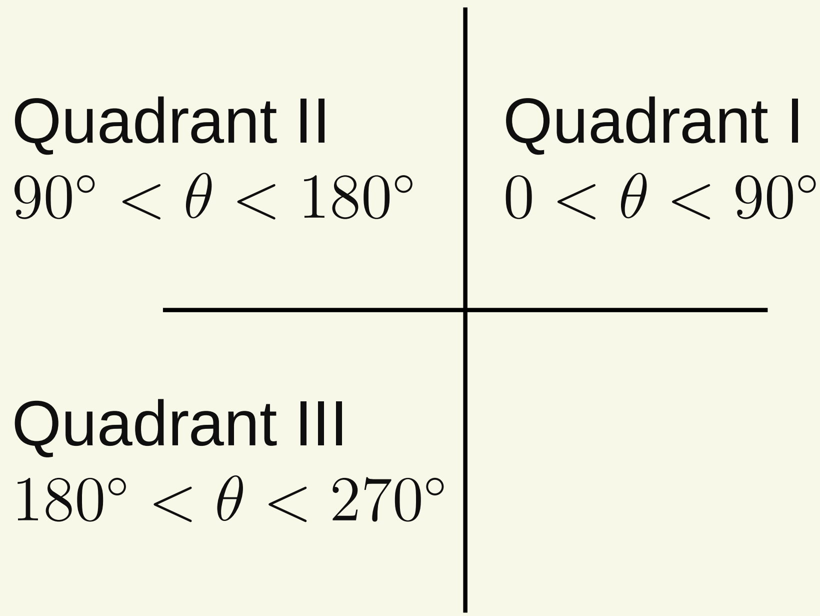

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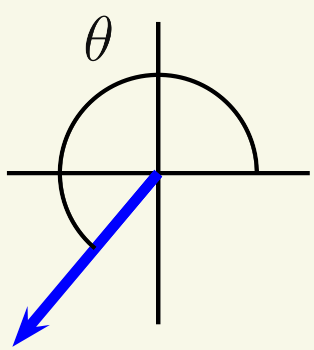

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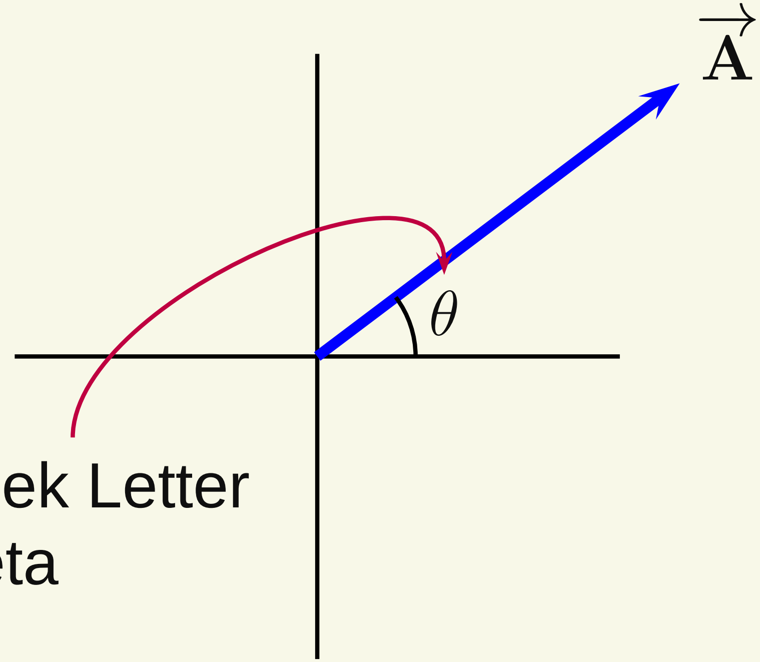

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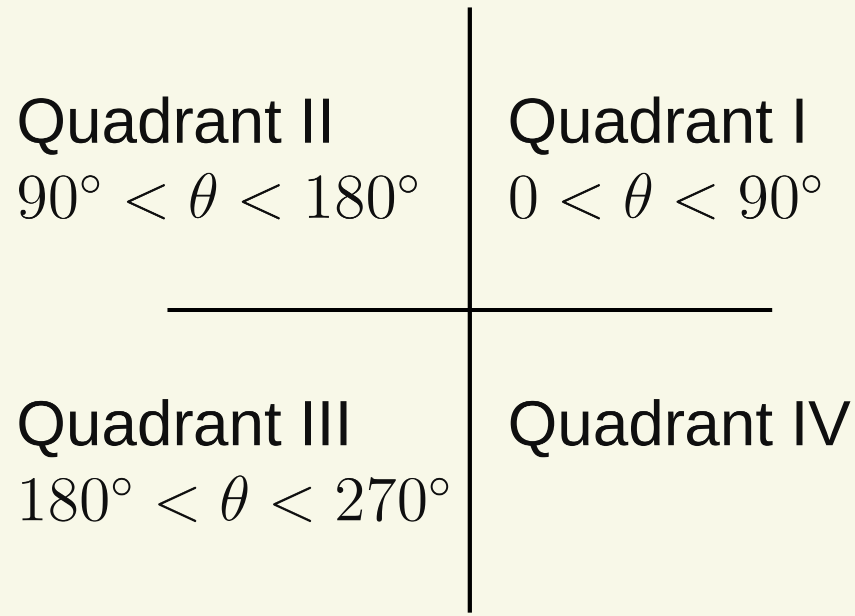

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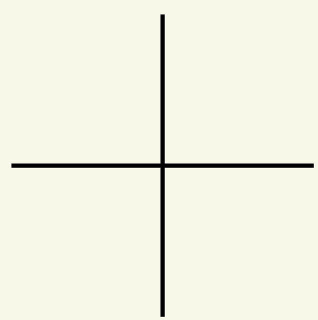

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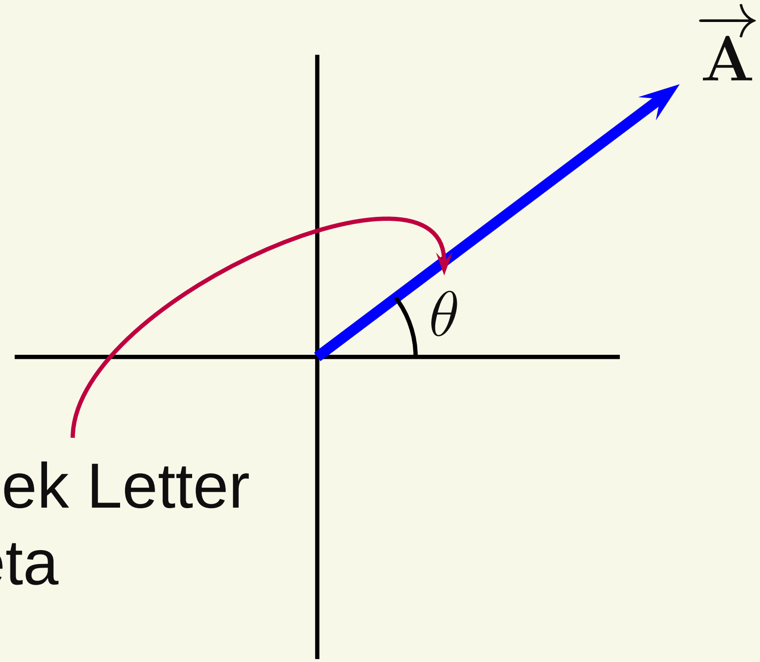

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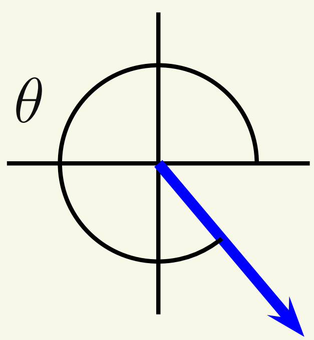
Standard Angle Review

Quadrant II $90^\circ < \theta < 180^\circ$	Quadrant I $0 < \theta < 90^\circ$
Quadrant III $180^\circ < \theta < 270^\circ$	Quadrant IV $270^\circ < \theta < 360^\circ$

Example



Vector Exercise

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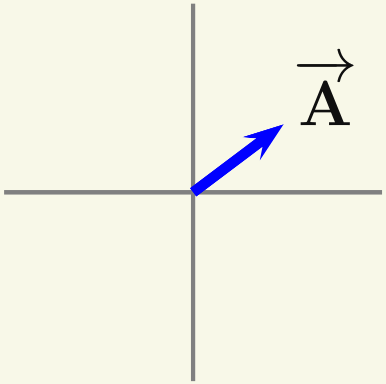

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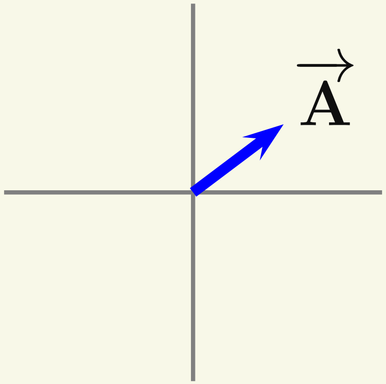

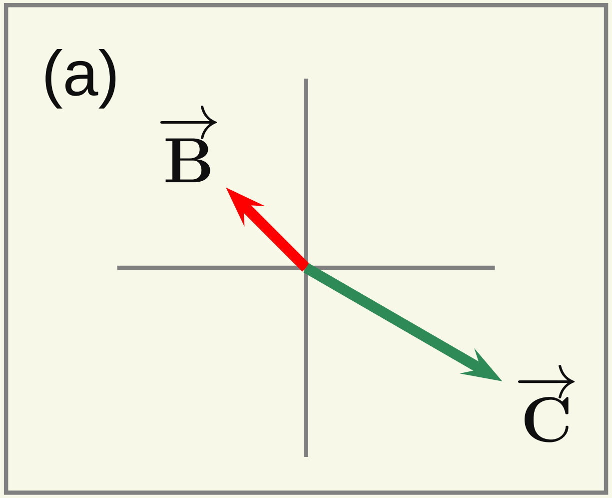

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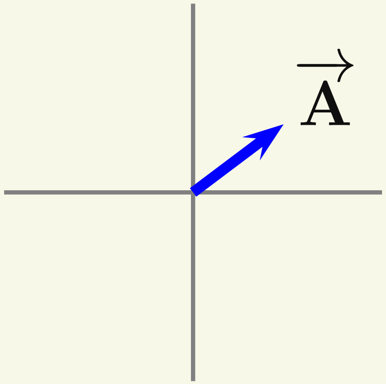

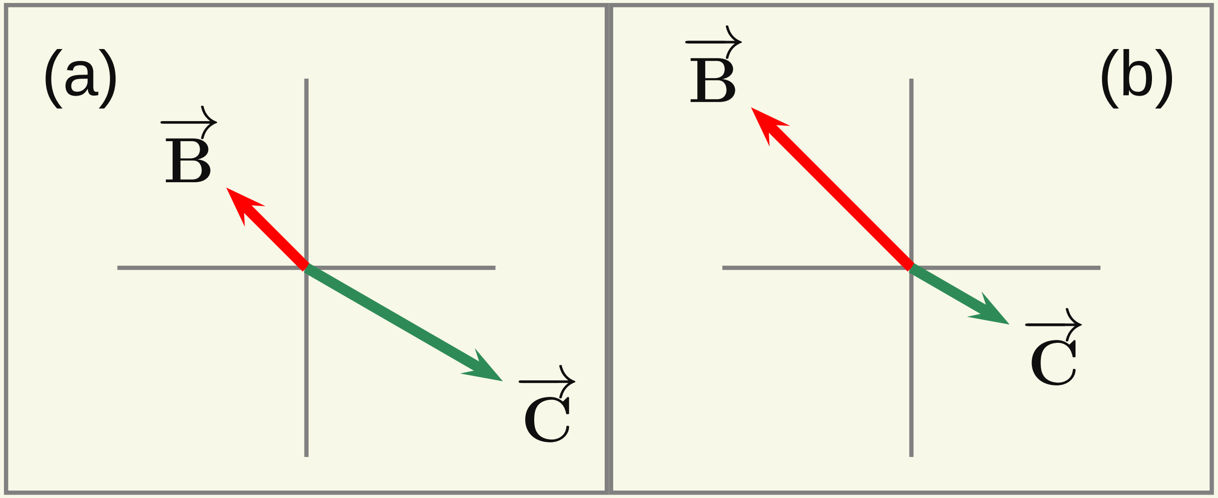

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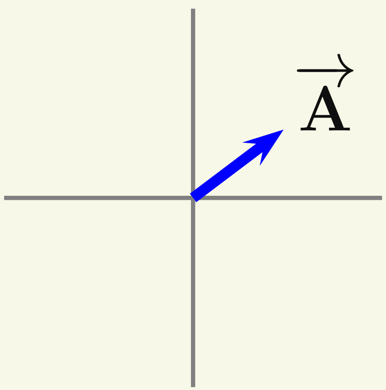

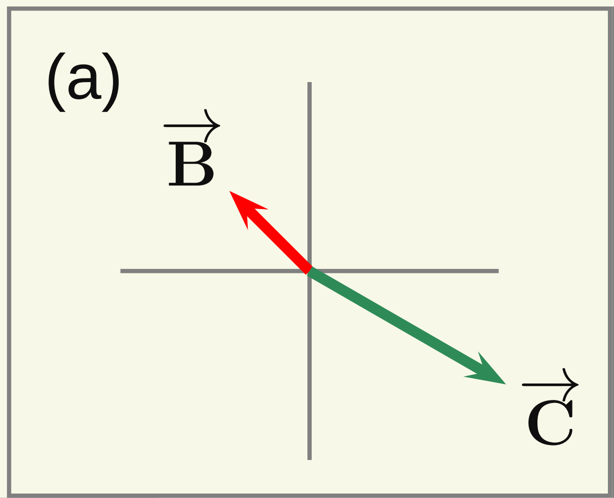

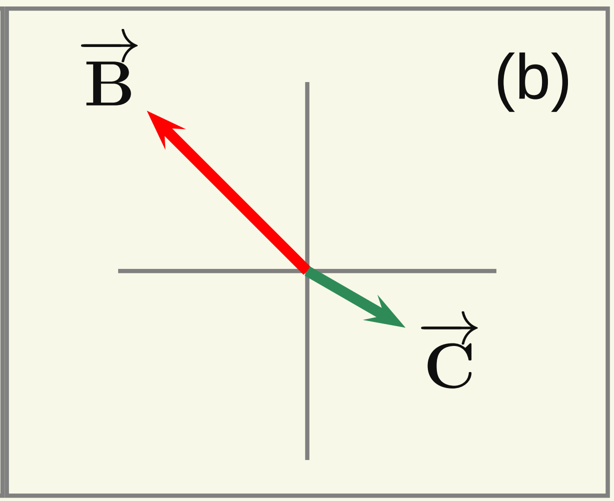

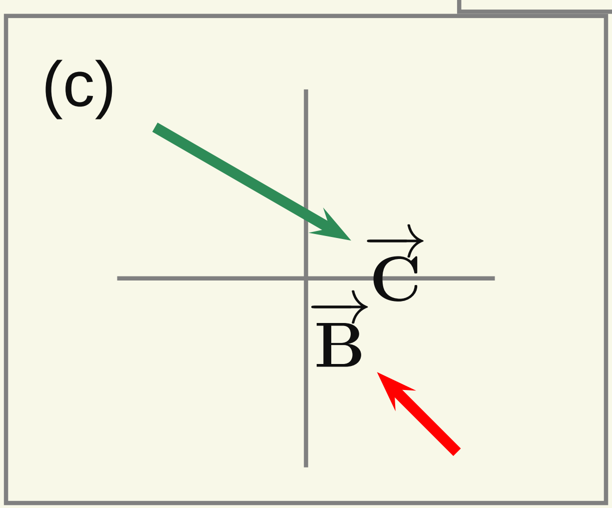

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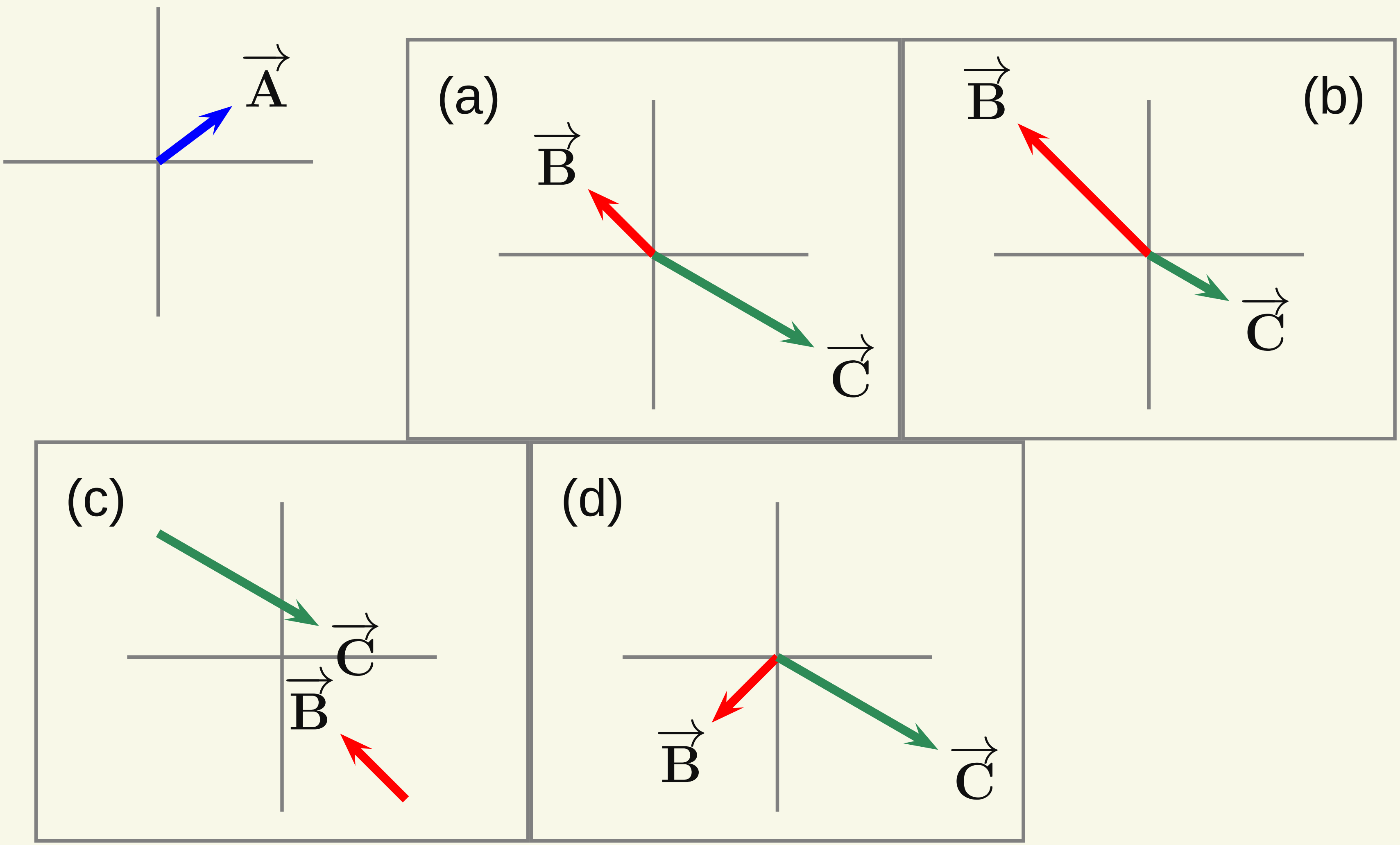

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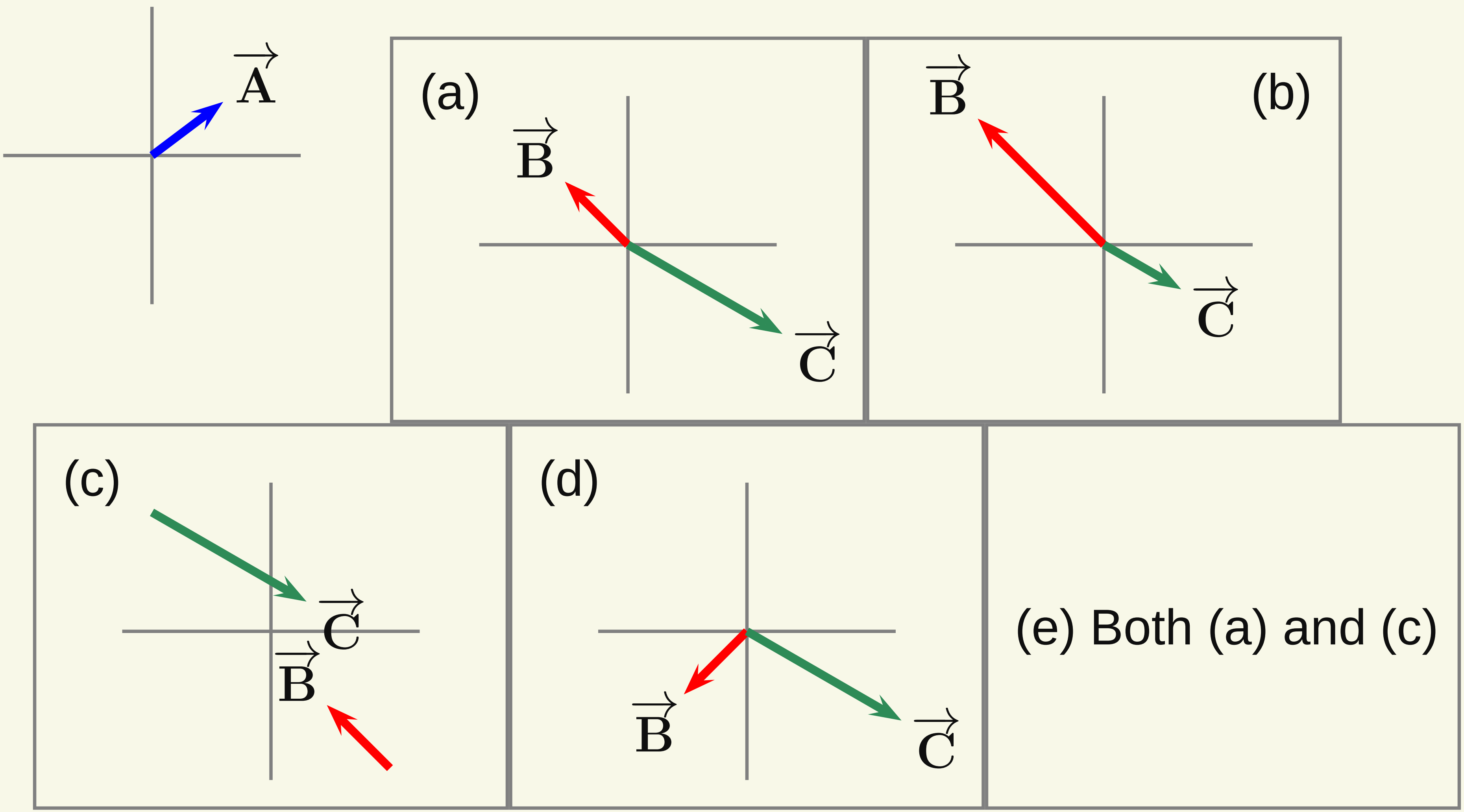

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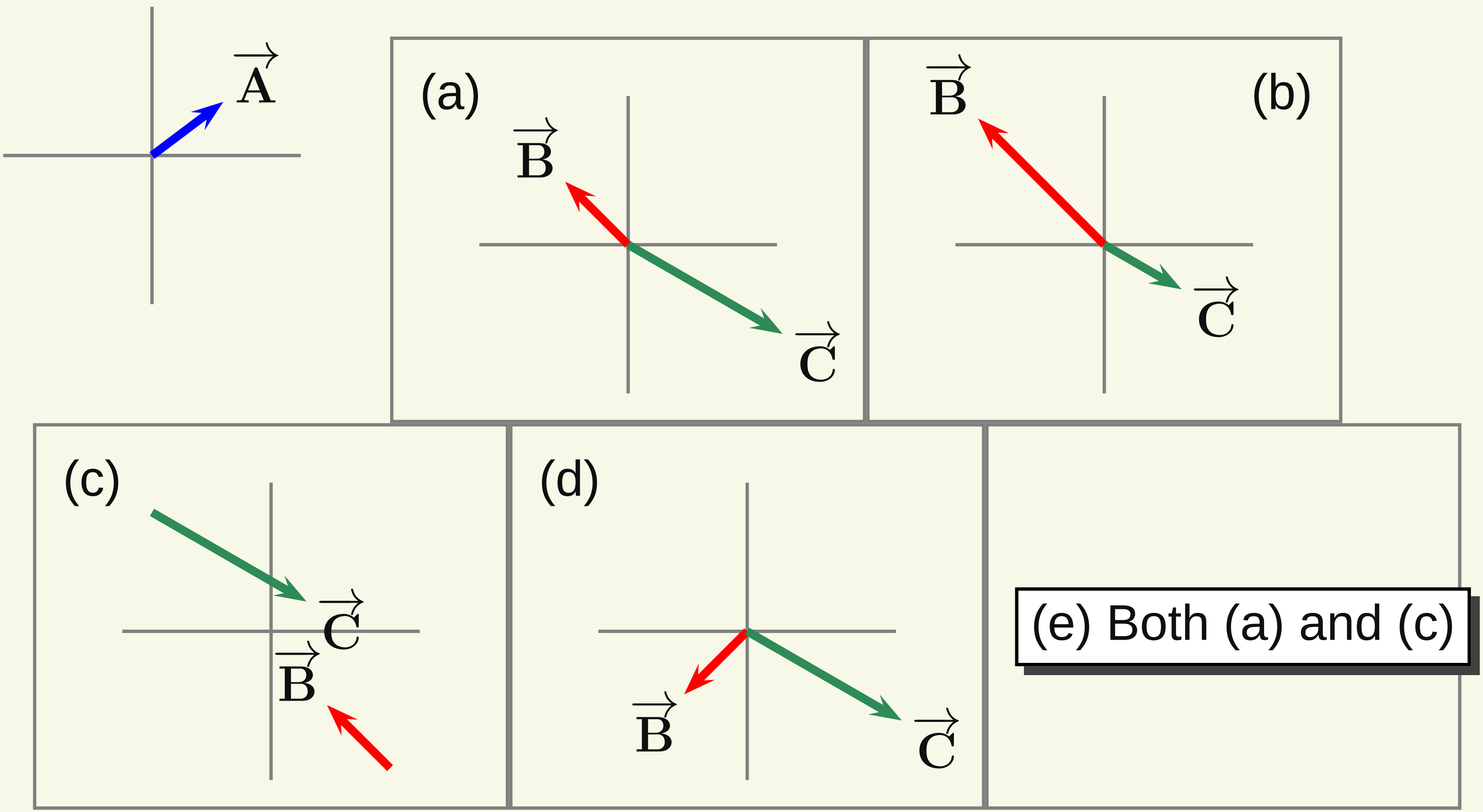

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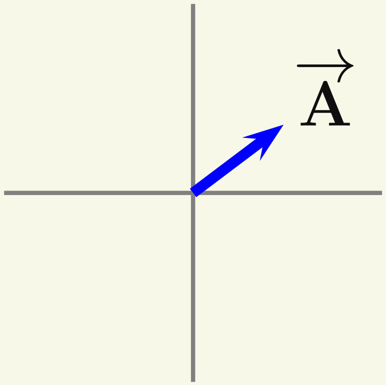

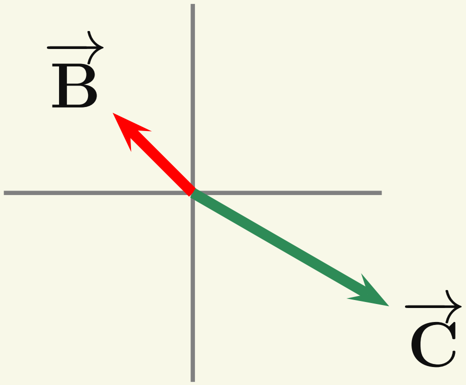

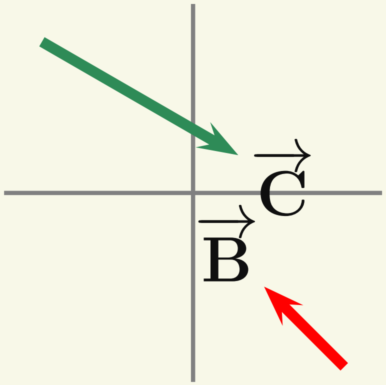

Vector-Exercise Followup

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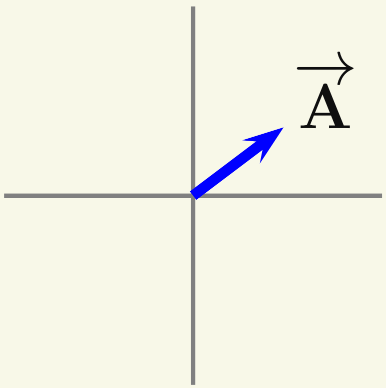
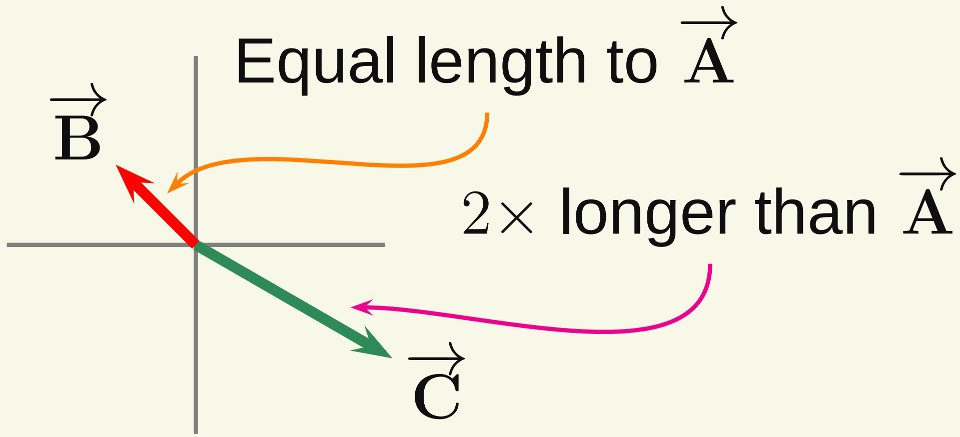
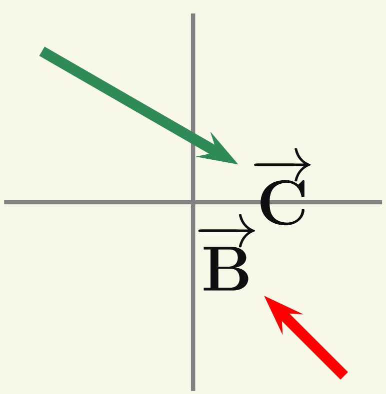
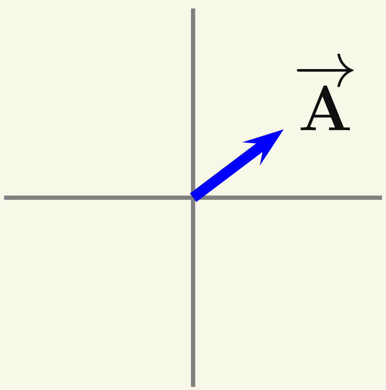


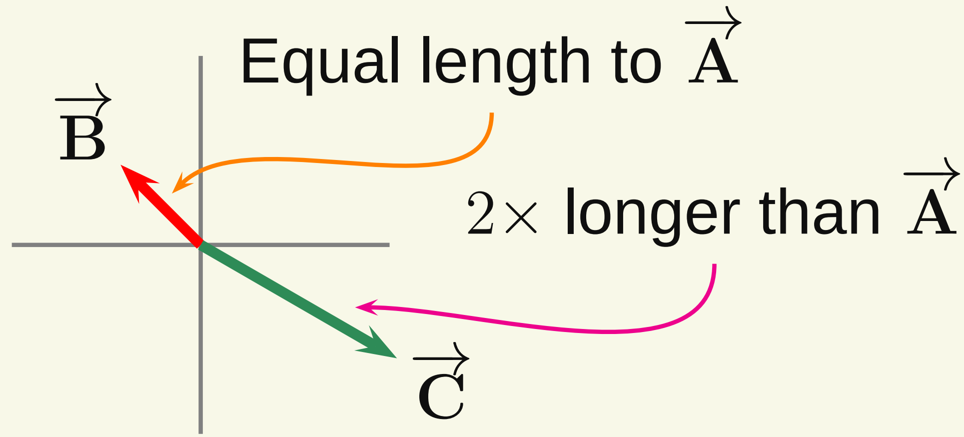


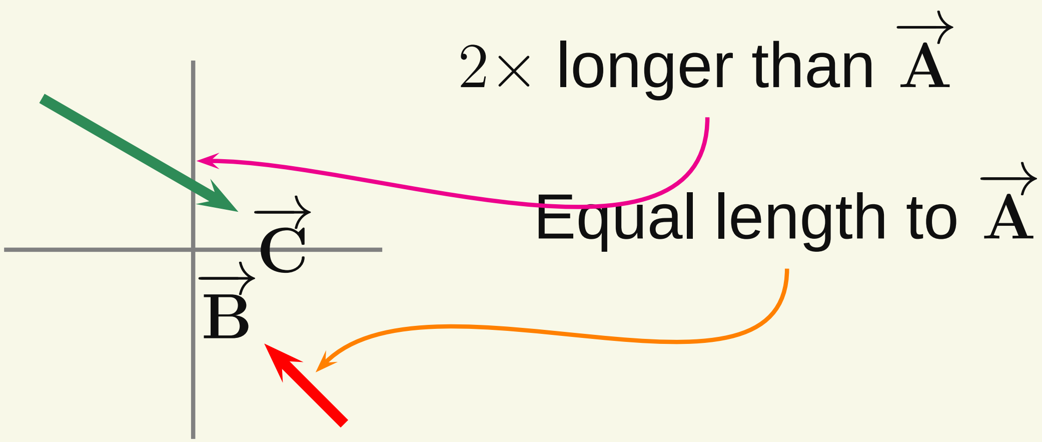


Vector-Exercise Followup

If $\overrightarrow{\mathbf{A}} = 5\,m/s$ at $37°$, which of the following drawing correctly shows $\overrightarrow{\mathbf{B}} = 5\,m/s$ at $135°$ and $\overrightarrow{\mathbf{C}} = 10\,m/s$ at $330°$?







Vector-Exercise Followup

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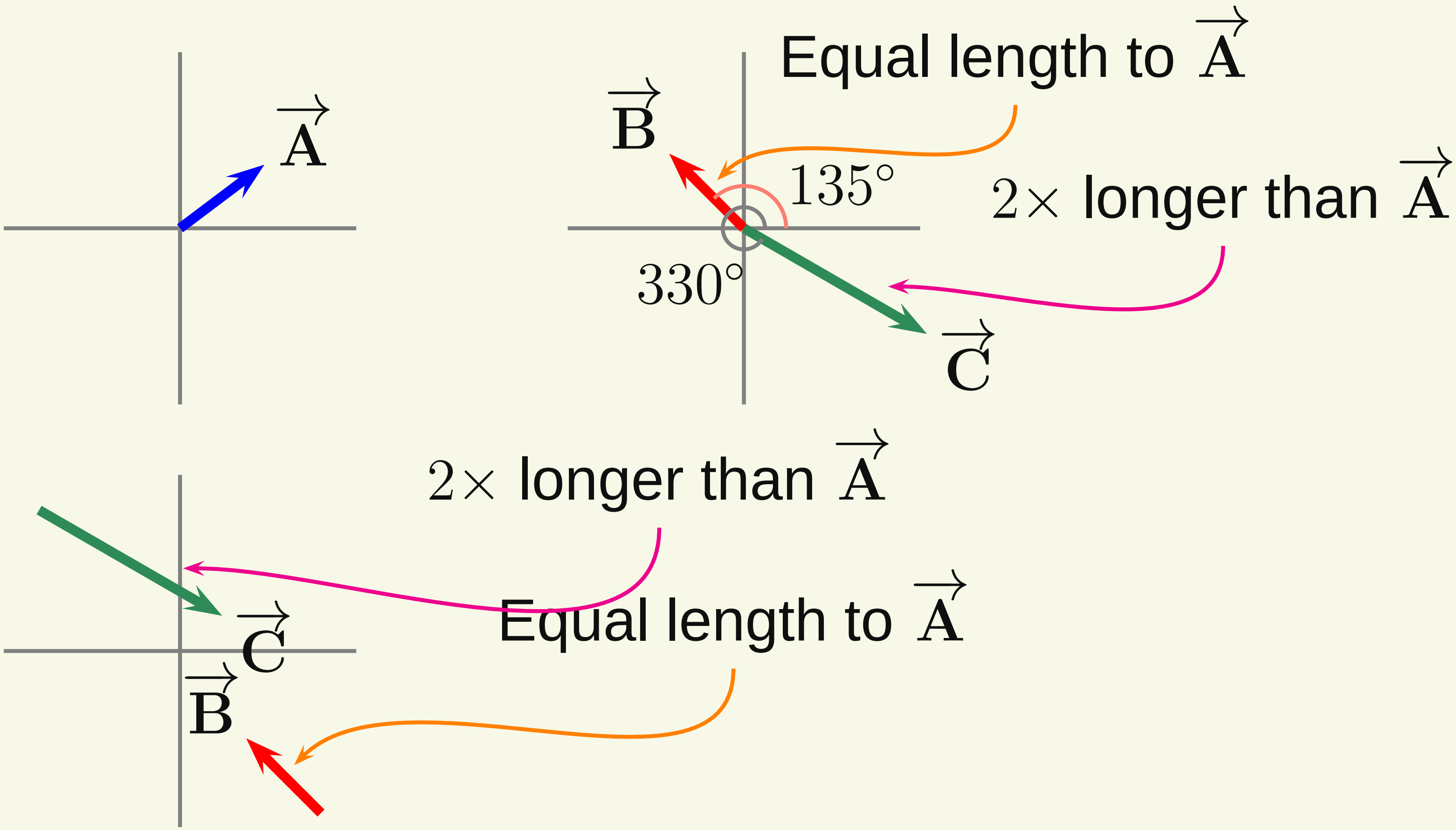

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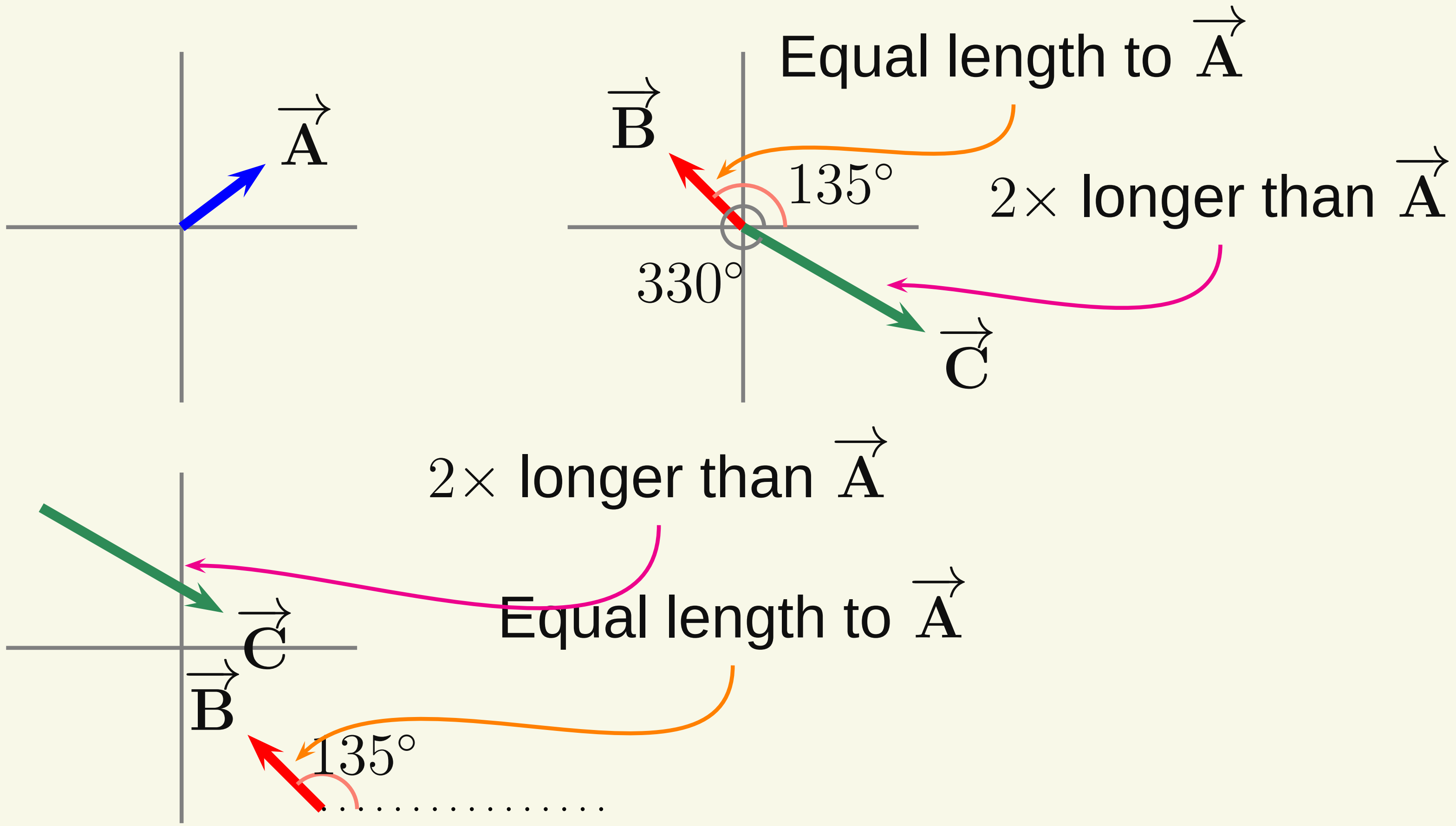

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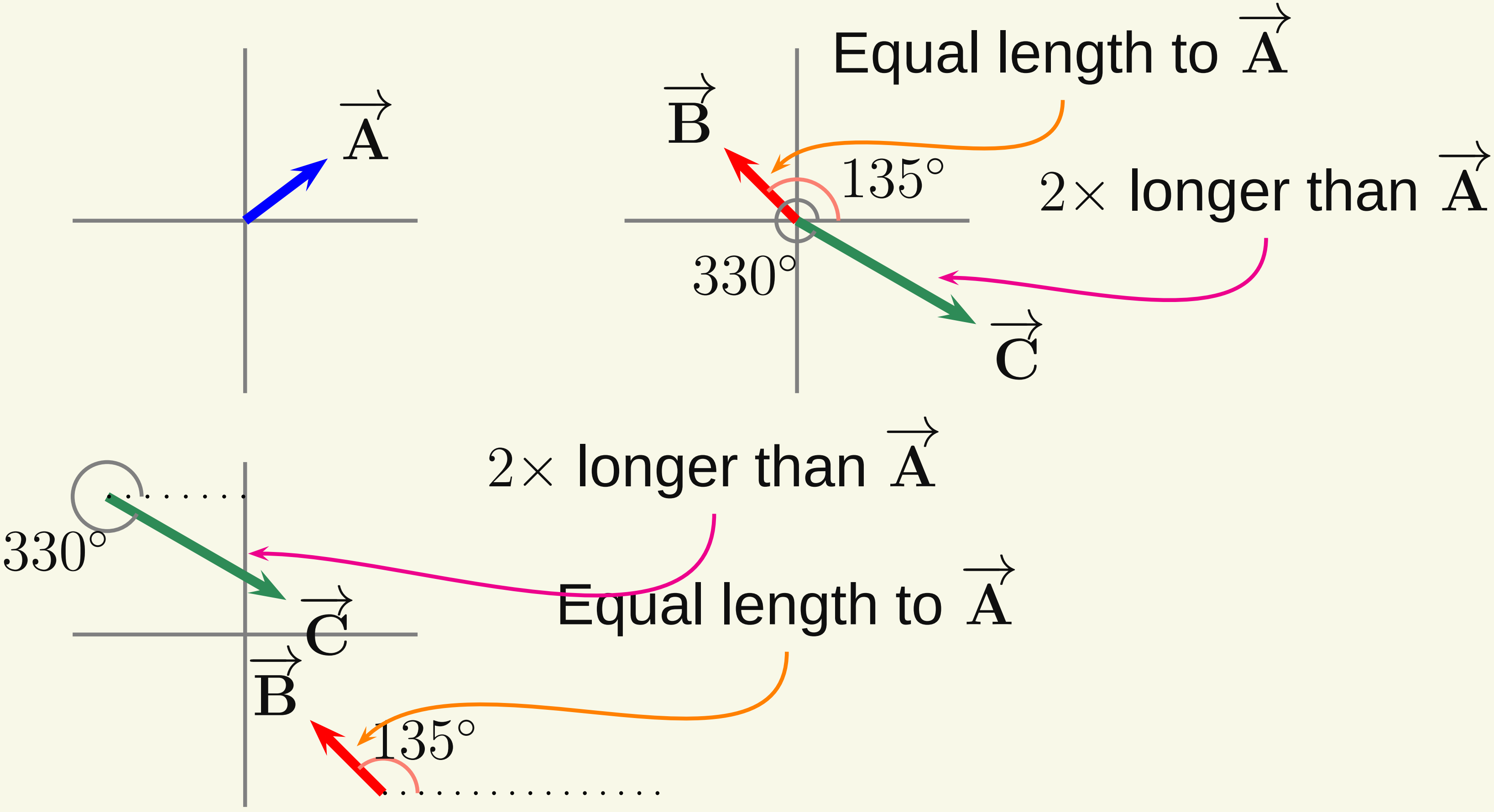

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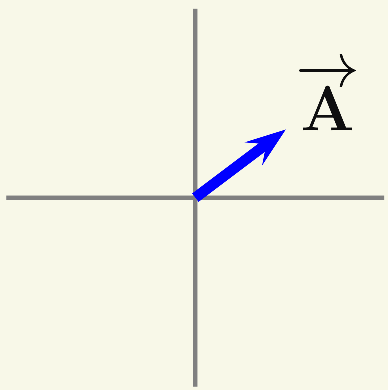

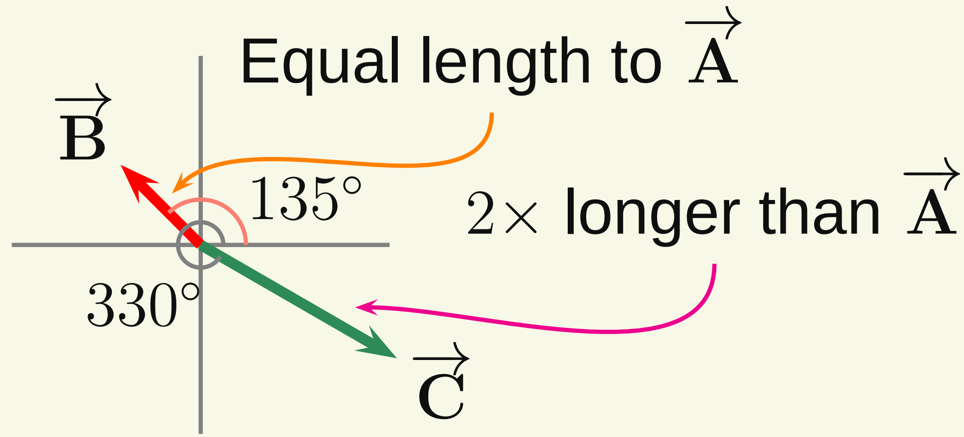

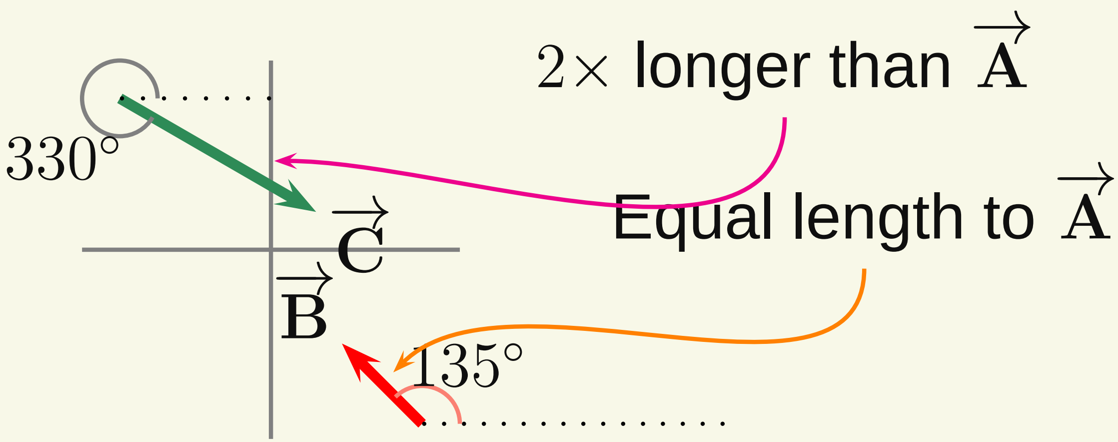

Two vectors are equal when they have the same magnitude and angle, regardless of where they are drawn