Probable Test Questions for Vectors

Given some vectors in *polar notation*: (with the exception of Part b, put all answers in polar notation)

a.) Graph vector "A" on the grid.

b.) Convert vector "A" to u.v.n.

c.) Determine (-1.4)A.

d.) Characterize the vector shown on the grid to the right in polar notation.

Given some vectors in *unit vector notation*: (with the exception of Part b, put all answers in unit vector notation)

a.) Graph vector "B" on the grid.

b.) Convert vector "B" to polar notation.

c.) Determine (-1.4)B.

d.) Characterize the vector shown on the grid to the right in unit vector notation.

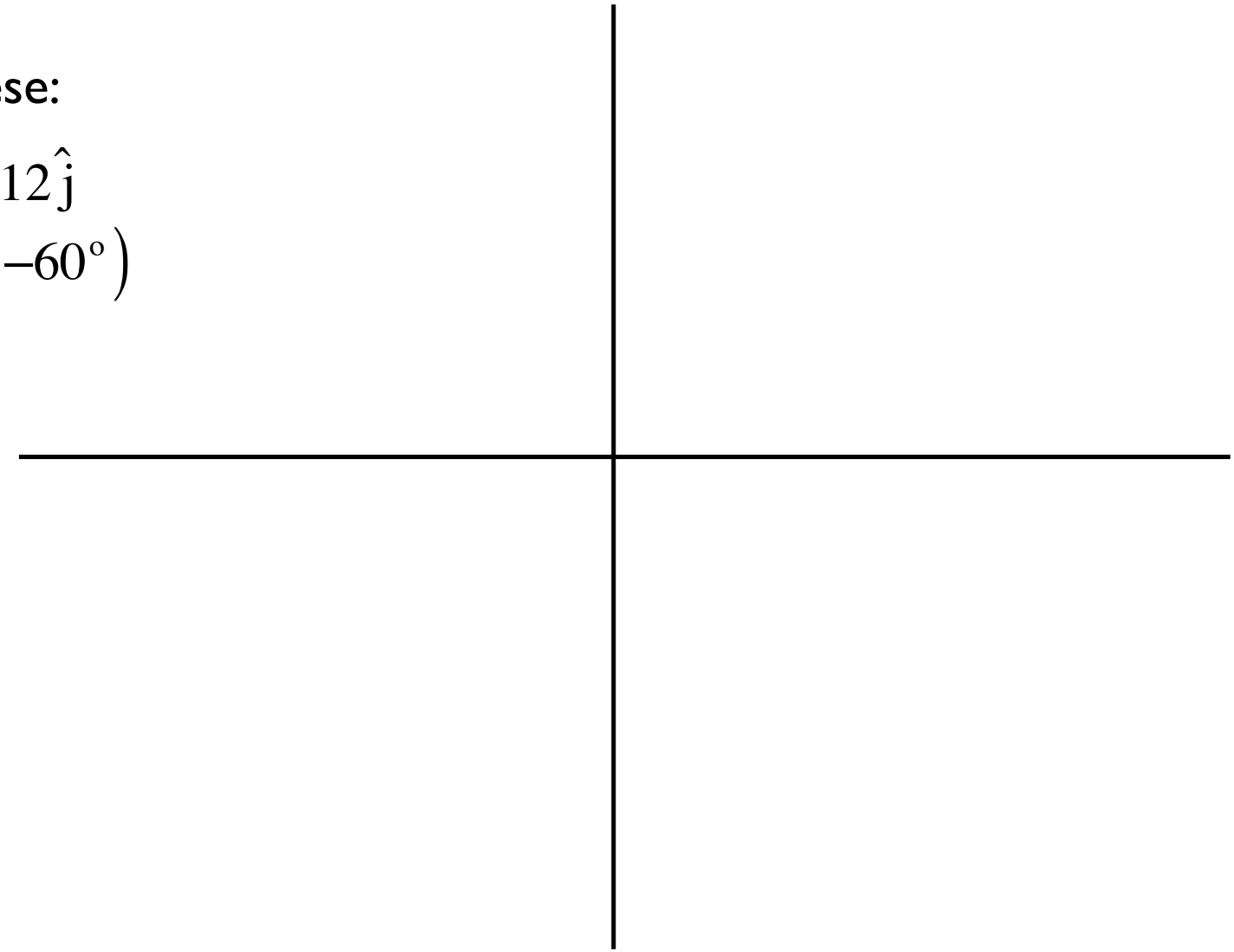
Given two vectors drawn to scale, use graphical vector manipulation to determine "(1/2)A - 3B".

Problem 3.23
(from Fletch's book)

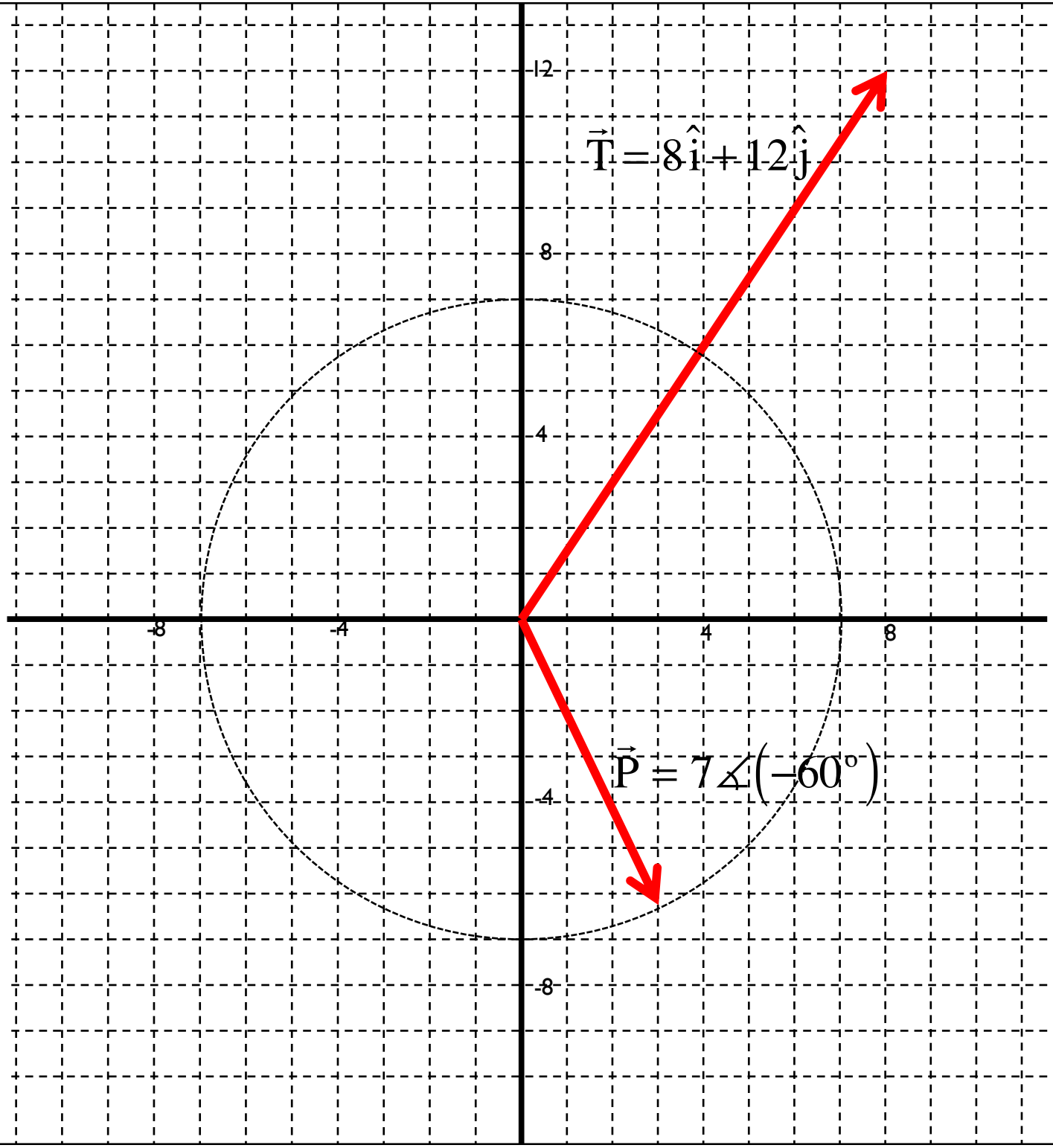
Graph these:

$$\vec{T} = 8\hat{i} + 12\hat{j}$$

$$\vec{P} = 7\angle(-60^\circ)$$



Note: How did I get the correct length of the $\vec{P} = 7\angle(-60^\circ)$ vector? I did NOT go down to the "7" hash mark on the y-axis, then go across (look—the vector's end is closer to being on the "6" hash mark). The way to do this is to find the "7" hash mark on the axis and swing an arc from that point to the correct angle.



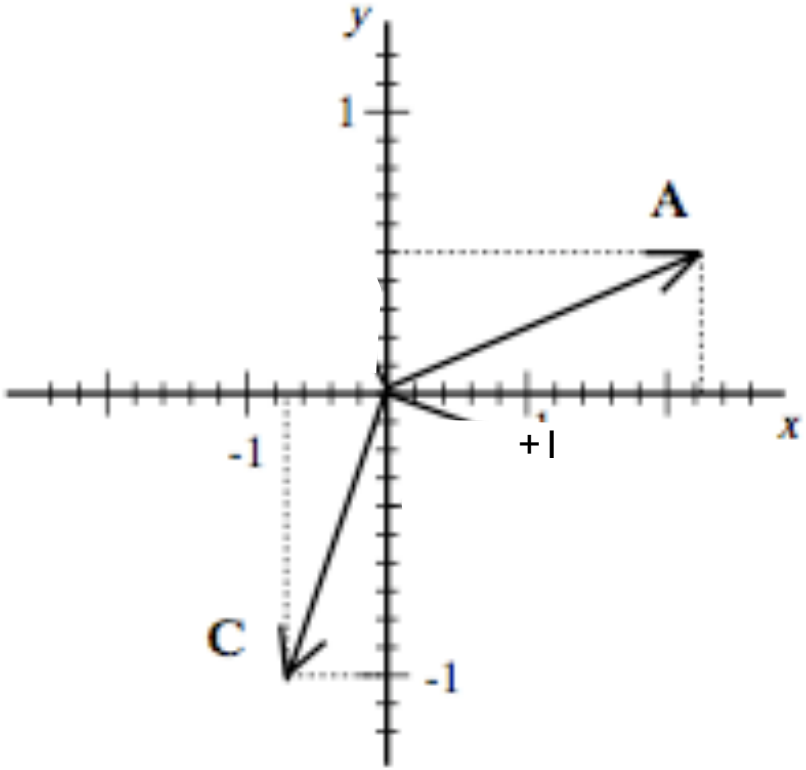
Problem 3.24

NOTE: This problem has axes that are not scaled the same. This is not a problem when dealing with vectors in unit vector notation. It IS a problem when using polar notation. As a consequence, look to see how I've changed the problem below. Also, know that the scaling on the test will be right! (And please accept my apologies for the confusion.)

Write out the following vectors in unit vector notation:

A =

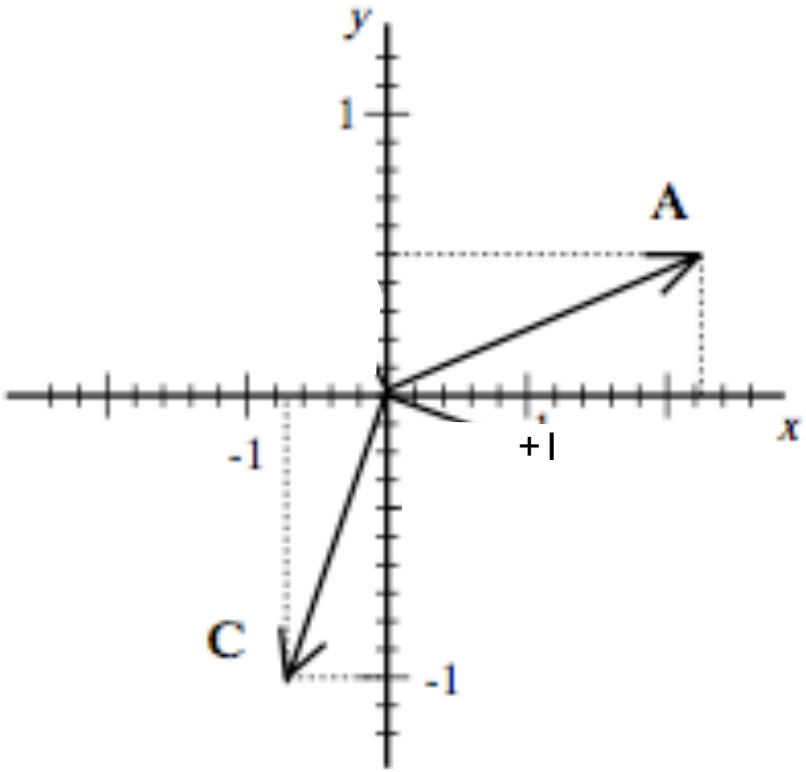
C =



The solution for the modified version of the book problem:

$$\vec{A} = 2.2\hat{i} + .5\hat{j}$$

$$\vec{C} = -.7\hat{i} - 1\hat{j}$$

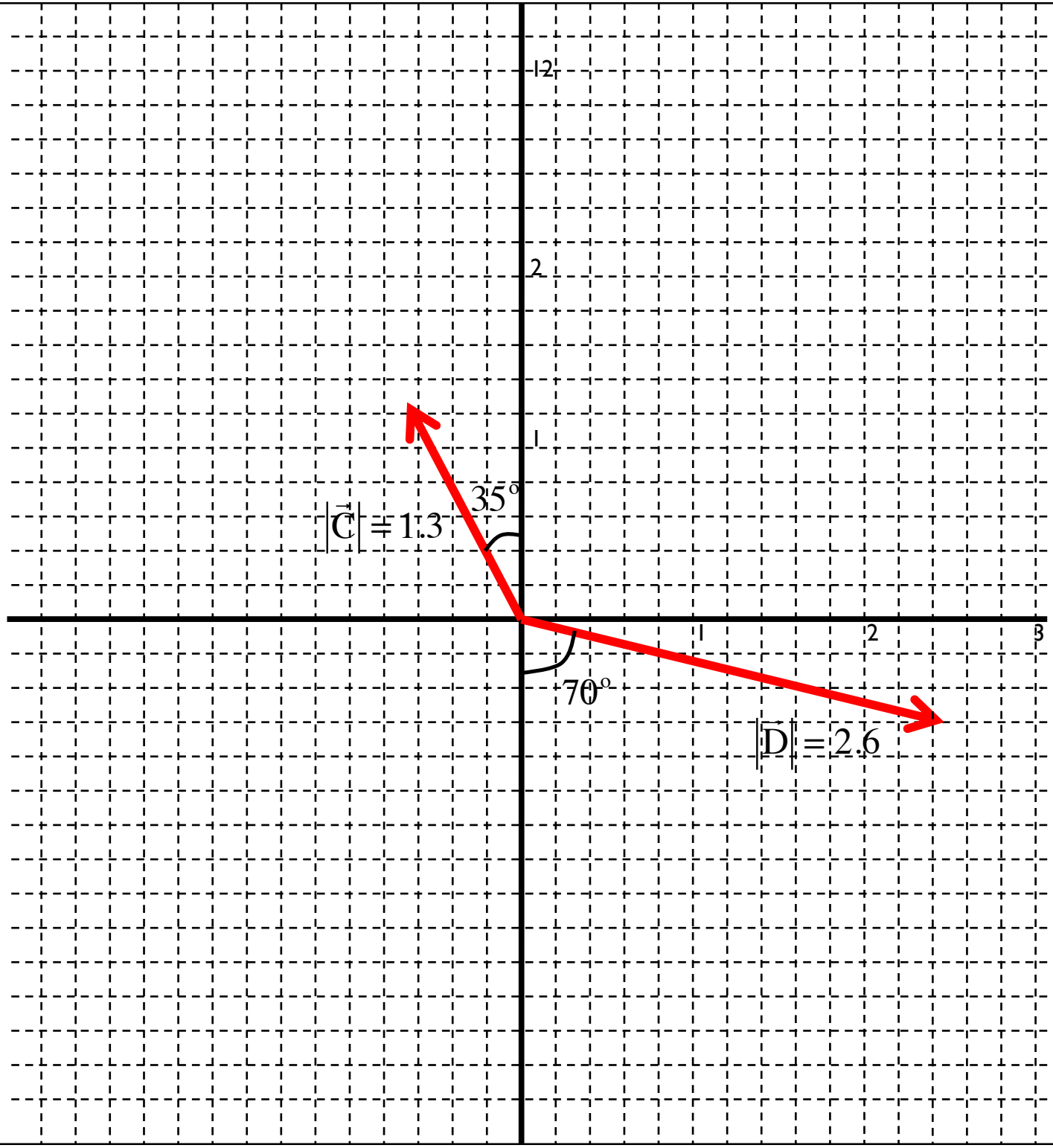


Note: I've changed the axes for this problem. The angles will now make more sense!

Characterize these vectors in polar notation:

$B =$

$D =$



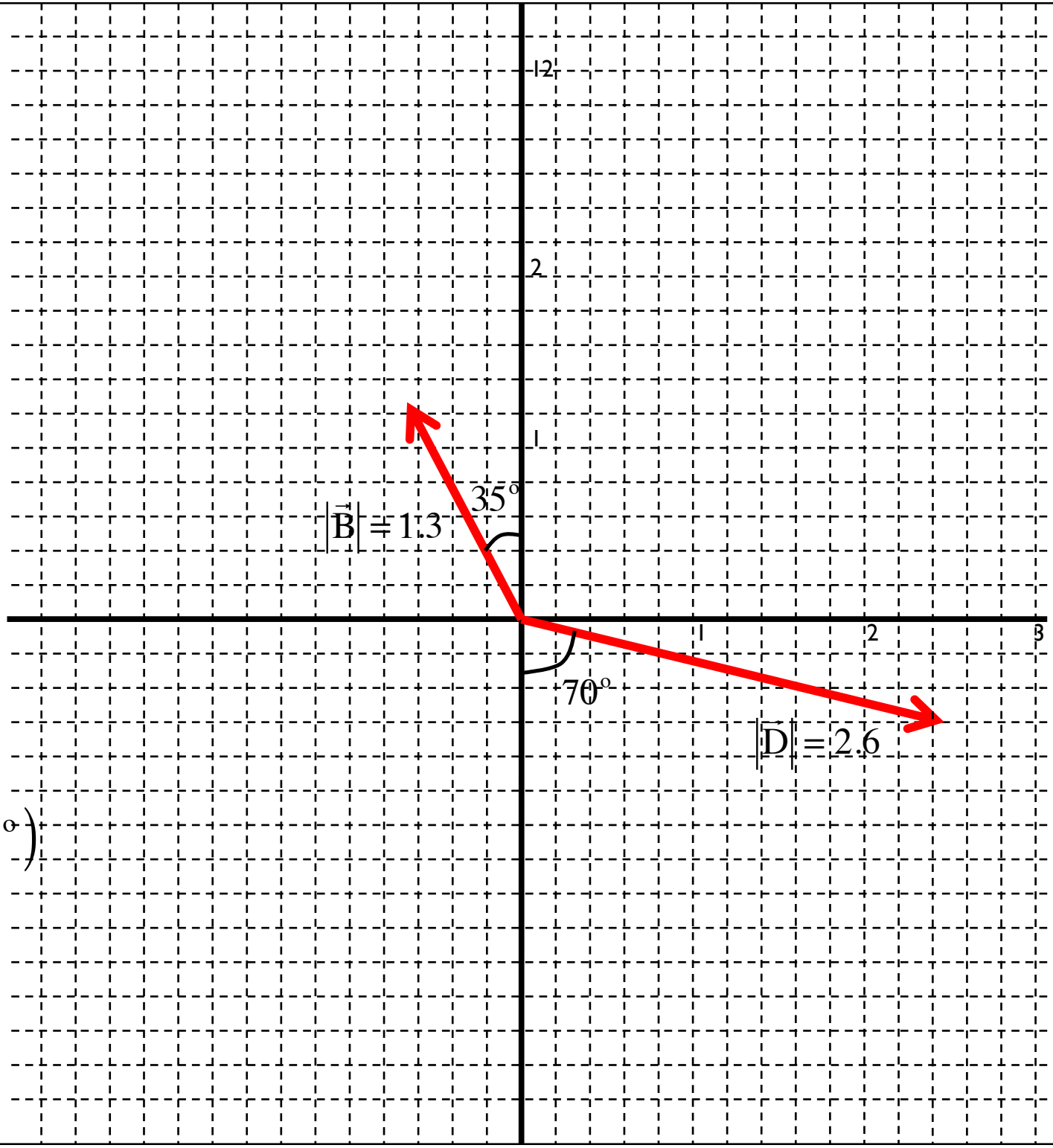
Note: I've changed the axes for this problem. The angles will now make more sense!

Characterize these vectors in polar notation:

$$\vec{B} = 1.3\angle\left(125^\circ\right)$$

$$\vec{D} = 2.6\angle\left(340^\circ\right)$$

$$\text{or } \vec{D} = 2.6\angle\left(-20^\circ\right)$$



Problem 3.25 (from Fletch's book)

Why are the apparent lengths different?

The scale on each axis is different.

Problem 3.26

Assuming the vectors give on the right, determine:

a.) $-\left(\frac{1}{3}\right)\mathrm{A} =$

b.) $-6\mathrm{B} =$

c.) $\mathrm{A} + \mathrm{B} - \mathrm{C} =$

d.) E converted to unit vector notation

$\vec{A} = -8\hat{i} + 12\hat{j}$

$\vec{B} = -4\hat{i} - 3\hat{j}$

$\vec{C} = 5\hat{i} - 6\hat{j} - 7\hat{k}$

$\vec{D} = 7 \angle (-60^\circ)$

$\vec{E} = 12 \angle 225^\circ$

$F = 2 \angle 105^\circ$

Determine:

$\vec{A} = -8\hat{i} + 12\hat{j}$

$\vec{B} = -4\hat{i} - 3\hat{j}$

$\vec{C} = 5\hat{i} - 6\hat{j} - 7\hat{k}$

$\vec{D} = 7 \angle (-60^\circ)$

$\vec{E} = 12 \angle 225^\circ$

$F = 2 \angle 105^\circ$

a.) $-\left(\frac{1}{3}\right)A = -\left(\frac{1}{3}\right)[8i + 12j]$

$= \left[-\frac{8}{3}i - 4j\right]$

b.) $-6B = -(6)[-4i - 3j]$

$= [24i + 18j]$

c.) $A + B - C = (-8i + 12j) + (-4i - 3j) - [5i - 6j - 7k]$

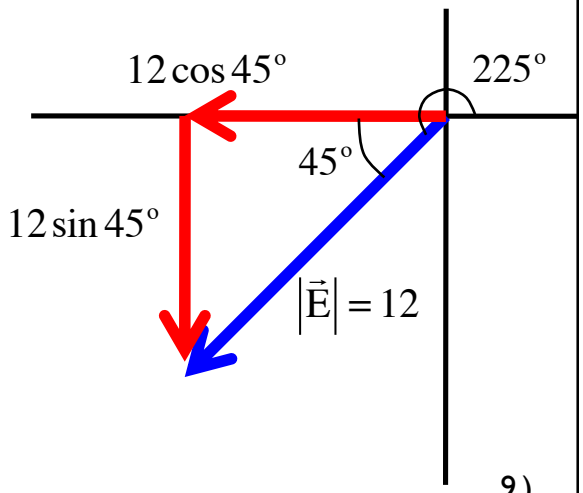
$= -17i + 15j + 7k$

d.) E converted to unit vector notation

$E = 12\angle 225^\circ$

$\Rightarrow \quad E = (-12\cos 45^\circ)i + (-12\sin 45^\circ)j$

$= -8.49i - 8.49j$



Determine:

e.) F converted to u.v.n.

$$F = 2\angle 105^\circ$$

$$\Rightarrow \quad F =$$

f.) convert A to polar notation

$$A = -8i + 12j$$

$$\Rightarrow \quad A =$$

g.) convert B to polar notation

$$B = -4i - 3j$$

$$\Rightarrow \quad B =$$

$\vec{A} = -8\hat{i} + 12\hat{j}$

$\vec{B} = -4\hat{i} - 3\hat{j}$

$\vec{C} = 5\hat{i} + 6\hat{j} - 7\hat{k}$

$\vec{D} = 7 \angle (-60^\circ)$

$\vec{E} = 12 \angle 225^\circ$

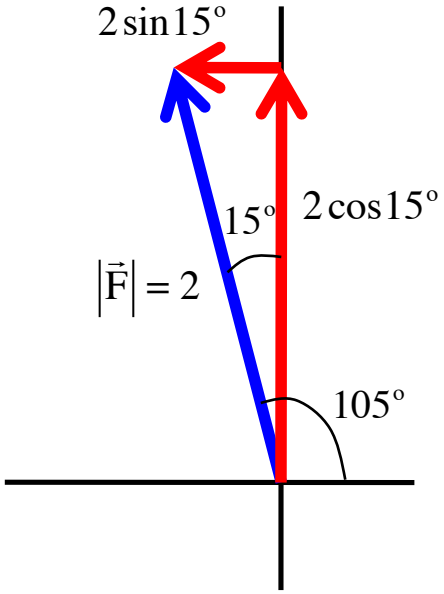
$F = 2 \angle 105^\circ$

e.) F converted to u.v.n.

$$F = 2\angle 105^\circ$$

$$\Rightarrow \quad F = \left(-2\sin 15^\circ\right)i + \left(2\cos 15^\circ\right)j$$

$$= -.52i + 1.93j$$

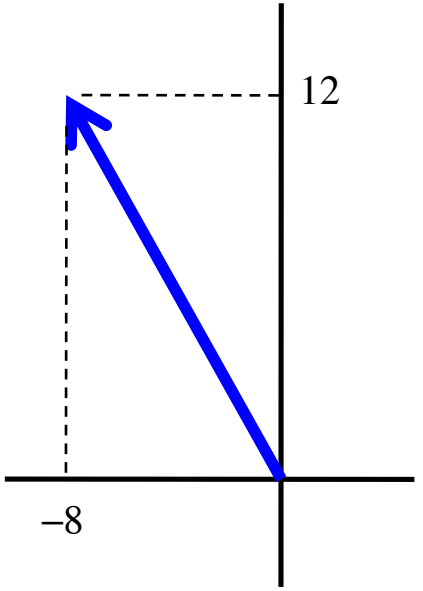


f.) convert A to polar notation

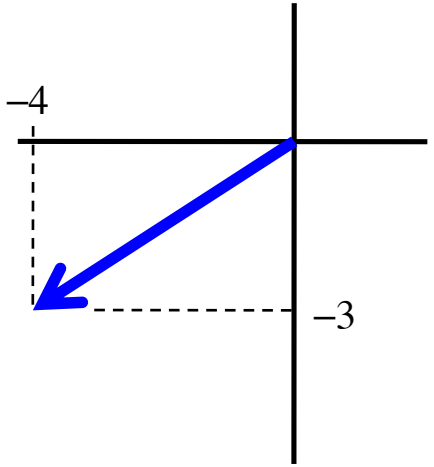
$$A = -8i + 12j$$

$$\Rightarrow \quad A = \left((-8)^2 + 12^2\right)^{1/2} \angle \left(\tan^{-1}\left(\frac{12}{-8}\right) + 180^\circ \right)$$

$$\Rightarrow \quad A = 14.4\angle 123.7^\circ$$



g.) convert B to polar notation



$$B = -4i - 3j$$

$$\Rightarrow \quad B = \left((-4)^2 + (-3)^2\right)^{1/2} \angle \left(\tan^{-1}\left(\frac{-3}{-4}\right) + 180^\circ \right)$$

$$\Rightarrow \quad B = 5 \angle 216.9^\circ$$