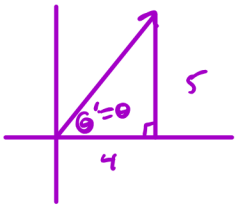
V4 - Component to Polar (Right Triangle Trig)

Given a vector in component form, find the vector's magnitude and direction (using an angle in standard position) and write the answer in polar form (magnitude, angle)

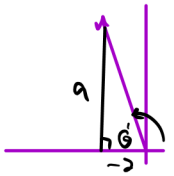
1. $\bar{a} = \langle 4, 5 \rangle$ $\bar{a} = (\sqrt{41}, 51°)$



$\|\bar{a}\| = \sqrt{x^2+y^2} = \sqrt{(4)^2+(5)^2} = \sqrt{16+25} = \sqrt{41}$

$\tan\theta' = \frac{5}{4}$, $\theta' = \tan^{-1}(5/4)$, $\theta' = 51°$

2. $\bar{e} = \langle -2, 9 \rangle$ $\bar{e} = (\sqrt{85}, 103°)$

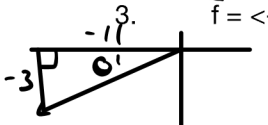


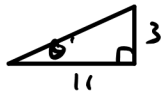
$\|\bar{e}\| = \sqrt{x^2+y^2} = \sqrt{(-2)^2+(9)^2} = \sqrt{4+81} = \sqrt{85}$

$\tan\theta' = \frac{9}{2}$, $\theta' = \tan^{-1}(\frac{9}{2})$, $\theta' = 77°$

$\theta = 180° - 77°$, $\theta = 103°$

3. $\bar{f} = \langle -11, -3 \rangle$ $\bar{f} = (\sqrt{130}, 195°)$



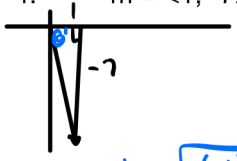


$\|\bar{f}\| = \sqrt{(-11)^2+(-3)^2} = \sqrt{121+9} = \sqrt{130}$

$\tan\theta' = \frac{3}{11}$, $\theta' = \tan^{-1}(\frac{3}{11})$, $\theta' = 15°$

$\theta = 180° + 15° = 195°$

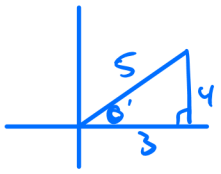
4. $\bar{m} = \langle 1, -7 \rangle$ $\bar{m} = (\sqrt{50}, -82°) = (\sqrt{50}, 278°)$



$\|\bar{m}\| = \sqrt{(1)^2+(-7)^2} = \sqrt{1+49} = \sqrt{50}$

$\tan\theta' = \frac{7}{1}$, $\theta' = \tan^{-1}(7)$, $\theta' = 82°$

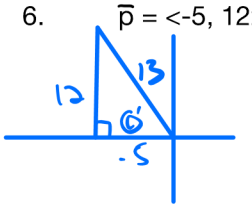
5. $\bar{n} = \langle 3, 4 \rangle$ $\bar{n} = (5, 53°)$



PT 3-4-5

$\tan\theta = \frac{4}{3}$, $\theta = \tan^{-1}(\frac{4}{3})$, $\theta = 53°$

6. $\bar{p} = \langle -5, 12 \rangle$ $\bar{p} = (13, 113°)$



PT 5-12-13

$\tan\theta' = \frac{12}{5}$, $\theta' = \tan^{-1}(\frac{12}{5})$, $\theta' = 67°$

$\theta = 180 - 67$, $\theta = 113°$