Vectors Review WS

1) $\langle 1-(-5), -6-(-5) \rangle = \boxed{\langle 6, -1 \rangle}$ Quadrant 4

2) $\langle 7-1, -5-0 \rangle = \boxed{\langle 6, -5 \rangle}$ Quadrant 4
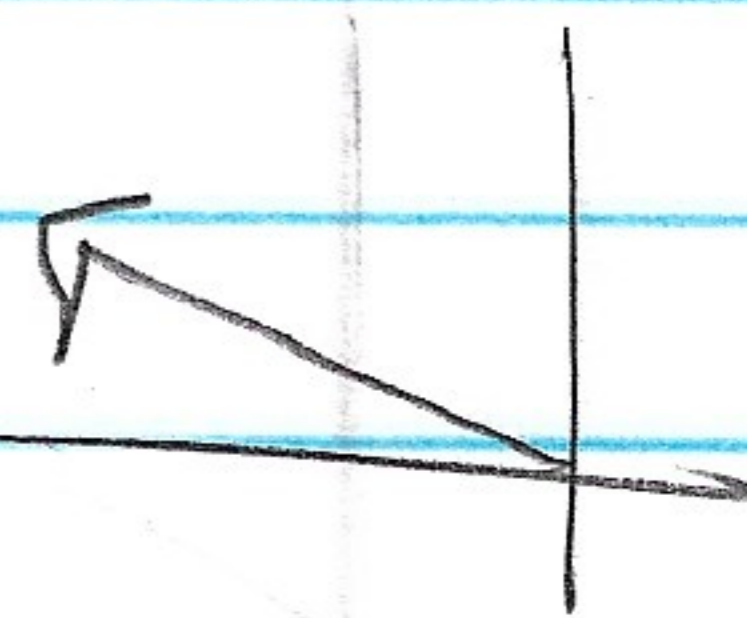
3) $\langle -9-(-5), -10-4 \rangle = \boxed{\langle -4, -14 \rangle}$ Quadrant 3

4) $\langle -6-(-1), 4-1 \rangle = \boxed{\langle -5, 3 \rangle}$ Quadrant 2

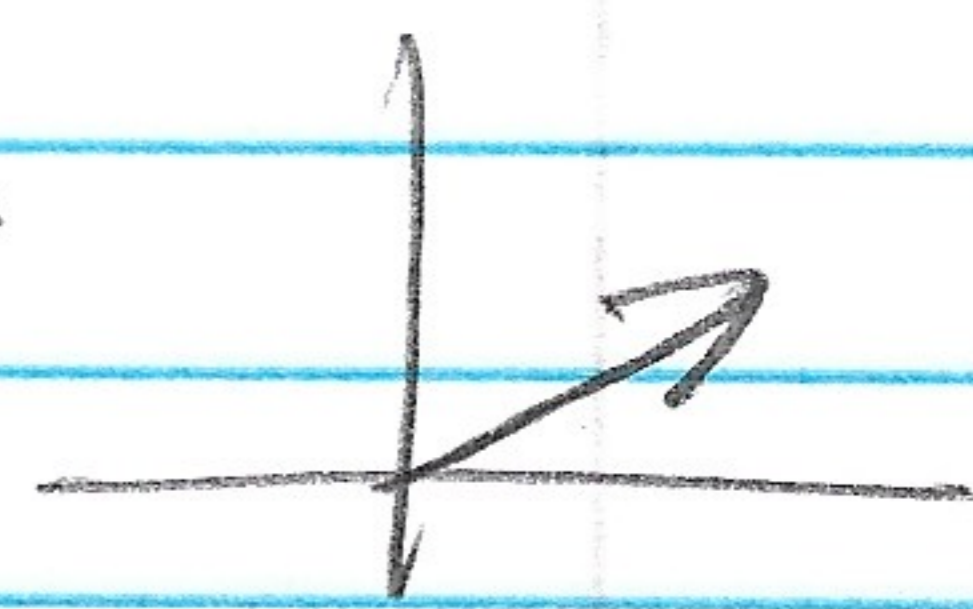5) $mag = \sqrt{(-31)^2 + 6^2} = \sqrt{997} = \boxed{31.58}$

$\theta' = \tan^{-1}\left(-\frac{6}{31}\right) = -10.95°$

$\theta = 180° - 10.95 = \boxed{169.05°}$
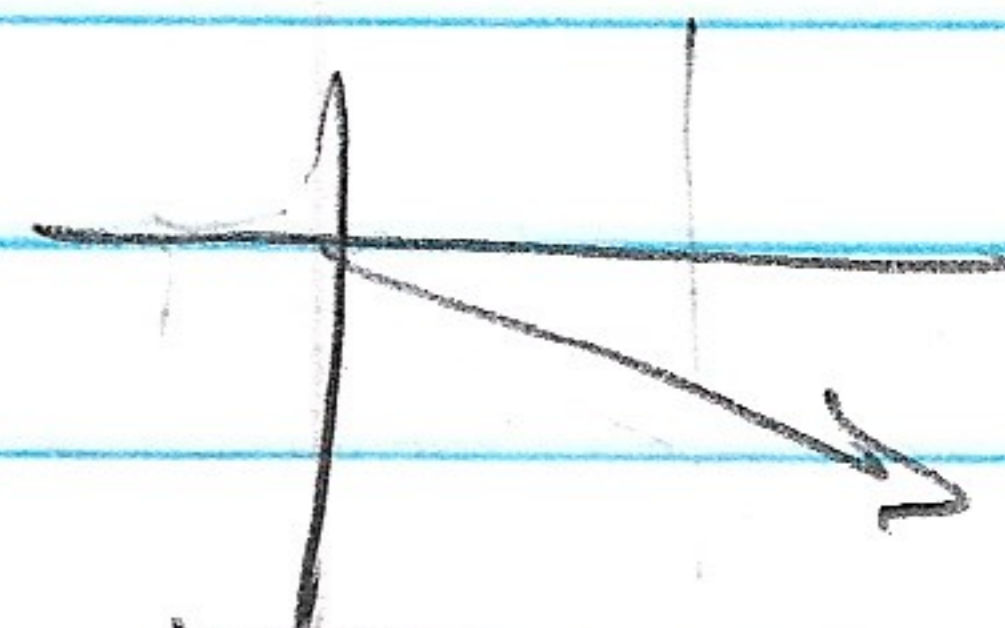
6) $mag = \sqrt{11^2 + 10^2} = \sqrt{221} = \boxed{14.87}$

$\theta' = \tan^{-1}\left(\frac{10}{11}\right) = \boxed{42.27°}$

7) $mag = \sqrt{30^2 + (-40)^2} = \sqrt{2500} = \boxed{50}$

$\theta' = \tan^{-1}\left(\frac{-40}{70}\right) = -53.13°$

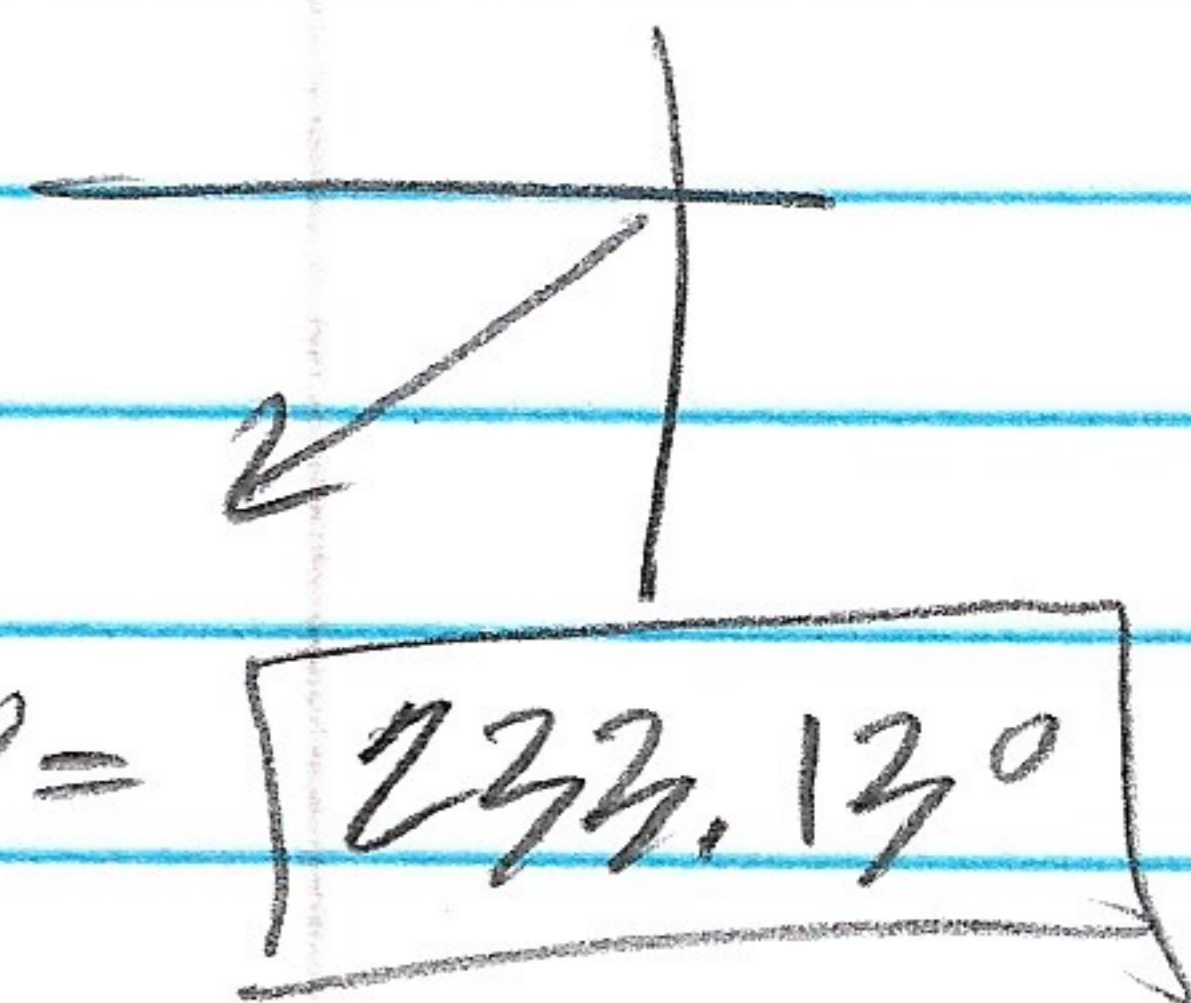$\theta = 360° - 53.13° = \boxed{306.87°}$

8) $mag = \sqrt{(-24)^2 + (-32)^2} = \sqrt{1600} = \boxed{40}$

$\theta' = \tan^{-1}\left(\frac{32}{24}\right) = 53.13°$

$\theta = 180° + 53.13° = \boxed{233.13°}$

9) $2\langle 5,-7\rangle - \langle -9,-11\rangle$

$= \langle 10,-14\rangle + \langle 9,11\rangle = \boxed{\langle 19,-3\rangle}$

10) $\langle 5,-7\rangle + \langle -9,7\rangle = \boxed{\langle -4,0\rangle}$

11) $-\langle -3,-3\rangle - \langle -5,-1\rangle$

$\langle 3,3\rangle + \langle 5,1\rangle = \boxed{\langle 8,4\rangle}$

12) $3\langle 1,12\rangle - \frac{1}{2}\langle 12,10\rangle$

$\langle 3,36\rangle + \langle -6,-5\rangle = \boxed{\langle -3,31\rangle}$

13) $\sqrt{(-9)^2 + 6^2} = \sqrt{117} = 3\sqrt{13}$

$\dfrac{\langle -9,6\rangle}{3\sqrt{13}} = \left\langle \dfrac{-3}{\sqrt{13}}, \dfrac{2}{\sqrt{13}}\right\rangle = \boxed{\left\langle \dfrac{-3\sqrt{13}}{13}, \dfrac{2\sqrt{13}}{13}\right\rangle}$

14) $\sqrt{2^2 + 6^2} = \sqrt{40} = 2\sqrt{10}$

$\dfrac{\langle 2,6\rangle}{2\sqrt{10}} = \left\langle \dfrac{1}{\sqrt{10}}, \dfrac{3}{\sqrt{10}}\right\rangle = \boxed{\left\langle \dfrac{\sqrt{10}}{10}, \dfrac{3\sqrt{10}}{10}\right\rangle}$

15) $\sqrt{25 + 144} = \sqrt{169} = 13$

$\dfrac{-5i + 12j}{13} = \boxed{\dfrac{-5}{13}i + \dfrac{12}{13}j}$

16) $\sqrt{49 + 49} = \sqrt{98} = 7\sqrt{2}$

$\dfrac{-7i + 7j}{7\sqrt{2}} = \dfrac{-1}{\sqrt{2}}i + \dfrac{1}{\sqrt{2}}j = \boxed{-\sqrt{\tfrac{1}{2}}\,i + \sqrt{\tfrac{1}{2}}\,j}$

17) $\langle -6, 3 \rangle \cdot \langle -4, -6 \rangle$
$= 24 + (-18) = \boxed{6}$

18) $\langle -5, -8 \rangle \cdot \langle 8, 8 \rangle$
$-40 + (-64) = \boxed{-104}$

19) $\langle 6, -4 \rangle \cdot \langle 0, -9 \rangle$
$0 + 36 = \boxed{36}$

20) $\langle -2, -9 \rangle \cdot \langle -7, 2 \rangle$
$= 14 + (-18) = \boxed{-4}$

21) $\theta = \cos^{-1}\left(\dfrac{11}{\sqrt{10} \cdot \sqrt{17}}\right) = \cos^{-1}\left(\dfrac{11}{\sqrt{170}}\right) = \boxed{32.47^\circ}$

22) $\theta = \cos^{-1}\left(\dfrac{-26}{\sqrt{8} \cdot \sqrt{85}}\right) = \cos^{-1}\left(\dfrac{-26}{\sqrt{680}}\right) = \boxed{175.60^\circ}$

23) $\theta = \cos^{-1}\left(\dfrac{-36}{\sqrt{145} \cdot \sqrt{16}}\right) = \cos^{-1}\left(\dfrac{-36}{\sqrt{2320}}\right) = \boxed{138.37^\circ}$

24) $\theta = \cos^{-1}\left(\dfrac{-21}{\sqrt{17} \cdot \sqrt{45}}\right) = \cos^{-1}\left(\dfrac{-21}{\sqrt{765}}\right) = \boxed{139.40^\circ}$