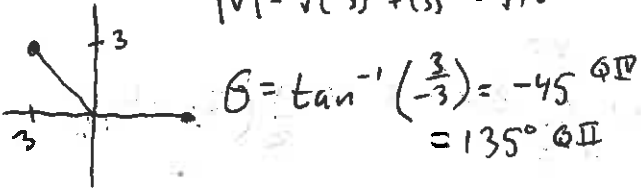


Pre-calc worksheet #4.

① $w = \langle 3-3, -2-7 \rangle$
 $= \langle 0, -9 \rangle$

② $w = \langle 4-2, 1-(-1) \rangle$
 $= \langle 2, 2 \rangle$
 $= 2i + 2j$

③ $v = \langle -3, 3 \rangle$
 $|v| = \sqrt{(-3)^2 + (3)^2} = \sqrt{18}$



$v = \sqrt{18} \langle \cos(135^\circ), \sin(135^\circ) \rangle$

④ $v = 4i - 10j$

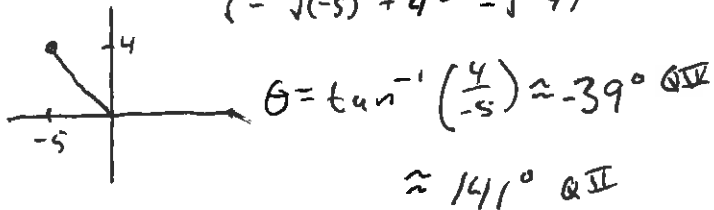
$|v| = \sqrt{(4)^2 + (-10)^2} = \sqrt{116}$

Unit vector = $\frac{\langle 4, -10 \rangle}{\sqrt{116}} = \left\langle \frac{4}{\sqrt{116}}, \frac{-10}{\sqrt{116}} \right\rangle$

$w = 8 \left\langle \frac{4}{\sqrt{116}}, \frac{-10}{\sqrt{116}} \right\rangle$

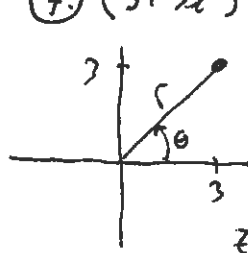
⑤ $z = 2(\cos(270^\circ) + i\sin(270^\circ))$
 $= 2(0 - i)$
 $= 0 - 2i$

⑥ $z = -5 + 4i$
 $r = \sqrt{(-5)^2 + 4^2} = \sqrt{41}$



$z = \sqrt{41} (\cos(141^\circ) + i\sin(141^\circ))$

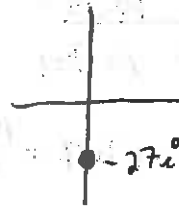
⑦ $(3 + 3i)^8$



$z^8 = (\sqrt{18})^8 (\cos(8 \cdot 45^\circ) + i\sin(8 \cdot 45^\circ))$
 $= 104976 (1 + 0i)$

$= 104976 + 0i$

⑧ $z = -27i$



spacing = $\frac{360^\circ}{3} = 120^\circ$

$x_1 = (27)^{1/3} (\cos(\frac{270^\circ}{3}) + i\sin(\frac{270^\circ}{3}))$

$= 3 (\cos(90^\circ) + i\sin(90^\circ))$

$= 3(0 + i) = 0 + 3i$

$x_2 = 3 (\cos(210^\circ) + i\sin(210^\circ))$

$= 3 \left(-\frac{\sqrt{3}}{2} - \frac{1}{2}i\right) = -\frac{3\sqrt{3}}{2} - \frac{3}{2}i$

$x_3 = 3 (\cos(330^\circ) + i\sin(330^\circ))$

$= 3 \left(\frac{\sqrt{3}}{2} - \frac{1}{2}i\right) = \frac{3\sqrt{3}}{2} - \frac{3}{2}i$

$$\textcircled{9} \quad \begin{aligned} 6x^3 - x^2 + 18x - 3 \\ x^2(6x-1) + 3(6x-1) \\ (x^2-3)(6x-1) \end{aligned}$$

$$\textcircled{10} \quad \begin{aligned} \cos^3 x - \cos x &= 0 \\ \cos x(\cos^2 x - 1) &= 0 \\ \cos x = 0 & \quad \cos^2 x - 1 = 0 \\ x = \frac{\pi}{2}, \frac{3\pi}{2} & \quad \cos^2 x = 1 \\ & \quad \cos x = \pm 1 \\ & \quad x = 0, \pi \end{aligned}$$

$$\textcircled{11} \quad 8x^4 - 4x^2 + 3x - 1 \div x - 6$$

$$\begin{array}{r|rrrrr} 6 & 8 & 0 & -4 & 3 & -1 \\ & & 48 & 288 & 1704 & 10242 \\ \hline & 8 & 48 & 284 & 1707 & 10241 \end{array}$$

$$8x^3 + 48x^2 + 284x + 1707 + \frac{10241}{x-6}$$

$$\begin{aligned} \textcircled{12} \quad & 8 \ln(x) - 2(\ln(x) + 3 \ln(y)) \\ &= \ln x^8 - 2 \ln(xy^3) \\ &= \ln x^8 - \ln(x^2 y^6) \\ &= \ln \left(\frac{x^8}{x^2 y^6} \right) \\ &= \ln \left(\frac{x^6}{y^6} \right) \end{aligned}$$

$$\begin{aligned} \textcircled{13} \quad \textcircled{a} \quad \sum_{i=1}^{\infty} \left(\frac{3}{4}\right)^i &= a_1 \left(\frac{1}{1-r}\right) \\ &= \frac{3}{4} \left(\frac{1}{1-\frac{3}{4}}\right) \\ &= \frac{3}{4} \left(\frac{1}{\frac{1}{4}}\right) \\ &= \frac{3}{4} \left(\frac{4}{1}\right) \\ &= 3 \end{aligned}$$

$$\begin{aligned} \textcircled{b} \quad \sum_{i=5}^{40} 8i - 5 &= \frac{n}{2} (a_5 + a_{40}) \\ &= \frac{36}{2} (35 + 315) \\ &= 6,300 \end{aligned}$$