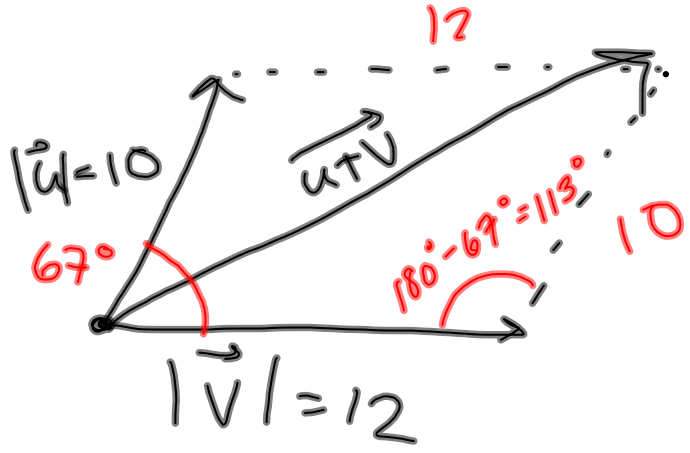
Quiz #7 solutions:

1. $\langle a, b \rangle$
2. $a\vec{i} + b\vec{j}$
3. $\sqrt{a^2+b^2}$
4. $\sqrt{29}$
5. $\langle -1, -4 \rangle$
6. -11
7. $\sqrt{2}$
8. $1/2$
9. undefined
10. $1/\sqrt{2}$

7.5

19. $|\vec{u}| = 10$, $|\vec{v}| = 12$, $\theta = 67°$

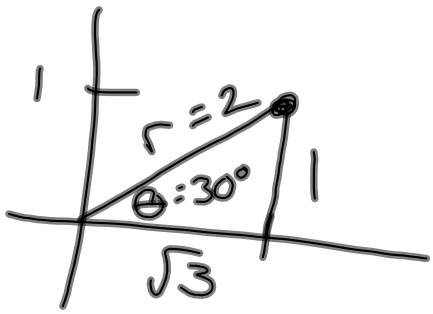
$|\vec{u}+\vec{v}| = ?$ & $\angle$ betw. $\vec{u}+\vec{v}$ & $\vec{u}$



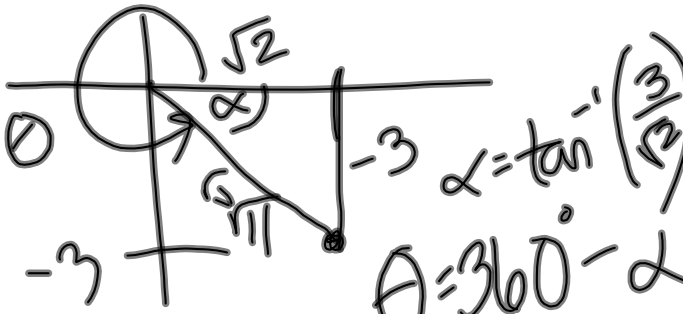
$|\vec{u}+\vec{v}| = \sqrt{10^2+12^2-2(10)(12)\cos 113°}$

7.3 $r\,\text{cis}\,\theta$

17. $\sqrt{3}+i = 2\,\text{cis}\,30^\circ = 2\,\text{cis}\,\frac{\pi}{6}$



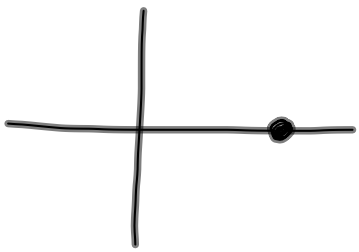
$\sqrt{2}-3i$



$\alpha = \tan^{-1}\left(\frac{3}{\sqrt{2}}\right)$

$\theta = 360^\circ - \alpha$

19. $\frac{2}{5}+0i$



$r=\frac{2}{5}; \theta = 0^\circ$

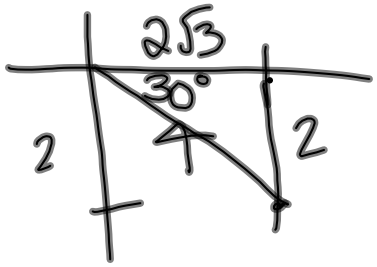
$\frac{2}{5}\,\text{cis}\,0^\circ$

$0-7i$

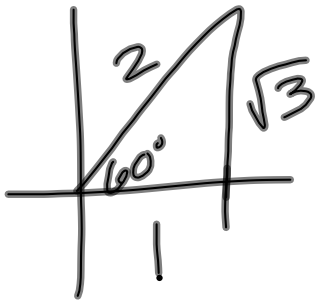
$r=7; \theta = 270^\circ$

$7\,\text{cis}\,270^\circ$

43. $\dfrac{2\sqrt{3}-2i}{1+\sqrt{3}i}$

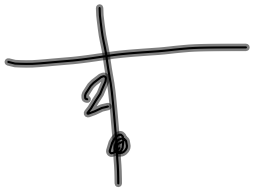


$\dfrac{4\,\mathrm{cis}\,330^\circ}{2\,\mathrm{cis}\,60^\circ}$



$= 2\,\mathrm{cis}\,270^\circ$

$= -2i$



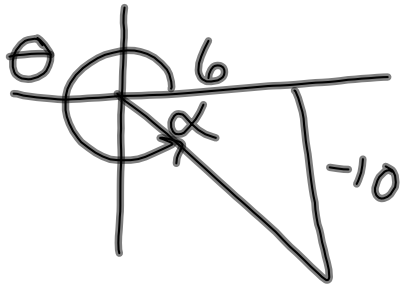
14. $\vec{v} = \langle 6, -10 \rangle$

a. $|\vec{v}| = \sqrt{6^2+(-10)^2} = \sqrt{136} = 2\sqrt{34}$

c. $\left\langle \frac{6}{2\sqrt{34}}, \frac{-10}{2\sqrt{34}} \right\rangle$

$\left\langle \frac{3\sqrt{34}}{34}, \frac{-5\sqrt{34}}{34} \right\rangle$

b. $\theta = 301^\circ$



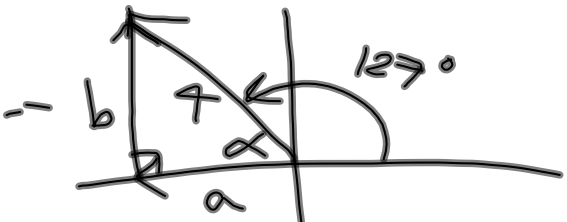
$360^\circ - \tan^{-1}\left(\frac{10}{6}\right)$

II $180^\circ - \tan^{-1}\left|\frac{b}{a}\right|$

III $180^\circ + \tan^{-1}\left|\frac{b}{a}\right|$

c. unit vector

16. $|\vec{v}| = 4$; $\theta = 127°$ $\langle a, b\rangle = ?$



$\cos 127° = \frac{a}{4}$

$a = 4\cos 127°$

≈ -2.4

$b = 4\sin 127°$

≈ 3.2

$a = |\vec{v}|\cos\theta$

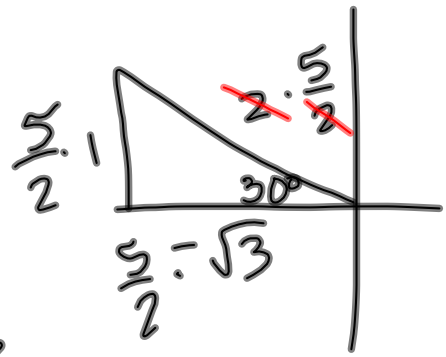
$b = |\vec{v}|\sin\theta$

$z = r(\cos\theta + i\sin\theta)$

$\langle -2.4, 3.2\rangle$

$|\vec{v}| = 5$; $\theta = 150°$

$\langle a, b\rangle$



$\left\langle -\frac{5\sqrt{3}}{2}, \frac{5}{2}\right\rangle$

19. $\vec{v} = \langle 5, -2 \rangle$; $\vec{w} = \langle 2, 5 \rangle$

smallest non-negative $\angle$ between the vectors?

$$\theta = \cos^{-1}\left(\frac{\vec{v}\cdot\vec{w}}{|\vec{v}||\vec{w}|}\right)$$

$$\theta = \cos^{-1}(0)$$

$$\theta = 90^\circ$$

* the dot product of 2 perpendicular vectors is 0

$$y = \frac{5}{2}\sec\left(3x - \frac{\pi}{2}\right) + 5$$

$$y = \frac{5}{2}\sec 3\left(x - \frac{\pi}{6}\right) + 5$$

"amp": 5/2

per: $\frac{2\pi}{3}$

h.shift: right $\frac{\pi}{6}$

v.shift: up 5