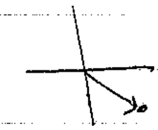
1. $(-3,-2)\,(5,-7) = \langle 5--3, -7--2 \rangle = \boxed{\langle 8,-5 \rangle}$

$\sqrt{8^2+(-5)^2} = \sqrt{64+25} = \boxed{\sqrt{89}}$

$\theta = \tan^{-1}\left(\frac{-5}{8}\right) = -32.01^\circ + 360 = \boxed{327.99^\circ}$



2. $(-5,2)(-8,15) = \langle -8--5, 15-2 \rangle = \boxed{\langle -3,13 \rangle}$

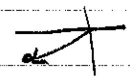
$\sqrt{(-3)^2+(13)^2} = \boxed{\sqrt{178}}$

$\theta = \tan^{-1}\left(\frac{13}{-3}\right) = -77.01 + 180 = \boxed{102.99^\circ}$

3. $(6,-7)(9,-11) = \langle -9-6, -11--7 \rangle = \boxed{\langle -15,-4 \rangle}$

$\sqrt{(-15)^2+(-4)^2} = \boxed{\sqrt{241}}$

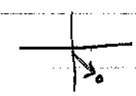
$\theta = \tan^{-1}\left(\frac{-4}{-15}\right) = \tan^{-1}\left(\frac{4}{15}\right) = 14.93 + 180 = \boxed{194.93^\circ}$



4. $(0,6)(2,2) = \langle 2-0, 2-6 \rangle = \boxed{\langle 2,-4 \rangle}$

$\sqrt{2^2+(-4)^2} = \underset{2\cdot 2\cdot 5}{\sqrt{20}} = \boxed{2\sqrt{5}}$

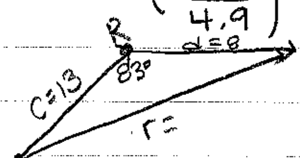
$\theta = \tan^{-1}\left(-\frac{4}{2}\right) = \tan^{-1}(-2) = -63.43 + 360 = \boxed{296.57^\circ}$



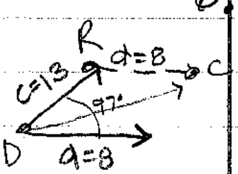
5. $(1.9,-4.7)(6.8,-12.3) = \langle 6.8-1.9, -12.3+4.7 \rangle = \boxed{\langle 4.9,-7.6 \rangle}$

$\sqrt{(4.9)^2+(-7.6)^2} = \sqrt{81.77} = \boxed{9.04}$

$\theta = \tan^{-1}\left(\frac{-7.6}{4.9}\right) = -57.19 + 360 = \boxed{302.81^\circ}$

6. 

$R = 180 - 97 = 83^\circ$



$r^2 = c^2 + d^2 - 2cd\cos R$

$r = \sqrt{13^2+8^2-2(13)(8)\cos 83}$

$\boxed{r = 14.41}$

$C^2 = d^2 + r^2 - 2dr\cos C$

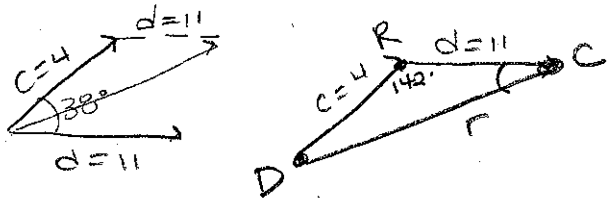
$13^2 = 8^2 + (14.41)^2 - 2(8)(14.41)\cos C$

$-102.6481 = -230.56\cos C$

$.45 = \cos C$

$\boxed{63.56^\circ} = C$

1)



7. $R = 180 - 38 = 142°$

$r^2 = c^2 + d^2 - 2cd\cos R$

$r = \sqrt{4^2 + 11^2 - 2(4)(11)\cos 142°}$

$r = \boxed{14.36}$

$c^2 = d^2 + r^2 - 2dr\cos C$

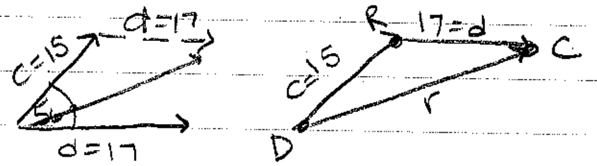
$4^2 = 11^2 + 14.36^2 - 2(11)(14.36)\cos C$

$-311.2096 = -315.92\cos C$

$.99 = \cos C$

$\boxed{C = 9.91°}$

8.



$R = 180 - 56 = 124°$

$r = \sqrt{15^2 + 17^2 - 2(15)(17)\cos 124°}$

$\boxed{r = 28.27}$

$15^2 = 17^2 + 28.27^2 - 2(17)(28.27)\cos C$

$-863.1929 = -961.18\cos C$

$.90 = \cos C$

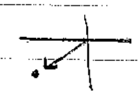
$\boxed{26.10°} = C$

9. $(-8, 15)(0, 6) = (0 - -8)i + (6 - 15)j = \boxed{8i - 9j}$

a.) $\sqrt{8^2 + (-9)^2} = \sqrt{64 + 81} = \boxed{\sqrt{145}}$

b.) $\theta = \tan^{-1}\left(\frac{-9}{8}\right) = -48.37 + 360 = \boxed{311.63°}$

10. $(2, -6)(-1, -9) = \boxed{-3i - 3j}$



a.) $\sqrt{(-3)^2 + (-3)^2} = \sqrt{9 + 9} = \sqrt{18} = \boxed{3\sqrt{2}}$

$3 \cdot 3 \cdot 2$

$\theta = \tan^{-1}\left(\frac{-3}{-3}\right) = \tan^{-1}(1) = \boxed{225°}$

use unit circle

11. $(3.7, 1.2)(6.5, 8.5) = \boxed{2.8i + 7.3j}$

a.) $\sqrt{2.8^2 + 7.3^2} = \sqrt{61.13} = \boxed{7.82}$

b.) $\theta = \tan^{-1}\left(\frac{7.3}{2.8}\right) = \boxed{69.02°}$

12. $(2.6, -6)(7, 3) = \boxed{4.4j + 9j}$

a.) $\sqrt{4.4^2 + 9^2} = \sqrt{100.36} = \boxed{10.02}$

b.) $\theta = \tan^{-1}\left(\frac{9}{4.4}\right) = \boxed{63.95°}$

13. $u = \langle 4, -4 \rangle \quad v = \langle 6, 9 \rangle$

a.) $-\frac{1}{2}u - 5v$

$\langle -2, 2 \rangle - \langle 30, 45 \rangle$

$\boxed{\langle -32, -43 \rangle}$

b.) $-3u + 6v$

$\langle -12, 12 \rangle + \langle 36, 54 \rangle$

$\boxed{\langle 24, 66 \rangle}$

14. $u = 2i - 3j \quad v = -i + 5j$

a.) $-\frac{1}{2}u - 5v$

$(-i + \frac{3}{2}j) + (+5i - 25j)$

$\boxed{4i - 23\frac{1}{2}j}$

b.) $-3u + 6v$

$(-6i + 9j) + (-6i + 30j)$

$\boxed{-12i + 39j}$

15. $\frac{\langle -3, 9 \rangle}{\sqrt{(-3)^2 + 9^2}} = \frac{\langle -3, 9 \rangle}{\sqrt{90}} = \frac{\langle -3, 9 \rangle}{3\sqrt{10}} = \left\langle \frac{-1}{\sqrt{10}}, \frac{3}{\sqrt{10}} \right\rangle = \boxed{\left\langle -\frac{\sqrt{10}}{10}, \frac{3\sqrt{10}}{10} \right\rangle}$

$3 \cdot 3 \cdot 10$

16. $\frac{\langle 8, 2 \rangle}{\sqrt{8^2 + 2^2}} = \frac{\langle 8, 2 \rangle}{\sqrt{68}} = \frac{\langle 8, 2 \rangle}{2\sqrt{17}} = \left\langle \frac{4}{\sqrt{17}}, \frac{1}{\sqrt{17}} \right\rangle = \boxed{\left\langle \frac{4\sqrt{17}}{17}, \frac{\sqrt{17}}{17} \right\rangle}$

$2 \cdot 2 \cdot 17$

17. $\frac{\langle -5, 5 \rangle}{\sqrt{(-5)^2 + 5^2}} = \frac{\langle -5, 5 \rangle}{\sqrt{50}} = \frac{\langle -5, 5 \rangle}{5\sqrt{2}} = \left\langle \frac{-1}{\sqrt{2}}, \frac{1}{\sqrt{2}} \right\rangle = \boxed{\left\langle -\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2} \right\rangle}$

$5 \cdot 5 \cdot 2$

18. $\frac{3i + 3j}{\sqrt{3^2 + 3^2}} = \frac{3i + 3j}{\sqrt{18}} = \frac{3i + 3j}{3\sqrt{2}} = \frac{1}{\sqrt{2}}i + \frac{1}{\sqrt{2}}j = \boxed{\frac{\sqrt{2}}{2}i + \frac{\sqrt{2}}{2}j}$

$3 \cdot 3 \cdot 2$

19. $\frac{-\frac{1}{2}i + \frac{3}{2}j}{\sqrt{(-\frac{1}{2})^2 + (\frac{3}{2})^2}} = \frac{-\frac{1}{2}i + \frac{3}{2}j}{\sqrt{5/2}} = \frac{-\frac{1}{2}i + \frac{3}{2}j}{\frac{\sqrt{5} \cdot \sqrt{2}}{\sqrt{2} \cdot \sqrt{2}}} = \frac{-\frac{1}{2}i + \frac{3}{2}j}{\frac{\sqrt{10}}{2}} = \left(-\frac{1}{2}i + \frac{3}{2}j\right)\frac{2}{\sqrt{10}}$

$= \frac{-i}{\sqrt{10}} + \frac{3j}{\sqrt{10}} = \boxed{-\frac{\sqrt{10}}{10}i + \frac{3\sqrt{10}}{10}j}$

20. $\frac{-7j}{\sqrt{0^2 + (-7)^2}} = \frac{-7j}{\sqrt{49}} = \frac{-7j}{7} = \boxed{-j}$