

Operations on Vectors

1. $\langle 2, 8 \rangle$ 2. $\langle -6, 2 \rangle$ 3. $\langle 6, -2 \rangle$ 4. $\langle 20, 15 \rangle$

5. $\langle -20, -15 \rangle$ 6. $\langle -6, 15 \rangle + \langle 24, 18 \rangle$
 $\langle 18, 33 \rangle$

7. $-5i + 8j$ 8. $6i - 3j$ 9. $2i$ 10. $-4j$

11. $8(\cos 45^\circ i + \sin 45^\circ j)$
 $8(\frac{\sqrt{2}}{2} i + \frac{\sqrt{2}}{2} j)$
 $4\sqrt{2} i + 4\sqrt{2} j$

12. $3(\cos 210^\circ i + \sin 210^\circ j)$
 $3(-\frac{\sqrt{3}}{2} i) + 3(-\frac{1}{2} j)$
 $-3\frac{\sqrt{3}}{2} i - \frac{3}{2} j$

13. $.6(\cos 115^\circ i + \sin 115^\circ j)$
 $-.254i + .544j$

14. $.9(\cos 208^\circ i + \sin 208^\circ j)$
 $-.795i - .423j$

15. $(6)(2) + (-1)(5)$
 7

16. $(-3)(7) + (8)(5)$
 -61

17. $(2)(6) + (-3)(5)$
 -3

18. $(1)(3) + (2)(-1)$
 1

19. $(4)(5) + (6)(-9)$
 20

20. $(2)(0) + (4)(-1)$
 -4

21. $\frac{(2)(-3) + (1)(1)}{(\sqrt{5})(\sqrt{10})} = \frac{-5}{5\sqrt{2}} = \frac{\sqrt{2}}{2} \cos^{-1}(\frac{\sqrt{2}}{2}) = 135^\circ$

22. $\frac{(1)(1) + (7)(1)}{150(\sqrt{2})} = \frac{8}{10} = \frac{4}{5} \cos^{-1}(\frac{4}{5}) = 36.9^\circ$

23. $\frac{(1)(-6) + (2)(3)}{(\sqrt{5})(\sqrt{45})} = \frac{0}{15} \cos^{-1}(0) = 90^\circ$

24. $\frac{(4)(2) + (0)(2)}{(\sqrt{16})(\sqrt{8})} = \frac{8}{8\sqrt{2}} = \frac{\sqrt{2}}{2} \cos^{-1}(\frac{\sqrt{2}}{2}) = 45^\circ$

$$\textcircled{25} \frac{(3)(0) + (4)(1)}{\sqrt{25}(\sqrt{1})} = \frac{4}{5} \cos^{-1}\left(\frac{4}{5}\right) = 36.9^\circ$$

$$\textcircled{26} \frac{(-5)(3) + (12)(2)}{\sqrt{169}(\sqrt{13})} = \frac{9}{13\sqrt{13}} \frac{9\sqrt{13}}{169} \cos^{-1}\left(\frac{9\sqrt{13}}{169}\right) = 78.9^\circ$$

$\angle 5, 17$
 $23, 27$

$$\textcircled{27} \langle -6, 3 \rangle \cdot \langle 3, 4 \rangle$$

$$-18 + 12$$

$$-6$$

$$\textcircled{28} \langle -2, 1 \rangle \cdot \langle 8, -1 \rangle$$

$$-16 + -8$$

$$-24$$

$$\textcircled{29} (-2)(3) + (1)(4) - ((-2)(-5) + (1)(12))$$

$$-2 = 22$$

$$-24$$

$$\textcircled{30} \langle -2, 1 \rangle \cdot \langle 9, 12 \rangle = (-2)(9) + (1)(12)$$

$$-18 + 12$$

$$-6$$