

Chapter 8 Solutions

These answers are to be used to check against your solutions. Your homework should show all of your work, not just the answers!

Section 8.1 – Geometric Vectors

31. $h = 1.60$ cm; $v = 2.05$ cm

32. $h = 0.99$ cm; $v = 0.99$ cm

33. $h = 2.04$ cm; $v = 0.51$ cm

34. $h = 2.82$ cm; $v = 1.03$ cm

40. a) $h = 0.92$ N; $v = 1.18$ N

b) $h = 0.31$ N; $v = 1.47$ N

41. $h = 36$ mph; $v = 30$ mph

43. about 71 lbs

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Section 8.2 – Algebraic Vectors

16. $\overrightarrow{YZ} = \langle 3, -2 \rangle$; $|\overrightarrow{YZ}| = \sqrt{13}$

18. $\overrightarrow{YZ} = \langle -3, 3 \rangle$; $|\overrightarrow{YZ}| = 3\sqrt{2}$

20. $\overrightarrow{YZ} = \langle 2, 6 \rangle$; $|\overrightarrow{YZ}| = 2\sqrt{10}$

22. $\overrightarrow{YZ} = \langle 5, -12 \rangle$; $|\overrightarrow{YZ}| = 13$

23. $\vec{a} = \langle 2, 11 \rangle$

24. $\vec{a} = \langle 8, 14 \rangle$

25. $\vec{a} = \langle -2, 19 \rangle$

26. $\vec{a} = \langle 0, 30 \rangle$

27. $\vec{a} = \langle -22, 29 \rangle$

28. $\vec{a} = \langle 14, -13 \rangle$

29. $\vec{a} = \langle 18, 9 \rangle$

30. $\vec{a} = \langle 2, -4 \rangle$

31. $\vec{a} = \langle 20, 50 \rangle$

36. 5; $3\vec{i} + 4\vec{j}$

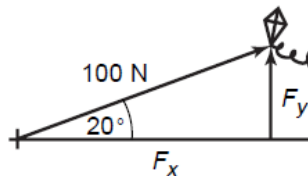
37. $\sqrt{13}$; $2\vec{i} - 3\vec{j}$

38. $\sqrt{157}$; $-6\vec{i} - 11\vec{j}$

39. $\sqrt{156.25}$; $3.5\vec{i} + 12\vec{j}$

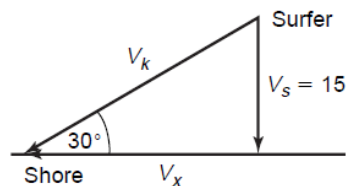
40. $2\sqrt{353}$; $-4\vec{i} + \vec{j}$

44. a)



b) 34 N

45. a)



b) 30 mph

47. a) 30 seconds

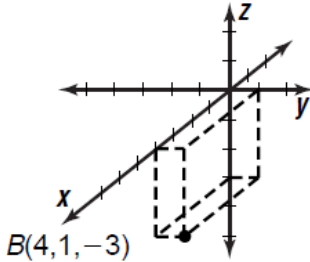
b) 30 m

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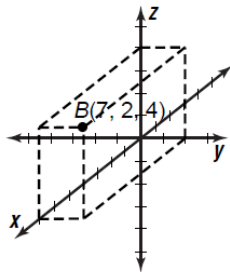
Section 8.3 – Vectors in 3-D

12.



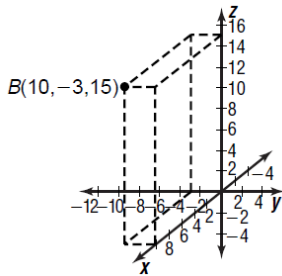
$$|\vec{OB}| = \sqrt{26}$$

13.



$$|\vec{OB}| = \sqrt{69}$$

14.



$$|\vec{OB}| = \sqrt{334}$$

15. $\langle 1, -4, -8 \rangle$; 9

16. $\langle -1, 1, -5 \rangle$; $3\sqrt{3}$

17. $\langle 1, -4, -4 \rangle$; $\sqrt{33}$

18. $\langle -4, 6, -4 \rangle$; $2\sqrt{17}$

22. $\langle 18, 36, 2 \rangle$

23. $\langle 6, -7.5, 11.5 \rangle$

24. $\langle 1, -8\frac{1}{4}, 4\frac{3}{4} \rangle$

25. $\langle 16\frac{2}{3}, -13, 23\frac{2}{3} \rangle$

26. $\langle 3.5, -0.75, 3.5 \rangle$

27. $\langle -5, -24, 8 \rangle$

29. $\langle 3, -8, -5 \rangle$; $3\vec{i} - 8\vec{j} - 5\vec{k}$

30. $\langle 2, 4, -1 \rangle$; $2\vec{i} + 4\vec{j} - \vec{k}$

31. $\langle -2, -4, 9 \rangle$; $-2\vec{i} - 4\vec{j} + 9\vec{k}$

32. $\langle -20, 5, -11 \rangle$; $-20\vec{i} + 5\vec{j} - 11\vec{k}$

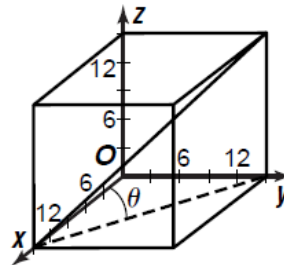
33. $\langle -7, 3, -6 \rangle$; $-7\vec{i} + 3\vec{j} - 6\vec{k}$

34. $\langle 15, -7, 0 \rangle$; $15\vec{i} - 7\vec{j}$

37. $\langle -9, 0, -9 \rangle$

40. $\langle 2, -2, 4 \rangle$

41. a)



b) about 26 ft

c) 35.25°

42. No, the distances between all the points are not equal (student should show the distances between the 3 points as proof).

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Section 8.4 – Perpendicular Vectors

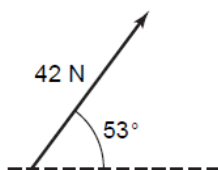
11. Inner Prod = 0; yes
13. Inner Prod = 2; no
15. Inner Prod = 32; no
17. Inner Prod = 6; no
19. Inner Prod = 9; no
21. $\langle 2, 2, -1 \rangle$; student should show verification
23. $\langle 0, 0, 10 \rangle$; student should show verification
25. $\langle 8, 8, 16 \rangle$; student should show verification
27. student needs to show 3×3 vector and its negative cross product are zero
29. possible answer: $\langle -2, -17, -14 \rangle$
31. possible answer: $\langle 0, 2, -1 \rangle$
38. a) $5u^2$
39. $k = -\frac{19}{29}$
41. $\overrightarrow{AB} = \langle 2, 0, 3 \rangle$
42. $|\overrightarrow{DE}| = \sqrt{89}$

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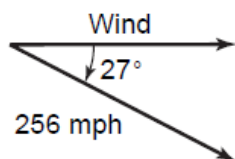
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Section 8.5 – Word Problems

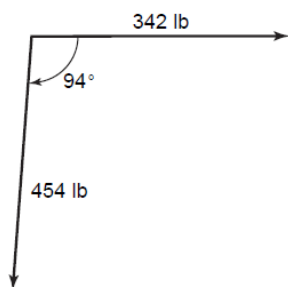
10.



11.



12.



13. 576.82 N; 42.5°

14. 99.87 mph; 334.3°

15. 199.19 km/hr; 90°

17. 194.87 N; 25.62°

19. 220.5 lb; 16.7°

21. 39.8 N; 270°

23. 19.9 N; 5.3° west of south

Chapter 8 Solutions

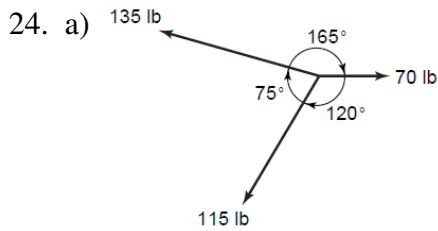
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Section 8.5 – Word Problems pt 2

16. greater than 17.36 lbs

18. 44°

20. $|\vec{r}| = 58.6 \text{ lbs at } 37.5^\circ$



b) Not Equilibrium; 134.5lb at 208.7°

27. a) 9.5° south of east

b) 18.2 mph

33. -2; not perpendicular

34. $\langle -12, -6, 3 \rangle$

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Section 8.6

12. $\langle x - 5, y - 7 \rangle = t\langle 2, 0 \rangle$

$$x = 5 + 2t; y = 7$$

14. $\langle x + 6, y - 10 \rangle = t\langle 3, 2 \rangle$

$$x = -6 + 3t; y = 10 + 2t$$

16. $\langle x - 1, y \rangle = t\langle -2, -4 \rangle$

$$x = 1 - 2t, y = -4t$$

18. $x = t, y = 4t - 5$

20. $x = t, y = 2t - 3$

22. $x = t, y = -\frac{2}{3}t + \frac{11}{3}$

24. $x = t, y = \frac{1}{2}t + 6$

26. $y = 6x + 42$

28. $y = \frac{1}{4}x + 5$

30. $x = 8$

31. a) $\langle x - 11, y + 4 \rangle = t\langle 3, 7 \rangle$

b) $x = 3t + 11, y = 7t - 4$

c) $y = \frac{7}{3}x - \frac{89}{3}$

37. a) $x = 3 - t, y = 4; x = 2 + t, y = 2 + 2t$

b) $t = \frac{1}{2}$; no, they don't hit

40. 162.2 km/h; 312.11°

41. -3; not perpendicular

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Section 8.7 – Motion

9. $|\vec{v}_x| = 32.5$; $|\vec{v}_y| = 56.29$

10. $|\vec{v}_x| = 46.18$; $|\vec{v}_y| = 8.73$

11. $|\vec{v}_x| = 891.77$; $|\vec{v}_y| = 802.96$

12. $|\vec{v}_x| = 15.01$; $|\vec{v}_y| = 7.98$

13. $|\vec{v}_x| = 55.11$; $|\vec{v}_y| = 41.53$

14. $|\vec{v}_x| = 43.49$; $|\vec{v}_y| = 14.98$

15. a) $x = 175t\cos35^\circ$, $y = 175t\sin35^\circ - 16t^2$
b) 899.32 ft

17. a) 158.32 ft/s
b) 127 yd

20. a) $x = -222.2t\cos45^\circ$
 $y = -222.2t\sin45^\circ - 4.9t^2$
b) -423.4 m
c) 608.4 km/h

21. a) 323.2 ft
b) 312.4 ft
c) 3.71 seconds

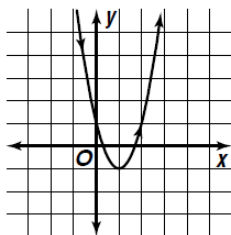
25. $y = 6x - 58$

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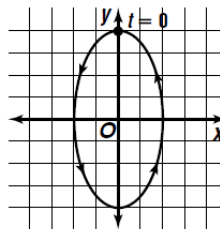
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Section 10.6

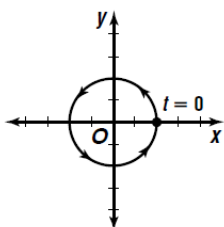
25. $y = 2x^2 - 4x + 1$



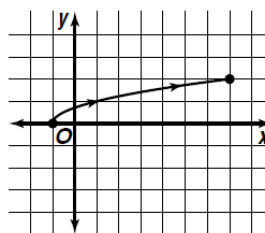
29. $x^2 + \frac{y^2}{4} = 1$



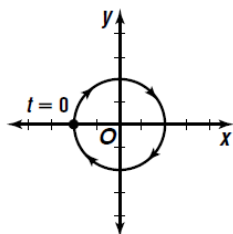
26. $x^2 + y^2 = 1$



30. $y = \sqrt{\frac{x+1}{2}}$



27. $x^2 + y^2 = 1$



31. $x^2 + y^2 = 9$

32. $x = 5\cos t, y = 5\sin t$

33. $x = 4\cos t, y = 4\sin t$

34. $x = 2\cos t, y = 5\sin t$

35. $x = \cos t, y = 4\sin t$

36. $x = t, y = t^2 - 4t + 7$

37. $x = t^2 + 2t - 1, y = t$

38. $x = \frac{1}{4}(t + 3)^2 + 2, y = t$

40. a) $x^2 + y^2 = 36$

b) $x = 6\sin(\pi t), y = 6\cos(\pi t)$

43. a) $x^2 + y^2 = 36$

b) $x = 6\sin t, y = 6\cos t$

28. $\frac{x^2}{9} + \frac{y^2}{4} = 1$

