Vectors for Neel

Name: _____ **Date:** _____

1. Which of the following describe a vector quantity?

   I. the area of a square

   II. the motion of a pendulum

   III. your weight

   IV. the speed of a car

   A. I only B. III only

   C. IV only D. II and IV only

2. $|\mathbf{z}|$ represents the _____ of vector z.

   A. magnitude B. direction

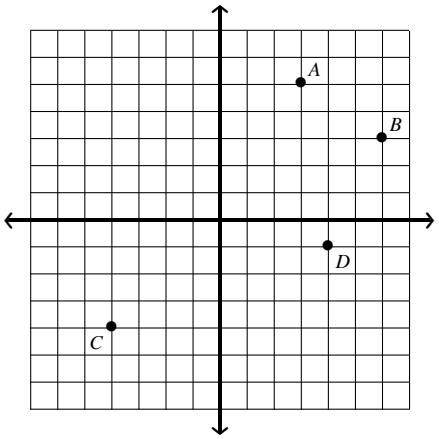
   C. angle D. sum

3. $\vec{t} = \langle 3, 7 \rangle$ represents the _____ of vector t.

   A. coordinates B. components

   C. direction D. magnitude

4. Which of the following vectors is the same as $\langle -3, 2 \rangle$?



   A. $\overrightarrow{BA}$ B. $\overrightarrow{CB}$ C. $\overrightarrow{CD}$ D. $\overrightarrow{DB}$

5. Which of the following vectors is the same as $\langle 8, 3 \rangle$?

   A. $\overrightarrow{BC}$ B. $\overrightarrow{CB}$ C. $\overrightarrow{CD}$ D. $\overrightarrow{DB}$

6. Express $\overrightarrow{XY}$ as an ordered pair if the coordinates of the points are $X(1, 2)$ and $Y(4, 5)$.

   A. $[3, 3]$ B. $[5, 7]$ C. 4.2 D. 9

7. Express $\overrightarrow{XY}$ as an ordered pair if the coordinates of the points are $X(-3,-4)$ and $Y(-2,4)$.

A. $[-5,-8]$ B. $[1,0]$

C. $[1,8]$ D. 8.1

8. Find the component form of the vector $\overrightarrow{AB}$ with initial point $A(2,-3)$ and terminal point $B(6,5)$.

A. $\langle -4,-8\rangle$ B. $\langle 4,8\rangle$

C. $\langle 4,-8\rangle$ D. $\langle -8,-2\rangle$

9. Find the component form of the vector $\overrightarrow{AB}$ with initial point $A(3,5)$ and terminal point $B(1,2)$.

A. $\langle -2,-3\rangle$ B. $\langle 2,3\rangle$

C. $\langle 4,7\rangle$ D. $\langle 3,10\rangle$

10. Given vector $v = \langle 3,7\rangle$. Which of these is equal to v?

A. a vector with initial point $(3,7)$ and terminal point $(0,0)$

B. a vector with initial point $(3,7)$ and terminal point $(6,0)$

C. a vector with initial point $(-1,-10)$ and terminal point $(2,-3)$

D. a vector with initial point $(-5,8)$ and terminal point $(-8,15)$

11. Given vector $v = \langle -4,6\rangle$. Which of these is equal to v?

A. a vector with initial point $(-4,6)$ and terminal point $(0,0)$

B. a vector with initial point $(-4,6)$ and terminal point $(-8,0)$

C. a vector with initial point $(-3,-10)$ and terminal point $(1,-4)$

D. a vector with initial point $(5,-8)$ and terminal point $(1,-2)$

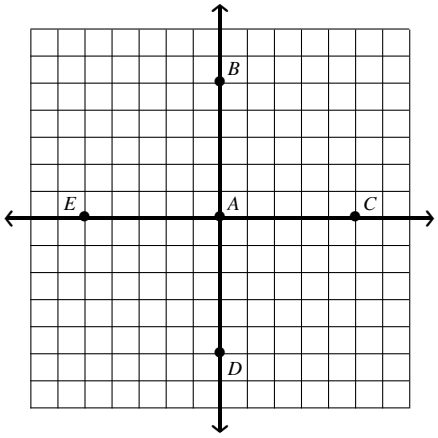
12. Which of the following represent a vector of magnitude 5 units west?

I. $\overrightarrow{AE}$

II. $\overrightarrow{AC}$

III. $\overrightarrow{AD}$

IV. $\overrightarrow{BA}$



A. I only

B. I and III

C. III only

D. I and IV

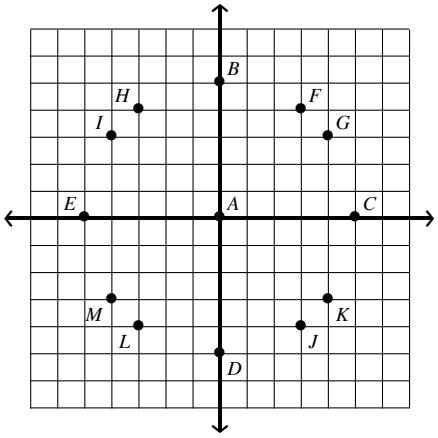
13. Which of the following represent a vector of magnitude 5 units 37° north of east?

I. $\overrightarrow{AG}$

II. $\overrightarrow{AF}$

III. $\overrightarrow{AI}$

IV. $\overrightarrow{MA}$



A. I only

B. II and III

C. III only

D. I and IV

14. Which of the following represent a vector of magnitude 5 units 53° north of west?

I. $\overrightarrow{AH}$

II. $\overrightarrow{AG}$

III. $\overrightarrow{JA}$

IV. $\overrightarrow{IA}$

A. I only

B. II only

C. I and III

D. II and IV

15. Find the magnitude of the vector $\mathbf{v} = \langle -2, 2 \rangle$.

A. 4 B. $\sqrt{2}$ C. $2\sqrt{2}$ D. $8\sqrt{2}$

16. Find the magnitude of the vector $\overrightarrow{AB}$ with initial point $A(2, -3)$ and terminal point $B(6, 5)$.

A. 8 B. 16 C. $4\sqrt{5}$ D. $2\sqrt{17}$

17. Find the magnitude of the vector $\overrightarrow{AB}$ with initial point $A(4, -2)$ and terminal point $B(1, -5)$.

A. 4 B. 6 C. $2\sqrt{3}$ D. $3\sqrt{2}$

18. Find the magnitude correct to the nearest tenth of the vector $\overrightarrow{AB}$ with initial point $A(1, 5)$ and terminal point $B(-3, -2)$.

A. 7.8 B. 7.9 C. 8.1 D. 8.2

19. Find the vector in the direction of $\langle 3, -6 \rangle$.

A. $\langle 3, -9 \rangle$ B. $\left\langle \frac{1}{4}, -\frac{1}{2} \right\rangle$

C. $\left\langle \frac{1}{10}, \frac{3}{5} \right\rangle$ D. $\left\langle -\frac{\sqrt{5}}{2}, \frac{3\sqrt{5}}{2} \right\rangle$

20. Find the vector in the direction of $\langle -2, -5 \rangle$.

A. $\langle -1.0, -2.5 \rangle$ B. $\langle 0.6, 1.5 \rangle$

C. $\langle -0.2, 0.5 \rangle$ D. $\langle -0.4, -2.0 \rangle$

21. The vector $\mathbf{v} = \langle 6, x \rangle$ has a magnitude of 10. What could be the value of x?

A. 4 B. 8 C. 9 D. 10

22. The vector $\mathbf{v} = \langle x, 24 \rangle$ has a magnitude of 25. What could be the value of x?

A. $-\frac{25}{24}$ B. -7 C. 1 D. $\frac{24}{25}$

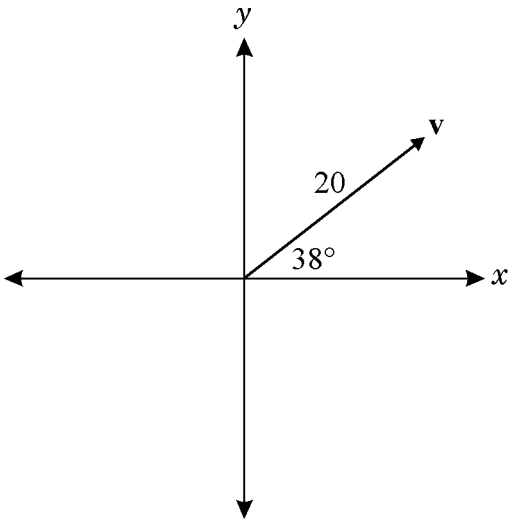
23. Find the direction angle to the nearest degree for the vector $\mathbf{v} = \langle 5, -2 \rangle$.

A. 22° B. 68° C. 248° D. 338°

24. Find the direction angle to the nearest degree for the vector $\mathbf{s} = \langle -8, 4 \rangle$.

A. 63° B. 117° C. 153° D. 207°

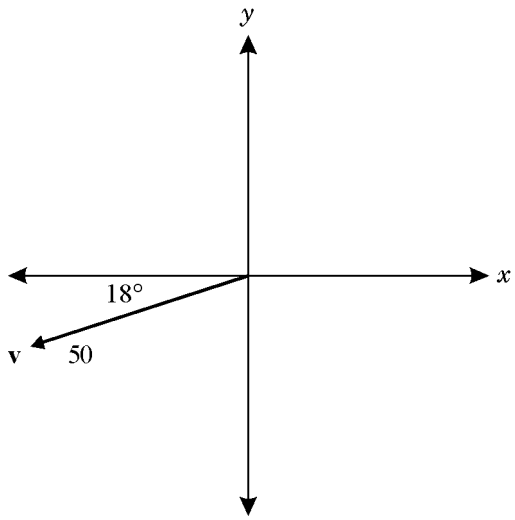
25. Use the diagram below to express the vector **v** in component form. Round your answer to the nearest tenth.



A. $\langle 12.6, 8.4 \rangle$ B. $\langle 15.8, 12.3 \rangle$

C. $\langle 13.6, 9.6 \rangle$ D. $\langle 8.2, 7.6 \rangle$

26. Use the diagram below to express the vector **v** in component form. Round your answer to the nearest tenth.



A. $\langle -47.2, -15.8 \rangle$ B. $\langle -47.6, -15.5 \rangle$

C. $\langle -48.3, -15.0 \rangle$ D. $\langle -48.9, -15.4 \rangle$

27. Find the ordered pair that describes the vector whose magnitude is 7.2 and whose angle of rotation is 63°.

A. $[5.7, 8.2]$ B. $[3.3, 6.4]$

C. $[9.4, 7.6]$ D. $[3.3, 7.4]$

28. A force **F** of 180 pounds is applied at an angle of 220° with the horizontal. Find the component form of **F** correct to the nearest tenth.

A. $\langle -138.3, -114.9 \rangle$ B. $\langle -137.9, -115.7 \rangle$

C. $\langle -135.8, -111.6 \rangle$ D. $\langle -133.9, -112.6 \rangle$

29. A force **F** of 60 pounds is applied at an angle of 345° with the horizontal. Find the component form of **F** correct to the nearest tenth.

A. $\langle 56.8, -14.8 \rangle$ B. $\langle 58.0, -15.5 \rangle$

C. $\langle 59.2, -16.3 \rangle$ D. $\langle 59.0, -15.0 \rangle$

30. A missile is launched from an airplane at a bearing of 225° at 2,500 mph. What is the component form of the velocity of the missile to the nearest mile per hour?

A. $\langle -1468, -1468 \rangle$ B. $\langle -1568, -1568 \rangle$

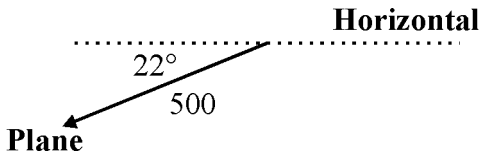
C. $\langle -1768, -1768 \rangle$ D. $\langle -1868, -1868 \rangle$

31. A plane is flying on a compass heading of 140° at a velocity of 500 mph. The wind is blowing with a bearing of 30° at 25 mph. Find the component form of the actual velocity of the plane.

A. $\langle -362.6, 336.8 \rangle$ B. $\langle -361.4, 333.9 \rangle$

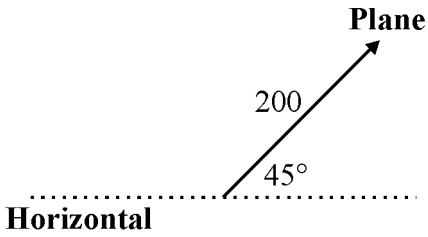
C. $\langle -372.6, 336.8 \rangle$ D. $\langle -398.4, 376.5 \rangle$

32. The diagram below represents an airplane descending at a speed of 500 miles per hour at an angle of 22° below the horizontal. What is the plane's rate of descent rounded to the nearest tenth of a mile per hour?



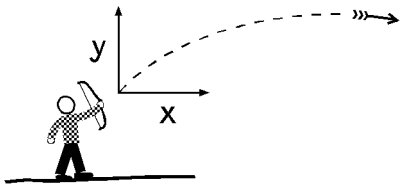
A. 148.7 B. 169.6 C. 187.3 D. 198.4

33. The diagram below represents an airplane ascending at a speed of 200 miles per hour at an angle of 45° above the horizontal. What is the plane's rate of ascent rounded to the nearest tenth of a mile per hour?



A. 140.0 B. 141.4 C. 144.2 D. 145.6

34. The diagram represents an arrow being shot at an angle of 20° with the horizontal at a velocity of 25 meters per second.

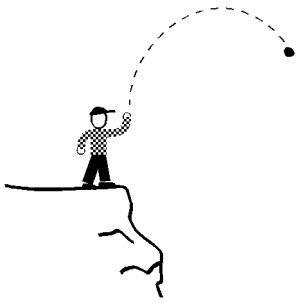


Find the magnitude of the horizontal component of the arrow's initial velocity to the nearest tenth of a meter per second.

A. 22.5 m/s B. 23.0 m/s

C. 23.5 m/s D. 24.5 m/s

35. The diagram represents an baseball being thrown of a cliff at an angle of 80° with the horizontal at a velocity of 88 meters per second.

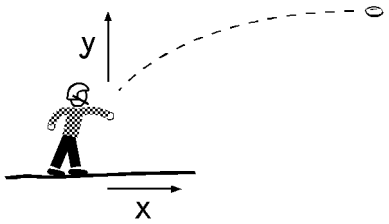


Find the magnitude of the vertical component of the ball's initial velocity to the nearest tenth of a meter per second.

A. 84.5 m/s B. 85.4 m/s

C. 85.9 m/s D. 86.7 m/s

36. The diagram represents an football being thrown at an angle of 35° with the horizontal at a velocity of 45 meters per second.

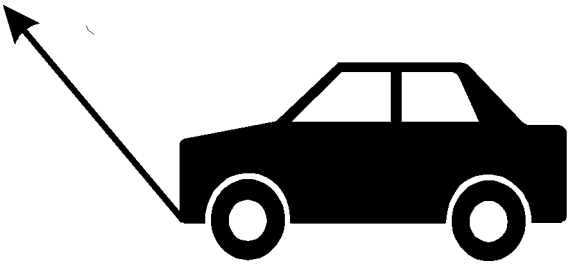


Find the magnitude of the vertical component of the football's initial velocity to the nearest tenth of a meter per second.

A. 25.8 m/s B. 32.6 m/s

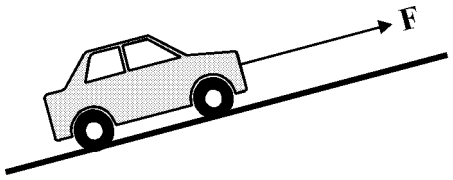
C. 36.9 m/s D. 37.0 m/s

37. A car is pulled with a force of 2500 pounds by a tow truck's cable that makes an angle of 50° with the horizontal. What is the vertical component of the force correct to the nearest pound?



A. 1,575 B. 1,607 C. 1,900 D. 1,915

38. A force of 1,000 pounds is required to pull the car up a ramp inclined at 15°. To the nearest pound, what is the weight of the car?



A. 3,200 B. 3,489 C. 3,864 D. 4,020

39. Mario is pushing a floating log with a pole. The force exerted by Mario on the pole is 85 N and the pole makes an angle of 60° with the surface the water. What force tends to submerge the log?

A. 42.5 N B. 67.9 N

C. 68.5 N D. 73.6 N

40. A girl is pulling a 30 lb wagon with a handle that makes a 35° angle with the horizontal. How much force to the nearest pound must she exert to lift the wagon off the ground?

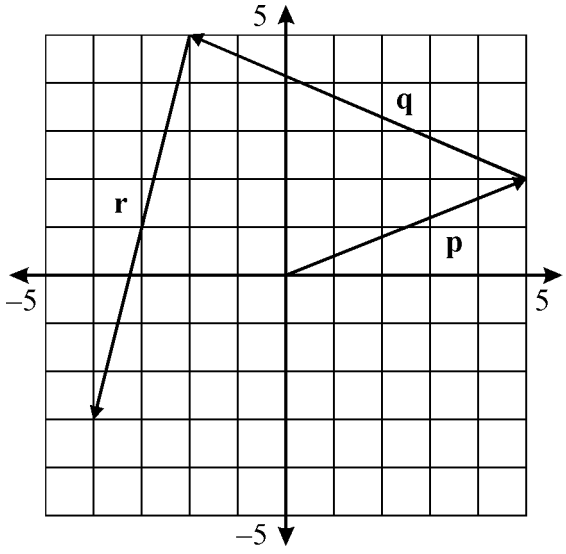
A. 52 lbs B. 37 lbs C. 25 lbs D. 17 lbs

41. A force of 300 N is applied in pushing a lawn mower. If the handle of the lawn mower makes an angle of 50° with the ground, determine the force that acts to move the lawn mower forward.

A. 192.8 N B. 229.8 N

C. 245.3 N D. 289.5 N

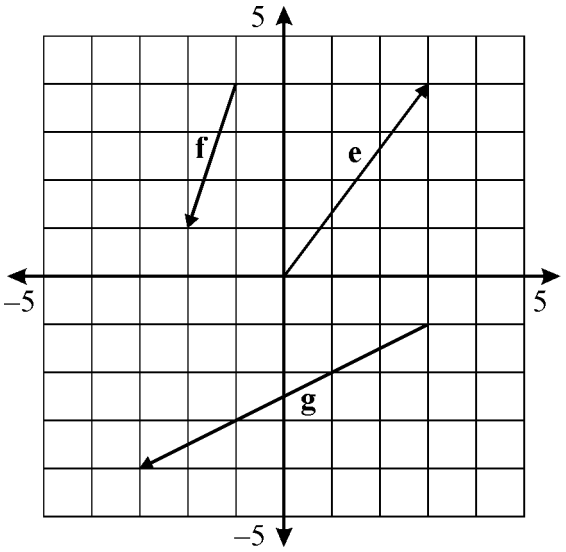
42. Refer to the graph below to find the component form of $\mathbf{q} + \mathbf{r}$.



A. $\langle -2, 5 \rangle$ B. $\langle -4, -3 \rangle$

C. $\langle -5, 11 \rangle$ D. $\langle -9, -5 \rangle$

43. Using the graph, what is the component form of $\mathbf{e} + \mathbf{g}$?



A. $[-3, 1]$ B. $[6, 3]$

C. $[6, -3]$ D. $[0, 0]$

44. Given: $\vec{a} = [1, -3]$ and $\vec{b} = [3, 5]$. Find $\vec{a} + \vec{b}$.

A. $[4, 8]$ B. $[4, 2]$ C. $[2, 2]$ D. $[2, 8]$

45. $\vec{a} = [7, 6]$ and $\vec{b} = [3, -4]$. Find $\vec{a} - \vec{b}$.

A. $[4, 2]$ B. $[4, 10]$

C. $[10, 10]$ D. $[10, 2]$

46. Given the points $A(-3, -4)$, $B(-2, 1)$, $C(-1, 4)$ and $D(3, -1)$.

If $\vec{v} = \overrightarrow{DA}$ and $\vec{w} = \overrightarrow{CB}$, what is $\vec{v} + \vec{w}$?

A. $[-7, -6]$ B. $[7, 6]$

C. $[-5, 0]$ D. $[5, 0]$

47. $[4, 10]$ is the sum of 2 vectors with components $[-3, a]$ and $[b, 4]$. What is b?

A. -1

B. 6

C. 7

D. cannot be determined

48. Given:

$P(0, 0)$ $Q(5, 2)$ $R(-2, 5)$ $S(-4, -3)$

$\mathbf{a} = \overrightarrow{PQ}$ $\mathbf{b} = \overrightarrow{QR}$ $\mathbf{c} = \overrightarrow{RS}$

Find $\mathbf{a} + \mathbf{b} + \mathbf{c}$.

A. $[2, 3]$ B. $[-3, 4]$

C. $[-4, -3]$ D. $[-2, 3]$

49. Given $\vec{n} = [-6, -3]$, what is the component form of $4\vec{n}$?

A. $[-24, -12]$ B. $[-10, -7]$

C. $[-2, 1]$ D. $[24, -12]$

50. $-4\vec{h} = [16, -8]$. Find $\vec{h}$.

A. $[20, -4]$ B. $[-4, 2]$

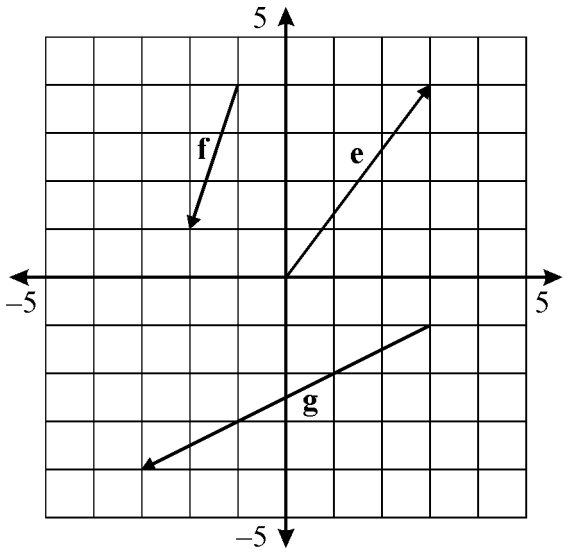
C. $[4, -2]$ D. $\left[\frac{1}{4}, -\frac{1}{2}\right]$

51. Given $\mathbf{p} = [3, -2]$ and $\mathbf{r} = [4, 7]$, what is $3\mathbf{p} - \mathbf{r}$?

A. $[5, -1]$ B. $[13, -13]$

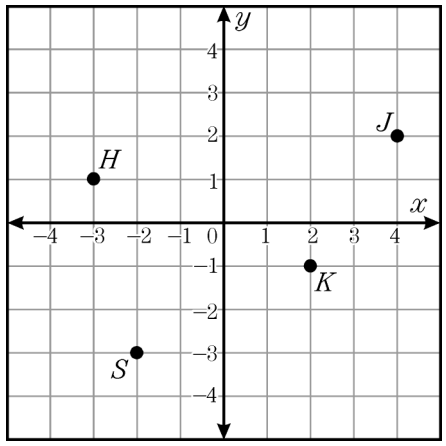
C. $[2, -5]$ D. $[5, -13]$

52. Using the graph below, what is the magnitude of $\mathbf{e} + \mathbf{f}$?



A. $\sqrt{5}$ B. $\sqrt{10}$ C. $\sqrt{26}$ D. $2\sqrt{17}$

53. Refer to the graph below. When $\mathbf{a} = \overrightarrow{HJ}$ and $\mathbf{b} = \overrightarrow{SK}$, what is the magnitude of $\mathbf{a} - \mathbf{b}$?



A. 3.162 B. 7.616 C. 5.831 D. 2.599

54. Two forces are given by $\vec{j} = [-2, 1]$ and $\vec{k} = [-5, 3]$, in Newtons. What is the magnitude of $\vec{j} + \vec{k}$?

A. $[-7, 4]$ B. 8.06

C. 8.54 D. 11

55. Let $\mathbf{c} = \langle 3, -1 \rangle$ and $\mathbf{d} = \langle 5, -4 \rangle$ find $\|\mathbf{c} - \mathbf{d}\|$

A. 5 B. $\sqrt{13}$ C. $3\sqrt{2}$ D. $4\sqrt{3}$

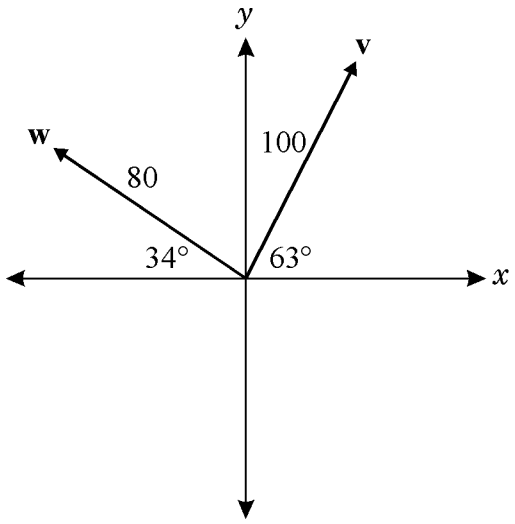
56. The resultant of two forces acting at right angles (one horizontal and one vertical) is a force of 200 pounds which makes an angle of 22° with the vertical force. Find to the nearest pound the value of the horizontal force.

A. 75 B. 65 C. 70 D. 72

57. Two forces act at right angles to each other (one horizontal and one vertical). The resultant has a magnitude of 310 tons and makes an angle of 37° with the horizontal force. Calculate the magnitude of the vertical force to the nearest ton.

A. 165 B. 187 C. 233 D. 248

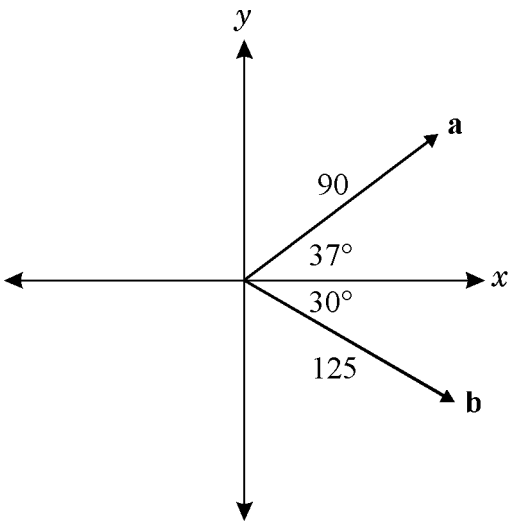
58. Use the diagram below to express the vector $\mathbf{v} + \mathbf{w}$ in component form. Round your answer to the nearest tenth.



A. $\langle -19.7, 122.5 \rangle$ B. $\langle -22.0, 130.8 \rangle$

C. $\langle -25.6, 144.6 \rangle$ D. $\langle -20.9, 133.8 \rangle$

59. Use the diagram below to express the vector $\mathbf{a} + \mathbf{b}$ in component form. Round your answer to the nearest tenth.



A. $\langle 182.8, -9.5 \rangle$ B. $\langle 180.1, -8.3 \rangle$

C. $\langle 178.6, -12.8 \rangle$ D. $\langle 183.8, -6.4 \rangle$

60. Vector $\mathbf{v}$ has a magnitude of 10 and directional angle of 30° while vector $\mathbf{u}$ has a magnitude of 20 and directional angle of 135°. Find the component form of $\mathbf{v} + \mathbf{u}$.

A. $\langle -5.0, 20.2 \rangle$ B. $\langle -5.5, 19.1 \rangle$

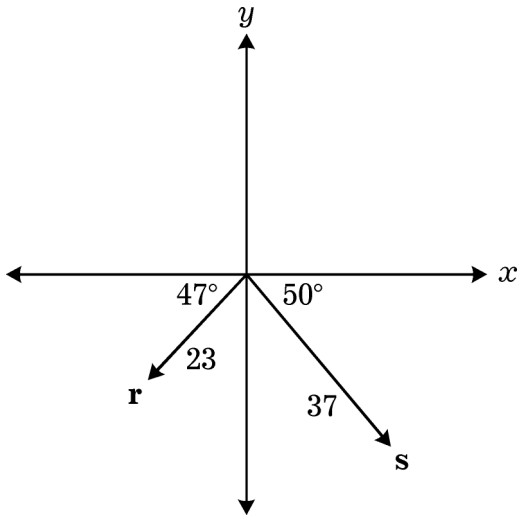
C. $\langle -5.7, 18.4 \rangle$ D. $\langle -6.8, 24.3 \rangle$

61. Vector $\mathbf{e}$ has a magnitude of 12 and directional angle of 45° while vector $\mathbf{f}$ has a magnitude of 15 and directional angle of 60°. Find the component form of $\mathbf{f} - \mathbf{e}$.

A. $\langle 7.5, 13.0 \rangle$ B. $\langle -1.0, 4.5 \rangle$

C. $\langle 1.0, -4.5 \rangle$ D. $\langle 16.0, -4.5 \rangle$

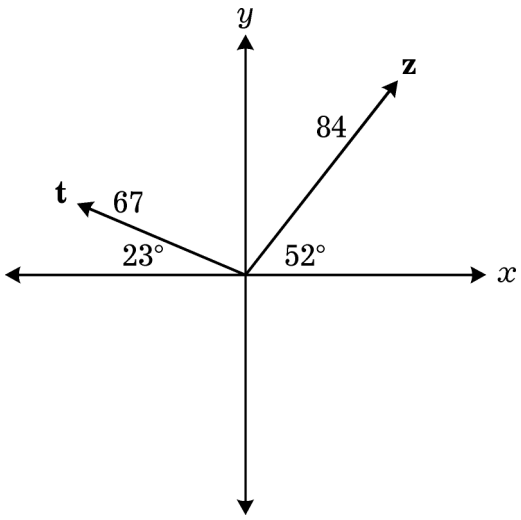
62.



What is the magnitude of the resultant force $\mathbf{r} + \mathbf{s}$? Round your answer to the nearest tenth.

A. 45.9 B. 53.3 C. 91.8 D. 116.3

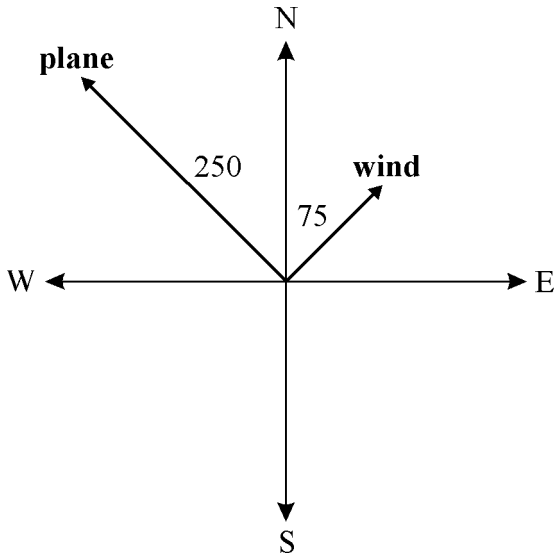
63.



What is the magnitude of the resultant force $\mathbf{t} + \mathbf{z}$? Round your answer to the nearest tenth.

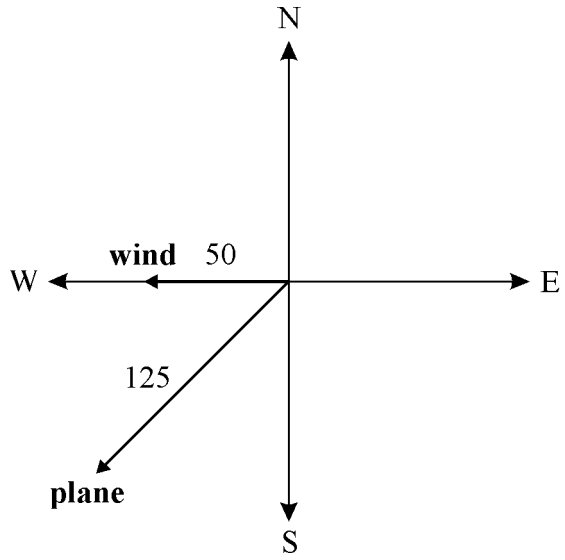
A. 91.8 B. 92.9 C. 102.3 D. 146.3

64. The diagram below represents a plane flying in a northwest direction at a velocity of 250 miles per hour. The wind is blowing towards the northeast at a velocity of 75 miles per hour. Find the velocity of the plane rounded to the nearest tenth of a mile per hour.



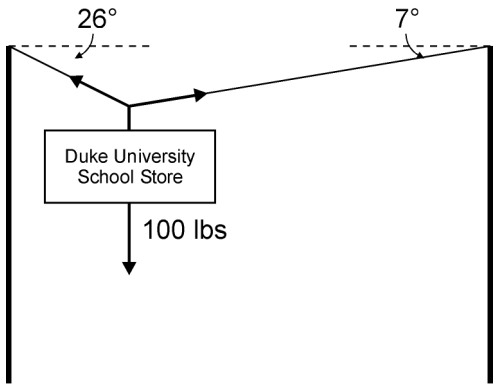
A. 260.3 B. 260.8 C. 261.0 D. 262.5

65. The diagram below represents a plane flying in a southwest direction at a velocity of 125 miles per hour. The wind is blowing from east to west at a velocity of 50 miles per hour. Find the velocity of the plane rounded to the nearest tenth of a mile per hour.



A. 164.2 B. 165.0 C. 165.3 D. 165.5

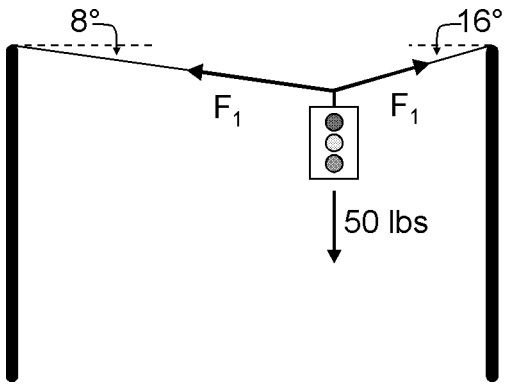
66. The school store sign is suspended by two cables as shown.



If the sign weighs 100 pounds, what is the tension in the shorter cable?

A. 165.0 B. 170.4 C. 182.2 D. 304.9

67. The traffic signal is suspended by two cables as shown.



If the traffic signal weighs 50 pounds, what is the tension in the cable that makes the 16° angle?

A. 25.0 B. 50.0 C. 118.2 D. 121.7

Vectors for Neel 12/06/2016

1.
Answer: B
Objective: P.04I

2.
Answer: A
Objective: P.04I

3.
Answer: B
Objective: P.04I

4.
Answer: A
Objective: P.04I

5.
Answer: C
Objective: P.04I

6.
Answer: A
Objective: P.04I

7.
Answer: C
Objective: P.04I

8.
Answer: B
Objective: P.04I

9.
Answer: A
Objective: P.04I

10.
Answer: C
Objective: P.04I

11.
Answer: D
Objective: P.04I

12.
Answer: A
Objective: P.04I

13.
Answer: D
Objective: P.04I

14.
Answer: C
Objective: P.04I

15.
Answer: C
Objective: P.04I

16.
Answer: C
Objective: P.04I

17.
Answer: D
Objective: P.04I

18.
Answer: C
Objective: P.04I

19.
Answer: B
Objective: P.04I

20.
Answer: A
Objective: P.04I

21.
Answer: B
Objective: P.04I

22.
Answer: B
Objective: P.04I

23.
Answer: D
Objective: P.04I

24.
Answer: C
Objective: P.04I

25.
Answer: B
Objective: P.04I

26.
Answer: B
Objective: P.04I

27.
Answer: B
Objective: P.04I

28.
Answer: B
Objective: P.04I

29.
Answer: B
Objective: P.04I

30.
Answer: C
Objective: P.04I

31.
Answer: B
Objective: P.04I

32.
Answer: C
Objective: P.04I

33.
Answer: B
Objective: P.04I

34.
Answer: C
Objective: P.04I

35.
Answer: D
Objective: P.04I

36.
Answer: A
Objective: P.04I

37.
Answer: D
Objective: P.04I

38.
Answer: C
Objective: P.04I

39.
Answer: D
Objective: P.04I

40.
Answer: A
Objective: P.04I

41.
Answer: A
Objective: P.04I

42.
Answer: D
Objective: P.04J

43.
Answer: A
Objective: P.04J

44.
Answer: B
Objective: P.04J

45.
Answer: B
Objective: P.04J

46.
Answer: A
Objective: P.04J

47.
Answer: C
Objective: P.04J

48.
Answer: C
Objective: P.04J

49.
Answer: A
Objective: P.04J

50.
Answer: B
Objective: P.04J

51.
Answer: D
Objective: P.04J

52.
Answer: A
Objective: P.04K

53.
Answer: A
Objective: P.04K

54.
Answer: B
Objective: P.04K

55.
Answer: B
Objective: P.04K

56.
Answer: A
Objective: P.04K

57.
Answer: B
Objective: P.04K

58.
Answer: D
Objective: P.04K

59.
Answer: B
Objective: P.04K

60.
Answer: B
Objective: P.04K

61.
Answer: B
Objective: P.04K

62.
Answer: A
Objective: P.04K

63.
Answer: B
Objective: P.04K

64.
Answer: C
Objective: P.04K

65.
Answer: A
Objective: P.04K

66.
Answer: C
Objective: P.04K

67.
Answer: D
Objective: P.04K