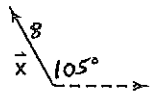
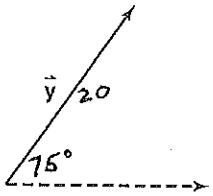
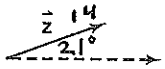
Pre-Calculus Worksheet 8-1 A Name _____

Use a ruler and a protractor to determine the magnitude (in centimeters) and direction of each vector.

5. 

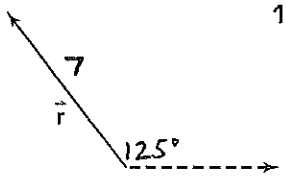
6. 

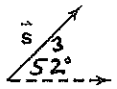
7. 

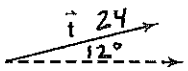
Use $\vec{x}$, $\vec{y}$, and $\vec{z}$ above to find the magnitude and direction of each resultant.

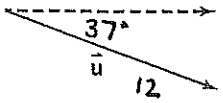
8. $\vec{x} + \vec{y}$ 9. $\vec{x} - \vec{y}$ 10. $4\vec{y} + \vec{z}$

Use a ruler and a protractor to determine the magnitude (in centimeters) and direction of each vector.

14. 

15. 

16. 

17. 

Use $\vec{r}$, $\vec{s}$, $\vec{t}$, and $\vec{u}$ above to find the magnitude and direction of each resultant.

18. $\vec{r} + \vec{s}$ 19. $\vec{s} + \vec{t}$

21. $\vec{u} - \vec{r}$ 22. $\vec{r} - \vec{t}$

24. $3\vec{s}$

27. $\vec{r} + \vec{s} - \vec{u}$

30. three times $\vec{t}$ and twice $\vec{u}$

Find the magnitude of the horizontal and vertical components of each vector shown for Exercises 14–17.

31. $\vec{r}$ 32. $\vec{s}$ 33. $\vec{t}$ 34. $\vec{u}$

51. Determine the equations of the vertical and horizontal asymptotes, if any, of $g(x) = \frac{x + 2}{(x - 1)(x + 3)}$. *(Lesson 3-7)*

52. **SAT/ACT Practice** **Grid-In** Three times the least of three consecutive odd integers is three greater than two times the greatest. Find the greatest of the three integers.

Pre-Calculus - Worksheet 8-2 A

Name _____

Pd ____

Find an ordered pair to represent $\vec{t}$ in each equation if $\vec{u} = \langle -1, 4 \rangle$ and $\vec{v} = \langle 3, -2 \rangle$.

7. $\vec{t} = \vec{u} + \vec{v}$

8. $\vec{t} = \frac{1}{2}\vec{u} - \vec{v}$

9. $\vec{t} = 4\vec{u} + 6\vec{v}$

10. $\vec{t} = -8\vec{u}$

~~Find the magnitude of each vector. Then write each vector as the sum of unit vectors.~~ Find the Magnitude

11. $\langle 8, -6 \rangle$

12. $\langle -7, -5 \rangle$

Find an ordered pair to represent $\vec{a}$ in each equation if $\vec{b} = \langle 6, 3 \rangle$ and $\vec{c} = \langle -4, 8 \rangle$.

23. $\vec{a} = \vec{b} + \vec{c}$

26. $\vec{a} = 2\vec{b} + 3\vec{c}$

29. $\vec{a} = 3\vec{b}$

32. $\vec{a} = 0.4\vec{b} - 1.2\vec{c}$

24. $\vec{a} = 2\vec{b} + \vec{c}$

27. $\vec{a} = -\vec{b} + 4\vec{c}$

30. $\vec{a} = -\frac{1}{2}\vec{c}$

33. $\vec{a} = \frac{1}{3}\left(2\vec{b} - 5\vec{c}\right)$

25. $\vec{a} = \vec{b} + 2\vec{c}$

28. $\vec{a} = \vec{b} - 2\vec{c}$

31. $\vec{a} = 6\vec{b} + 4\vec{c}$

34. $\vec{a} = \left(3\vec{b} + \vec{c}\right) + 5\vec{b}$

Find the magnitude of each vector. Then write each vector as the sum of unit vectors.

36. $\langle 3, 4 \rangle$

37. $\langle 2, -3 \rangle$

38. $\langle -6, -11 \rangle$

39. $\langle 3.5, 12 \rangle$

40. $\langle -4, 1 \rangle$

41. $\langle -16, -34 \rangle$

53. **Geometry** Two sides of a triangle are 400 feet and 600 feet long, and the included angle measures 46°20′. Find the perimeter and area of the triangle. *(Lesson 5-8)*

55. Using a graphing calculator to graph $y = x^3 - x^2 + 3$. Determine and classify its extrema. *(Lesson 3-6)*

57. **SAT Practice** For which values of x is $7x + 1$ greater than $7x - 1$?

A all real numbers
B only positive real numbers
C only $x = 0$
D only negative real numbers
E no real numbers

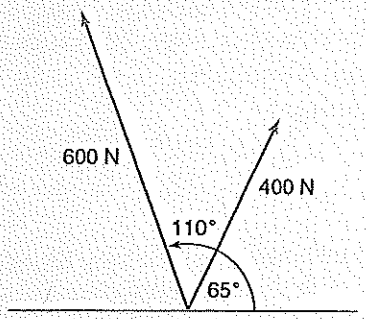
Pre-Calculus - Worksheet 8-2 B Name _____

Ad ____

Write the ordered pair that represents $\overrightarrow{MP}$. Then find the magnitude of $\overrightarrow{MP}$.

4. $M(2, -1), P(-3, 4)$ 5. $M(5, 6), P(0, 5)$ 6. $M(-19, 4), P(4, 0)$

13. **Construction** The Walker family is building a cabin for vacationing. Mr. Walker and his son Terrell have erected a scaffold to stand on while they build the walls of the cabin. As they stand on the scaffold Terrell pulls on a rope attached to a support beam with a force of 400 newtons (N) at an angle of 65° with the horizontal. Mr. Walker pulls with a force of 600 newtons at an angle of 110° with the horizontal. What is the magnitude of the combined force they exert on the log?



Write the ordered pair that represents $\overrightarrow{YZ}$. Then find the magnitude of $\overrightarrow{YZ}$.

14. $Y(4, 2), Z(2, 8)$

16. $Y(-2, 5), Z(1, 3)$

18. $Y(3, 1), Z(0, 4)$

20. $Y(5, 0), Z(7, 6)$

15. $Y(-5, 7), Z(-1, 2)$

17. $Y(5, 4), Z(0, -3)$

19. $Y(-4, 12), Z(1, 19)$

21. $Y(14, -23), Z(23, -14)$

22. Find an ordered pair that represents the vector from $A(31, -33)$ to $B(36, -45)$. Then find the magnitude of $\overrightarrow{AB}$.

42. Write $\overrightarrow{ST}$ as the sum of unit vectors for points $S(-9, 2)$ and $T(-4, -3)$.

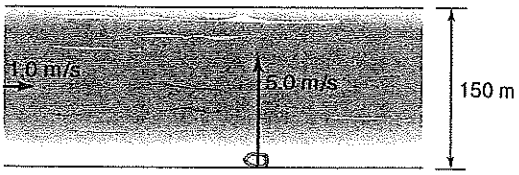
43. Prove that addition of vectors is associative.

44. **Recreation** In the 12th Bristol International Kite Festival in September 1997 in England, Peter Lynn set a record for flying the world's biggest kite, which had a lifting surface area of 630 square meters. Suppose the wind is blowing against the kite with a force of 100 newtons at an angle 20° above the horizontal.
   a. Draw a diagram representing the situation.
   b. How much force is lifting the kite?

45. **Surfing** During a weekend surfboard competition, Kiyoshi moves at a 30° angle toward the shore. The velocity component toward the shore is 15 mph.
   a. Make a labeled diagram to show Kiyoshi's velocity and the velocity components.
   b. What is Kiyoshi's velocity?

46. **Critical Thinking** Suppose the points Q, R, S, and T are noncollinear, and $\overrightarrow{QR} + \overrightarrow{ST} = \vec{0}$.
   a. What is the relationship between $\overrightarrow{QR}$ and $\overrightarrow{ST}$?
   b. What is true of the quadrilateral with vertices Q, R, S, and T?

47. **River Rafting** The Soto family is rafting on the Colorado River. Suppose that they are on a stretch of the river that is 150 meters wide, flowing south at a rate of 1.0 m/s. In still water their raft travels 5.0 m/s.



   a. How long does it take them to travel from one bank to the other if they head for a point directly across the river?
   b. How far downriver will the raft land?
   c. What is the velocity of the raft relative to the shore?

48. **Critical Thinking** Show that any vector $\vec{v}$ can be written as $\langle |\vec{v}| \cos\theta, |\vec{v}| \sin\theta \rangle$.

Pre-Calculus - Worksheet 8-3A Name _____ Pd ___

4. Locate point $G(4, -1, 7)$ in space. Then find the magnitude of a vector from the origin to G.

Locate point B in space. Then find the magnitude of a vector from the origin to B.

12. $B(4, 1, -3)$ 13. $B(7, 2, 4)$ 14. $B(10, -3, 15)$

Write the ordered triple that represents $\overrightarrow{RS}$. Then find the magnitude of $\overrightarrow{RS}$.

5. $R(-2, 5, 8), S(3, 9, -3)$ 6. $R(3, 7, -1), S(10, -4, 0)$

Write the ordered triple that represents $\overrightarrow{TM}$. Then find the magnitude of $\overrightarrow{TM}$.

15. $T(2, 5, 4), M(3, 1, -4)$

17. $T(2, 5, 4), M(3, 1, 0)$

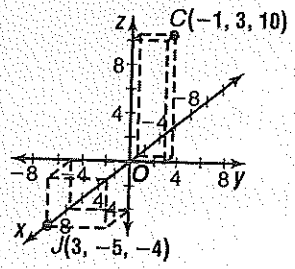
19. $T(-5, 8, 3), M(-2, -1, -6)$

16. $T(-2, 4, 7), M(-3, 5, 2)$

18. $T(3, -5, 6), M(-1, 1, 2)$

20. $T(0, 6, 3), M(1, 4, -3)$

21. Write the ordered triple to represent $\overrightarrow{CJ}$. Then find the magnitude of $\overrightarrow{CJ}$.



43. Find the sum of the vectors $\langle 3, 5\rangle$ and $\langle -1, 2\rangle$ algebraically. *(Lesson 8-2)*

44. Find the coordinates of point D such that $\overrightarrow{AB}$ and $\overrightarrow{CD}$ are equal vectors for points $A(5, 2)$, $B(-3, 3)$, and $C(0, 0)$. *(Lesson 8-1)*

47. State the amplitude and period for the function $y = 6 \sin \frac{\theta}{2}$. *(Lesson 6-4)*

50. **SAT/ACT Practice** You have added the same positive quantity to the numerator and denominator of a fraction. The result is

A greater than the original fraction.
B less than the original fraction.
C equal to the original fraction.
D one-half the original fraction.
E cannot be determined from the information given.

Pre-Calculus- Worksheet 8-3 B Name _____ Pd ___

Find an ordered triple to represent $\vec{a}$ in each equation if $\vec{f} = \langle 1, -3, -8 \rangle$ and $\vec{g} = \langle 3, 9, -1 \rangle$.

7. $\vec{a} = 3\vec{f} + \vec{g}$

8. $\vec{a} = 2\vec{g} - 5\vec{f}$

Find an ordered triple to represent $\vec{u}$ in each equation if $\vec{v} = \langle 4, -3, 5 \rangle$, $\vec{w} = \langle 2, 6, -1 \rangle$, and $\vec{z} = \langle 3, 0, 4 \rangle$.

22. $\vec{u} = 6\vec{w} + 2\vec{z}$

24. $\vec{u} = \frac{3}{4}\vec{v} - \vec{w}$

26. $\vec{u} = 0.75\vec{v} + 0.25\vec{w}$

28. Find an ordered triple to represent the sum $\frac{2}{3}\vec{f} + 3\vec{g} - \frac{2}{5}\vec{h}$, if $\vec{f} = \langle -3, 4.5, -1 \rangle$, $\vec{g} = \langle -2, 1, 6 \rangle$, and $\vec{h} = \langle 6, -3, -3 \rangle$.

Write $\overrightarrow{EF}$ as the sum of unit vectors.

9. $E(-5, -2, 4), F(6, -6, 6)$

10. $E(-12, 15, -9), F(-12, 17, -22)$

Write $\overrightarrow{LB}$ as the sum of unit vectors.

29. $L(2, 2, 7), B(5, -6, 2)$

31. $L(9, 7, -11), B(7, 3, -2)$

33. $L(-1, 2, -4), B(-8, 5, -10)$

35. Show that $|\overrightarrow{G_1G_2}| = |\overrightarrow{G_2G_1}|$.

36. If $\vec{m} = \langle m_1, m_2, m_3 \rangle$, then $-\vec{m}$ is defined as $\langle -m_1, -m_2, -m_3 \rangle$. Show that $|-\vec{m}| = |\vec{m}|$

11. **Physics** Suppose that during a storm the force of the wind blowing against a skyscraper can be expressed by the vector $\langle 132, 3454, 0\rangle$, where each measure in the ordered triple represents the force in newtons. What is the magnitude of this force?

39. **Computer Games** Nate Rollins is designing a computer game. In the game, a knight is standing at point (1, 4, 0) watching a wizard sitting at the top of a tree. In the computer screen, the tree is one unit high, and its base is at (2, 4, 0). Find the displacement vector for each situation.

a. from the origin to the knight
b. from the bottom of the tree to the knight

40. **Critical Thinking** Find the vector $\vec{c}$ that must be added to $\vec{a} = \langle 1, 3, 1\rangle$ to obtain $\vec{b} = \langle 3, 1, 5\rangle$.

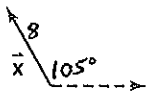
41. **Aeronautics** Dr. Chiaki Mukai is Japan's first female astronaut. Suppose she is working inside a compartment shaped like a cube with sides 15 feet long. She realizes that the tool she needs is diagonally in the opposite corner of the compartment.

a. Draw a diagram of the situation described above.
b. What is the minimum distance she has to glide to secure the tool?
c. At what angle to the floor must she launch herself?

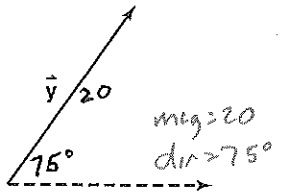
42. **Chemistry** Dr. Alicia Sanchez is a researcher for a pharmaceutical firm. She has graphed the structure of a molecule with atoms having positions $A = (2, 0, 0)$, $B = \left(1, \sqrt{3}, 0\right)$, and $C = \left(1, \frac{1}{3}, \frac{2\sqrt{2}}{3}\right)$. She needs to have every atom in this molecule equidistant from each other. Has she achieved this goal? Explain why or why not.

Pre-Calculus Worksheet 8-1A Name Key

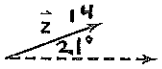
Use a ruler and a protractor to determine the magnitude (in centimeters) and direction of each vector.

5. 

mag = 8
dir = 105

6. 

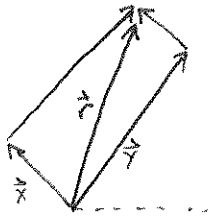
mag = 20
dir = 75°

7. 

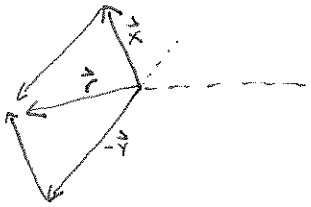
mag = 14
dir = 21

Use $\vec{x}$, $\vec{y}$, and $\vec{z}$ above to find the magnitude and direction of each resultant.

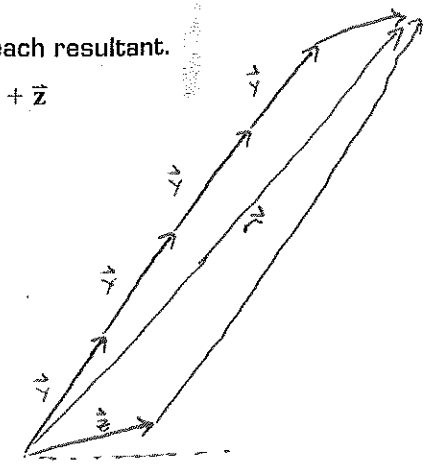
8. $\vec{x} + \vec{y}$



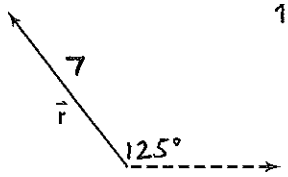
9. $\vec{x} - \vec{y}$

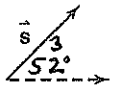


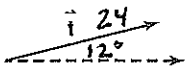
10. $4\vec{y} + \vec{z}$

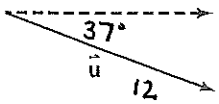


Use a ruler and a protractor to determine the magnitude (in centimeters) and direction of each vector.

14. 

15. 

16. 

17. 

Use $\vec{r}$, $\vec{s}$, $\vec{t}$, and $\vec{u}$ above to find the magnitude and direction of each resultant.

18. $\vec{r} + \vec{s}$

19. $\vec{s} + \vec{t}$

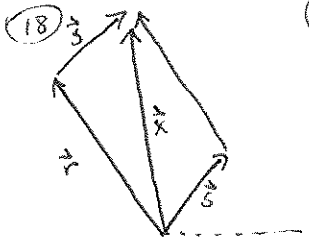
21. $\vec{u} - \vec{r}$

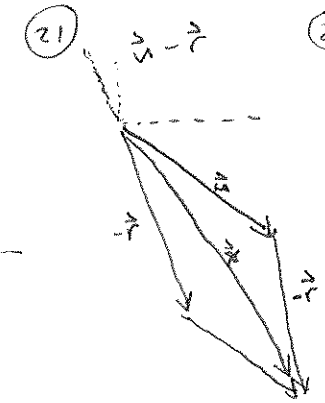
22. $\vec{r} - \vec{t}$

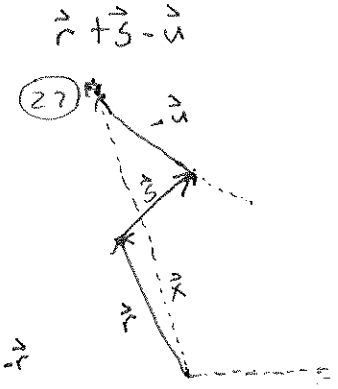
24. $3\vec{s}$

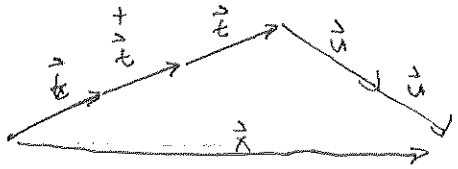
27. $\vec{r} + \vec{s} - \vec{u}$

30. three times $\vec{t}$ and twice $\vec{u}$









Find the magnitude of the horizontal and vertical components of each vector shown for Exercises 14–17.

31. $\vec{r}$ $\langle 7\cos 125, 7\sin 125\rangle$ $\langle -4.01, 5.73\rangle$

32. $\vec{s}$ $\langle 3\cos 52, 3\sin 52\rangle$ $\langle 1.84, 2.36\rangle$

33. $\vec{t}$ $\langle 24\cos 12, 24\sin 12\rangle$ $\langle 23.47, 4.99\rangle$

34. $\vec{u}$ $\langle 12\cos 37, 12\sin 37\rangle$ $\langle 9.58, 7.22\rangle$

51. Determine the equations of the vertical and horizontal asymptotes, if any, of $g(x) = \frac{x + 2}{(x - 1)(x + 3)}$. *(Lesson 3-7)*

x^2+2x-3

Vertical asymp. at $x = 1, -3$

horiz. asymp at $y = 0$

equations:

$\begin{cases} x \to \infty & y \to 0 \\ x \to -\infty & y \to 0 \end{cases}$

52. **SAT/ACT Practice** **Grid-In** Three times the least of three consecutive odd integers is three greater than two times the greatest. Find the greatest of the three integers.

3 cons. odds $\begin{cases} n \\ n+2 \\ n+4 \end{cases}$

$3n = 2(n+4) + 3$

$3n = 2n + 8 + 3$

$n = 11$

$n + 4 = 11 + 4 = 15$

Pre-Calculus - Worksheet 8-2 A Name Key Pd ____

Find an ordered pair to represent $\vec{t}$ in each equation if $\vec{u} = \langle -1, 4 \rangle$ and $\vec{v} = \langle 3, -2 \rangle$.

7. $\vec{t} = \vec{u} + \vec{v}$ $= \langle 3-1, -2+4 \rangle$ $\langle 2, 2 \rangle$

8. $\vec{t} = \frac{1}{2}\vec{u} - \vec{v}$ $= \langle -\frac{1}{2}, 2 \rangle + \langle -3, 2 \rangle = \langle -3\frac{1}{2}, 4 \rangle$

9. $\vec{t} = 4\vec{u} + 6\vec{v}$ $\langle -4, 16 \rangle + \langle 18, -12 \rangle$ $\langle 14, 4 \rangle$

10. $\vec{t} = -8\vec{u}$ $\langle 8, -32 \rangle$

~~Find the magnitude of each vector. Then write each vector as the sum of unit vectors.~~ Find the Magnitude

11. $\langle 8, -6 \rangle = 10$

12. $\langle -7, -5 \rangle = \sqrt{74} = 8.6$

Find an ordered pair to represent $\vec{a}$ in each equation if $\vec{b} = \langle 6, 3 \rangle$ and $\vec{c} = \langle -4, 8 \rangle$.

23. $\vec{a} = \vec{b} + \vec{c}$

26. $\vec{a} = 2\vec{b} + 3\vec{c}$ $\langle 2 \cdot 6 + 3(-4), 2 \cdot 3 + 3 \cdot 8 \rangle = \langle 0, 30 \rangle$

29. $\vec{a} = 3\vec{b}$

32. $\vec{a} = 0.4\vec{b} - 1.2\vec{c}$

24. $\vec{a} = 2\vec{b} + \vec{c}$

27. $\vec{a} = -\vec{b} + 4\vec{c}$ $\langle -6, 3 \rangle + \langle -16, 32 \rangle = \langle -22, 29 \rangle$

30. $\vec{a} = -\frac{1}{2}\vec{c}$

33. $\vec{a} = \frac{1}{3}\left(2\vec{b} - 5\vec{c}\right)$

25. $\vec{a} = \vec{b} + 2\vec{c}$

28. $\vec{a} = \vec{b} - 2\vec{c}$

31. $\vec{a} = 6\vec{b} + 4\vec{c}$

34. $\vec{a} = \left(3\vec{b} + \vec{c}\right) + 5\vec{b}$ $\langle 18, 9 \rangle + \langle -4, 8 \rangle + \langle 30, 15 \rangle$ $\langle 44, 32 \rangle$

Find the magnitude of each vector. Then write each vector as the sum of unit vectors.

36. $\langle 3, 4\rangle = 5$

37. $\langle 2, -3\rangle = 3.6$

38. $\langle -6, -11\rangle = 12.53$

39. $\langle 3.5, 12\rangle = 12.5$

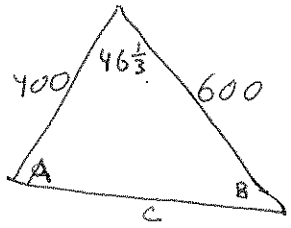
40. $\langle -4, 1\rangle = 4.123$

41. $\langle -16, -34\rangle$

$M = \sqrt{256 + 1156}$

$M = \sqrt{1412} = 37.6$

53. **Geometry** Two sides of a triangle are 400 feet and 600 feet long, and the included angle measures 46°20′. Find the perimeter and area of the triangle. *(Lesson 5-8)*



$c^2 = 400^2 + 600^2 - 2(400)(600)\cos(46\frac{1}{3})$

$c^2 = 188,578$

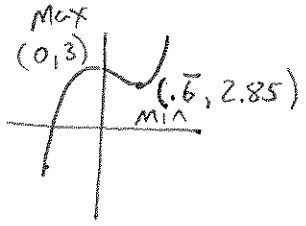
$c = 434$

$\frac{434}{\sin 46\frac{1}{3}} = \frac{400}{\sin B}$

$B = 41.8$

$A = 96.9$

55. Using a graphing calculator to graph $y = x^3 - x^2 + 3$. Determine and classify its extrema. *(Lesson 3-6)*



57. **SAT Practice** For which values of x is $7x + 1$ greater than $7x - 1$?

(A) all real numbers
B only positive real numbers
C only $x = 0$
D only negative real numbers
E no real numbers

$7x + 1 > 7x - 1$

$-7x \quad -7x$

$1 > -1$

All Reals

$0 = 2$

No Solution

Pre-Calculus - Worksheet 8-2 B Name Key Ad ____

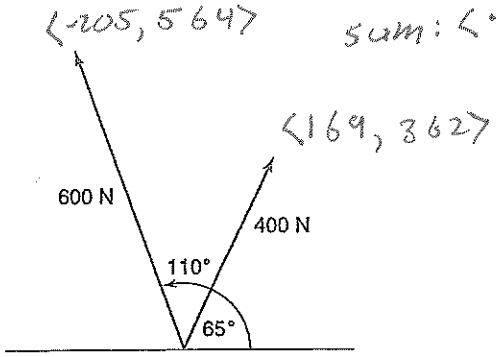
Write the ordered pair that represents $\overrightarrow{MP}$. Then find the magnitude of $\overrightarrow{MP}$.

4. $M(2, -1), P(-3, 4)$
P - M
$\langle -3-2, 4-(-1) \rangle$
$\langle -5, 5 \rangle$
$m = 7.07$

5. $M(5, 6), P(0, 5)$
P - M
$\langle 0-5, 5-6 \rangle$
$\langle -5, -1 \rangle$
$m = 5.1$

6. $M(-19, 4), P(4, 0)$
P - M
$\langle 4-(-19), 0-4 \rangle$
$\langle 23, -4 \rangle$
$m = 23.35$

13. **Construction** The Walker family is building a cabin for vacationing. Mr. Walker and his son Terrell have erected a scaffold to stand on while they build the walls of the cabin. As they stand on the scaffold Terrell pulls on a rope attached to a support beam with a force of 400 newtons (N) at an angle of 65° with the horizontal. Mr. Walker pulls with a force of 600 newtons at an angle of 110° with the horizontal. What is the magnitude of the combined force they exert on the log?



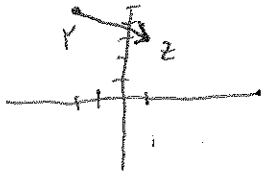
Write the ordered pair that represents $\overrightarrow{YZ}$. Then find the magnitude of $\overrightarrow{YZ}$.

14. $Y(4, 2), Z(2, 8)$ Z-Y $\langle -2, 6 \rangle$ Mag = 6.3

16. $Y(-2, 5), Z(1, 3)$ $\overrightarrow{YZ} = \langle 3, -2 \rangle$ Mag = $\sqrt{13}$

18. $Y(3, 1), Z(0, 4)$ Z-Y = $\langle -3, 9 \rangle$ Mag = 9.5

20. $Y(5, 0), Z(7, 6)$ $\overrightarrow{YZ} = \langle 2, 6 \rangle$ Mag = $\sqrt{40}$



15. $Y(-5, 7), Z(-1, 2)$ $\langle 4, -5 \rangle$ Mag = 6.4

17. $Y(5, 4), Z(0, -3)$ $\overrightarrow{YZ} = \langle -5, -7 \rangle$ Mag = $\sqrt{74}$

19. $Y(-4, 12), Z(1, 19)$ $\langle 5, 7 \rangle$ Mag = 8.6

21. $Y(14, -23), Z(23, -14)$ $\overrightarrow{YZ} = \langle 9, 9 \rangle$ Mag = $\sqrt{162}$

22. Find an ordered pair that represents the vector from $A(31, -33)$ to $B(36, -45)$. Then find the magnitude of $\overrightarrow{AB}$.

42. Write $\overrightarrow{ST}$ as the sum of unit vectors for points $S(-9, 2)$ and $T(-4, -3)$.

43. Prove that addition of vectors is associative.

$\vec{a} = \langle 1, 2 \rangle$
$\vec{b} = \langle 3, 4 \rangle$
$\vec{c} = \langle 5, 6 \rangle$

$\vec{a} + (\vec{b} + \vec{c}) = (\vec{a} + \vec{b}) + \vec{c}$

$\langle 1,2 \rangle + (\langle 3,4 \rangle + \langle 5,6 \rangle) = (\langle 1,2 \rangle + \langle 3,4 \rangle) + \langle 5,6 \rangle$

$\langle 1,2 \rangle + \langle 8,10 \rangle = \langle 4,6 \rangle + \langle 5,6 \rangle = \langle 9,12 \rangle$

44. **Recreation** In the 12th Bristol International Kite Festival in September 1997 in England, Peter Lynn set a record for flying the world's biggest kite, which had a lifting surface area of 630 square meters. Suppose the wind is blowing against the kite with a force of 100 newtons at an angle 20° above the horizontal.

a. Draw a diagram representing the situation.

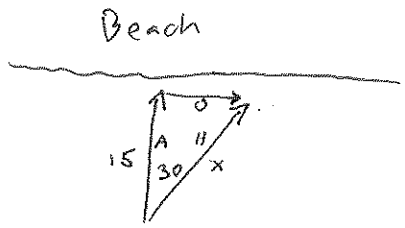
b. How much force is lifting the kite?

34 N up

45. **Surfing** During a weekend surfboard competition, Kiyoshi moves at a 30° angle toward the shore. The velocity component toward the shore is 15 mph.

a. Make a labeled diagram to show Kiyoshi's velocity and the velocity components.

b. What is Kiyoshi's velocity?



$\cos 30 = \frac{15}{x}$

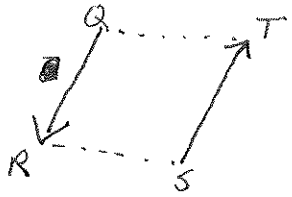
$x = 17.3.$

46. **Critical Thinking** Suppose the points Q, R, S, and T are noncollinear, and $\overrightarrow{QR} + \overrightarrow{ST} = \vec{0}$.

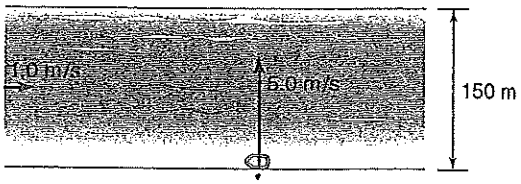
a. What is the relationship between $\overrightarrow{QR}$ and $\overrightarrow{ST}$?

b. What is true of the quadrilateral with vertices Q, R, S, and T?

parallelogram



47. **River Rafting** The Soto family is rafting on the Colorado River. Suppose that they are on a stretch of the river that is 150 meters wide, flowing south at a rate of 1.0 m/s. In still water their raft travels 5.0 m/s.

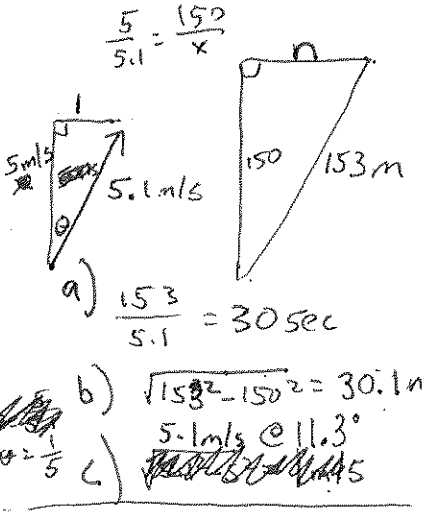


a. How long does it take them to travel from one bank to the other if they head for a point directly across the river?

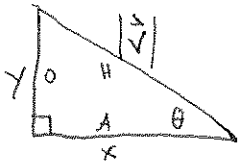
b. How far downriver will the raft land?

c. What is the velocity of the raft relative to the shore?

fixed point



48. **Critical Thinking** Show that any vector $\vec{v}$ can be written as $\langle |\vec{v}| \cos\theta, |\vec{v}| \sin\theta \rangle$.



$\sin\theta = \frac{y}{|\vec{v}|}$

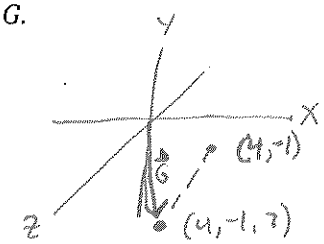
$y = |\vec{v}| \sin\theta$

$\cos\theta = \frac{x}{|\vec{v}|}$

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

Pre-Calculus - Worksheet 8-3 A Name Key Pd ___

4. Locate point $G(4, -1, 7)$ in space. Then find the magnitude of a vector from the origin to G.

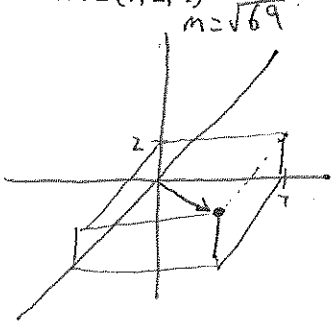


$d = \sqrt{4^2 + (-1)^2 + 7^2} = 8.12$

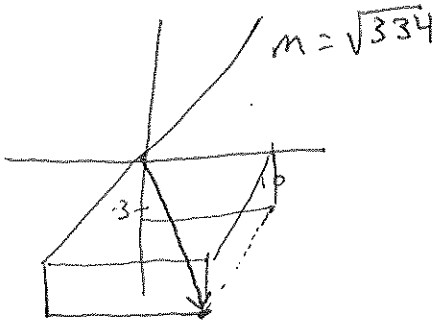
Locate point B in space. Then find the magnitude of a vector from the origin to B.

12. $B(4, 1, -3)$

13. $B(7, 2, 4)$



14. $B(10, -3, 15)$



Write the ordered triple that represents $\overrightarrow{RS}$. Then find the magnitude of $\overrightarrow{RS}$.

5. $R(-2, 5, 8), S(3, 9, -3)$

6. $R(3, 7, -1), S(10, -4, 0)$

Write the ordered triple that represents $\overrightarrow{TM}$. Then find the magnitude of $\overrightarrow{TM}$.

15. $T(2, 5, 4), M(3, 1, -4)$

17. $T(2, 5, 4), M(3, 1, 0)$ $= \langle 3-2, 1-5, 0-4 \rangle = \langle 1, -4, -4 \rangle = \sqrt{33}$

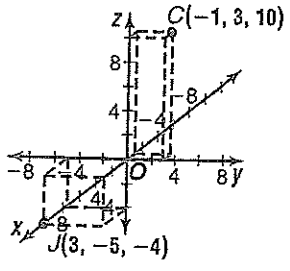
19. $T(-5, 8, 3), M(-2, -1, -6)$

16. $T(-2, 4, 7), M(-3, 5, 2) = \langle -3-(-2), 5-4, 2-7 \rangle = \langle -1, 1, -5 \rangle = \sqrt{27}$

18. $T(3, -5, 6), M(-1, 1, 2)$

20. $T(0, 6, 3), M(1, 4, -3)$

21. Write the ordered triple to represent $\overrightarrow{CJ}$. Then find the magnitude of $\overrightarrow{CJ}$.



43. Find the sum of the vectors $\langle 3, 5\rangle$ and $\langle -1, 2\rangle$ algebraically. *(Lesson 8-2)*

$\langle 2, 7\rangle$

44. Find the coordinates of point D such that $\overrightarrow{AB}$ and $\overrightarrow{CD}$ are equal vectors for points $A(5, 2)$, $B(-3, 3)$, and $C(0, 0)$. *(Lesson 8-1)*

$\overrightarrow{AB} = B - A = \langle -8, 1\rangle$ $\quad \overrightarrow{CD} = D - C = \langle -8, 1\rangle$

$\langle x-0, y-0\rangle = \langle -8, 1\rangle$

$x = -8 \quad y = 1$

$D(-8, 1)$

47. State the amplitude and period for the function $y = 6 \sin \frac{\theta}{2}$. *(Lesson 6-4)*

$A = 6$ $\quad$ Per $= \frac{2\pi}{\frac{1}{2}} = 4\pi$

50. **SAT/ACT Practice** You have added the same positive quantity to the numerator and denominator of a fraction. The result is

A greater than the original fraction.
B less than the original fraction.
C equal to the original fraction.
D one-half the original fraction.
E cannot be determined from the information given.

$\frac{4+2}{7+2} = \frac{6}{9}$

$\downarrow \qquad \downarrow$

$.571 \qquad .6$

$\frac{x}{y} = \frac{x+2}{y+2}$

$x(y+2) = y(x+2)$

$xy + 2x = yx + 2y$

$2x = 2y$

since $y > x$

then $\frac{x+2}{y+2} > \frac{x}{y}$

$\frac{1}{2} + 3 = \frac{4}{5}$

$\downarrow \qquad \downarrow$

$.5 \qquad .8$