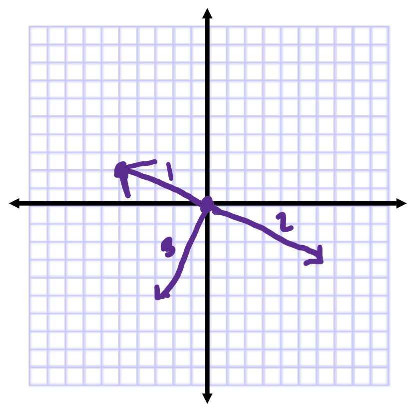
4.8A Vectors

AP Precalculus

4.8A Practice Solutions

Instructions: Graph each vector from the origin. Find the magnitude.



1) < -5, 2 >

$\|1\| = \sqrt{(-5)^2+(2)^2} = \sqrt{25+4} = \boxed{\sqrt{29}}$

2) < 6, -3 >

$\|2\| = \sqrt{(6)^2+(-3)^2} = \sqrt{36+9} = \sqrt{45} = \sqrt{5}\cdot\sqrt{9}$

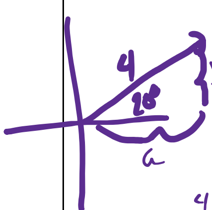
$\boxed{= 3\sqrt{5}}$

3) < -3, -5 >

$\|3\| = \sqrt{(-3)^2+(-5)^2} = \sqrt{9+25} = \boxed{\sqrt{34}}$

Directions: Find the components of the vector given the magnitude and direction.

4) $\|\mathbf{v}\| = 4, \theta = 20°$ $\langle a, b \rangle$



$\cos 20 = \frac{a}{4}$

$4 \cdot \cos 20 = a$

$3.76 = a$

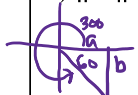
$\sin 20 = \frac{b}{4}$

$4 \sin 20 = b$

$1.37 = b$

$\boxed{\langle 3.76, 1.37 \rangle}$

5) $\|\mathbf{w}\| = 18, \theta = 300°$ $\langle a, b \rangle$



$\cos 300 = \frac{a}{18}$

$18 \cdot \cos 300 = a$

$9 = a$

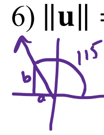
$\sin 300 = \frac{b}{18}$

$18 \cdot \sin 300 = b$

$-15.59 = b$

$\boxed{\langle 9, -15.59 \rangle}$

6) $\|\mathbf{u}\| = 7, \theta = 115°$ $\langle a, b \rangle$



$\cos 115 = \frac{a}{7}$

$7 \cdot \cos 115 = a$

$-2.96 = a$

$\sin 115 = \frac{b}{7}$

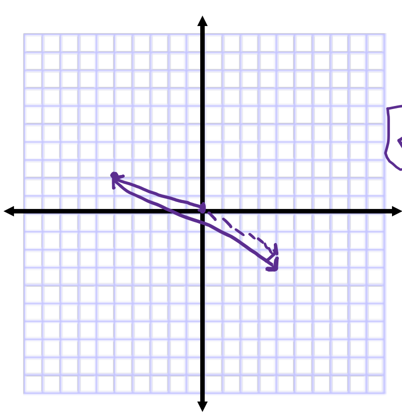
$7 \cdot \sin 115 = b$

$6.34 = b$

$\boxed{\langle -2.96, 6.34 \rangle}$

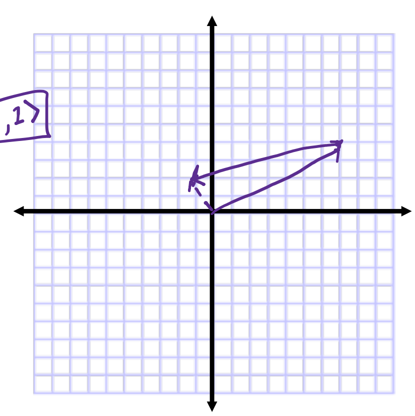
Directions: Add the vectors graphically and find the resulting vector.

7) < -5, 2 > + < 9, -5 >



$\boxed{\langle 4, -3 \rangle}$

8) < 7, 4 > + < -8, -2 >



$\boxed{\langle -1, 2 \rangle}$

Directions: Use the following vectors to simplify the following expressions.

$\boldsymbol{u} = \langle 3, 2 \rangle, \boldsymbol{v} = \langle -5, 7 \rangle, \boldsymbol{w} = \langle -4, -9 \rangle$

9) 2**u** - **w**

$2\langle 3,2 \rangle - 1\langle -4,-9 \rangle$

$\langle 6,4 \rangle + \langle 4,9 \rangle$

$\boxed{\langle 10, 13 \rangle}$

10) 3**w** + 2**v** - **u**

$3\langle -4,-9 \rangle + 2\langle -5,7 \rangle - \langle 3,2 \rangle$

$\langle -12,-27 \rangle + \langle -10,14 \rangle + \langle -3,-2 \rangle$

$\boxed{\langle -25, -15 \rangle}$

11) **u** + 4**v** – 5**v**

$\langle 3,2 \rangle + 4\langle -5,7 \rangle - 5\langle -5,7 \rangle$

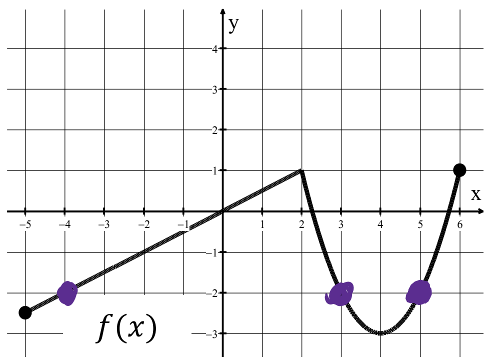
$\langle 3,2 \rangle + \langle -20,28 \rangle + \langle 25,-35 \rangle$

$\boxed{\langle 8, -5 \rangle}$

4.8A Test Prep

4.8A Vectors

12) A continuous function f is defined on the closed interval $-5 < x < 6$ and is shown in the graph below. For how many values of b, $-5 < b < 6$, is the average rate of change of f on the interval $[b, 5]$ equal to 0? Give a reason for your answer.



If the average rate of change equals zero, then it would create a horizontal line. (slope of zero).

Since $f(5) = -2$, we must find other occurrences where $f(b) = -2$. This occurs at two values of b. $b = -4$ and $b = 3$.

13) **No calculator allowed!** The polynomial function g is given by $g(x) = (x - 6)(x^2 + 2x + 2)$. Which of the following describes the zeros of g?

$x=6$
1 real

$\sqrt{2^2-4(1)2}$
$\sqrt{4-8}$
$\sqrt{-4}$
2 imaginary

(A) g has exactly two distinct real zeros.

(B) g has exactly three distinct real zeros.

(C) g has exactly one distinct real zero and no non-real zeros.

(D) g has exactly one distinct real zero and two non-real zeros.

14. The following polynomial function f is given by $f(x) = -7x^6 + 2x^2 + 4$. Which of the following statements about the end behavior of f is true?

~~(A)~~ The sign of the leading term of f is ~~positive~~, and the degree of the leading term of f is even; therefore, $\lim_{x\to-\infty} f(x) = \infty$ and $\lim_{x\to\infty} f(x) = \infty$.

~~(B)~~ The sign of the leading term of f is negative, and the degree of the leading term of f is ~~odd~~; therefore, $\lim_{x\to-\infty} f(x) = \infty$ and $\lim_{x\to\infty} f(x) = -\infty$.

~~(C)~~ The sign of the leading term of f is ~~positive~~, and the degree of the leading term of f ~~is~~ odd; therefore, $\lim_{x\to-\infty} f(x) = -\infty$ and $\lim_{x\to\infty} f(x) = \infty$.

(D) The sign of the leading term of f is negative, and the degree of the leading term of f is even; therefore, $\lim_{x\to-\infty} f(x) = -\infty$ and $\lim_{x\to\infty} f(x) = -\infty$.