Review WS KEY

Sunday, February 22, 2015 1:16 PM

Precalculus
6.1, 6.3 Review

Name: Key
Period:

6.1: VECTORS

if $u=\langle 2,3\rangle$, $v=\langle -7,4\rangle$, $w=\langle -1,-5\rangle$

1. 2u + v + 3w

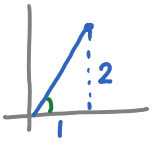
$2\langle 2,3\rangle + \langle -7,4\rangle + 3\langle -1,-5\rangle$
$\langle 4,6\rangle + \langle -7,4\rangle + \langle -3,-15\rangle$
$\langle 4-7-3, 6+4-15\rangle$
$\langle -6,-5\rangle$

2. Find the component form of a vector AB with A = (2, -1) and B = (3, 1).

(tail) (head)

$\langle 3-2, 1+1\rangle$
$\langle 1,2\rangle$

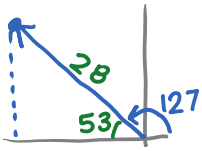
3. Find the magnitude and direction angle of the vector in #2.



$|v| = \sqrt{1^2+2^2}$
$|v| = \sqrt{5}$

$\tan\theta = 2$
$\theta = 63.43°$

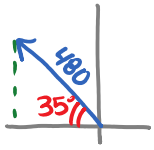
4. Find the component form of a vector with a direction angle of 127 degrees and magnitude of 28.



$x = 28\cos 53$
$x = 16.85$
$y = 28\sin 53$
$y = 22.36$

$\langle -16.85, 22.36\rangle$

5. An airplane flies at a bearing of 305 degrees and at a speed of 480 miles per hour. Find the component form of the velocity vector of the plane.



$305 - 270 = 35$

$x = 480\cos 35 = 393.19$
$y = 480\sin 35 = 275.32$

$\langle -393.19, 275.32\rangle$

6.3: PARAMETRIC EQUATIONS

For 6-7, eliminate the parameter and state the shape of the resulting graph.

6. x = 1 - 2t, y = 3 + 4t

$x = 1-2t$
$\frac{x-1}{-2} = \frac{-2t}{-2}$
$t = \frac{x-1}{-2}$

$y = 3 + 4\left(\frac{x-1}{-2}\right)$
$y = 3 - 2(x-1)$
$y = -2x + 5$ (line)

7. x = 6cost, y = 6sint

$x^2 + y^2 = (6\cos t)^2 + (6\sin t)^2$
$x^2 + y^2 = 36\cos^2 t + 36\sin^2 t$
$x^2 + y^2 = 36(\cos^2 t + \sin^2 t)$
$x^2 + y^2 = 36$

(circle w/ radius 6 centered @ the origin)

For 8-10, find a parameterization.

8. The line through points (-2, 5) and (3, 1).

$\langle 3+2, 1-5 \rangle$
$\langle 5, -4 \rangle$

$x = -2 + 5t$
$y = 5 - 4t$ $\quad -\infty < t < \infty$

9. For #8, what would be the parametrization for a line *segment* with the same endpoints?

$x = -2 + 5t$
$y = 5 - 4t$ $\quad 0 \le t \le 1$

10. A circle with radius of 6 and center at (4, 5).

$x = 4 + 6\cos t$
$y = 5 + 6\sin t$ $\quad 0 \le t \le 2\pi$

11. Mia Hamm is heading down the field, winds up and boots a soccer ball with an initial velocity of 54 feet per second and at angle of 36° with the ground. From where the soccer ball is kicked, Mia is approximately 75 feet from the goal (which has a crossbar that is 8 feet off the ground).

a. Write a parametric equation to model the path of the soccer ball.

$x = (54\cos 36)t$
$y = -16t^2 + (54\sin 36)t$

b. If the goalie can block a ball up to 6 feet off the ground, will Mia score? If not, explain if the ball will be blocked by the goalie or miss the net entirely.

$75 = (54\cos 36)t$
$t = 1.72 \text{ sec}$

$y = -16(1.72)^2 + (54\sin 36)(1.72)$
$y = 7.33 \text{ ft}$ GOAL!

12. Katniss Everdeen shoots an arrow from a tree 100 feet above the ground. The arrow leaves her bow with a velocity of 245 feet per second at an angle of 15° with the horizontal.

a. What is the maximum height the arrow reaches before it starts falling back to the ground?

$x = (245\cos 15)t$
$y = -16t^2 + (245\sin 15)t + 100$
↑ Function mode! find vertex... (max)
162.83 ft

b. How long does it take the arrow to reach the ground? How far from the tree did it land?

$0 = -16t^2 + (245\sin 15)t + 100$
$t = 5.17 \text{ sec}$

$x = (245\cos 15)(5.17)$
$x = 1223.89 \text{ ft}$

13. Cortney drops a penny from the top of the Empire State Building, from a height of 1250 feet. When does the penny hit the ground? (Ignore air resistance)

$x = 5$ (arbitrary)
$y = -16t^2 + 1250$

$0 = -16t^2 + 1250$
$-1250 = -16t^2$
$78.125 = t^2$
$t = 8.84 \text{ sec}$