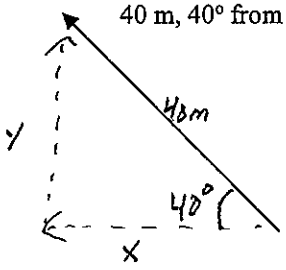
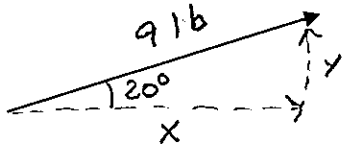
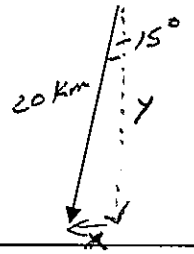
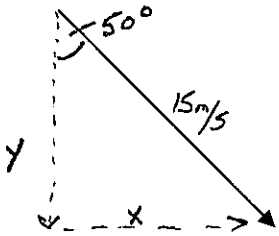
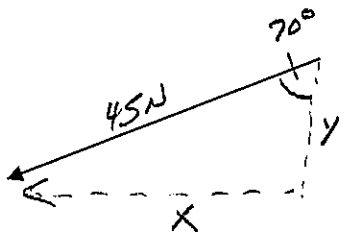
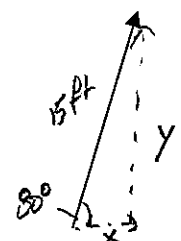
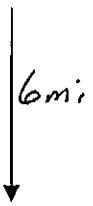
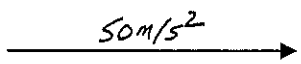
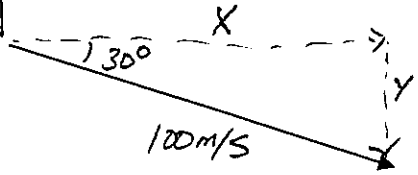
Name KEY
Date _____ Period _____

Vector Components Worksheet

1. Using dotted lines, draw the horizontal and vertical components for each vector shown below. Show only one pair of the components.

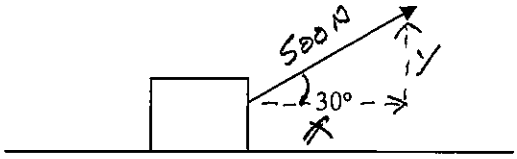
1) 40 m, 40° from horizontal 	2) 9 lb, 20° from horizontal 	3) 20 km 15° from vertical 
4)  15 m/s, 50° from vertical	5)  45N, 70° from vertical	6)  15 ft, 80° from horizontal
7)  6 mi, 0° from vertical	8)  50 m/s², 0° from horizontal	9)  100 m/s, 30° from horizontal

2. Using the angles given on the diagrams in problem #1 above, calculate the values of the horizontal (**x**) and vertical (**y**) components for each diagram you did above, showing your work in the box for each below.
Note: ***Be sure your calculator is in "DEGREE" mode before doing your calculations.***

X = 30,64m	Y = 25,71m	X = 8,461b	Y = 3,081b	X = 5,18Km	Y = 19,32 Km
$\cos 40° = \frac{x}{40}$	$\sin 40° = \frac{y}{40}$	$\cos 20° = \frac{x}{9}$	$\sin 20° = \frac{y}{9}$	$\sin 15° = \frac{x}{20}$	$\cos 15° = \frac{y}{20}$
X = 30,64m	Y = 25,71m	X = 8,461b	Y = 3,08 lb	X = 5,18	Y = 19,32
X = 11,49m/s	Y = 9,64m/s	X = 42,29N	Y = 15,39N	X = 2,60ft	Y = 14,77ft
$\sin 50° = \frac{x}{15}$	$\cos 50° = \frac{y}{15m/s}$	$\sin 70° = \frac{x}{45N}$	$\cos 70° = \frac{y}{45N}$	$\cos 80° = \frac{x}{15}$	$\sin 80° = \frac{y}{15}$
X = 11,49 m/s	Y = 9,64 m/s	X = 42,29 N	Y = 15,39 N	X = 2,60 ft	Y = 14,77 ft
X = 0	Y = 6m	X = 50 m/s²	Y = 0	X = 86,6m/s	Y = 50 m/s
				$\cos 30° = \frac{x}{100}$	$\sin 30° = \frac{y}{100}$
				X = 86,6 m/s	Y = 50 m/s

3. A force of 500 Newtons (represented by the arrow coming from the box) is applied along a towrope held at 30 degrees above the horizontal to pull a box across a floor as shown below in the diagram.

a. Draw the x and y components of the pull force on the diagram below.



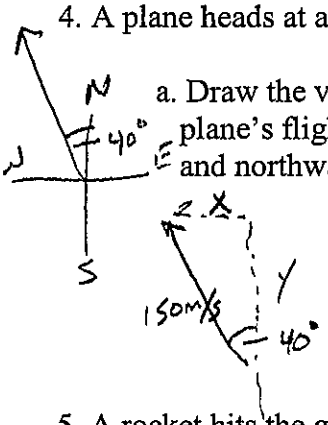
b. Calculate the component of the force that actually causes the box to move (horizontal component)

433 N

$\cos 30° = \frac{X}{500\ N}$

$X = 433N$

4. A plane heads at an angle of 40° West of North at a speed of 150 m/s.



a. Draw the vector representing the plane's flight and show the westward and northward components of it's velocity.

b. Calculate the westward and northward components of the plane's velocity.

96.4 m/s West
114.9 m/s North

$\sin 40° = \frac{X}{150\ m/s}$

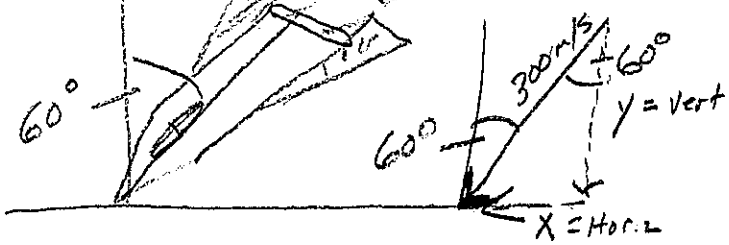
$X = 96.42 m/s$

$\cos 40° = \frac{Y}{150\ m/s}$

$Y = 114.91 m/s$

5. A rocket hits the ground at an angle of 60° from the horizontal at a speed of 300 m/s.

a. Draw the vector representing the rocket's impact and show the ~~westward~~ and ~~eastward~~ components of it's velocity.



b. Calculate the horizontal and vertical components of the rocket's impact velocity.

150 m/s horizontal
259.8 m/s vertical

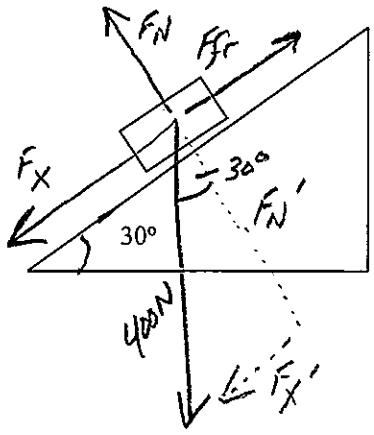
$\cos 60° = \frac{Y}{300\ m/s}$

$Y = 150\ m/s$

$\sin 60° = \frac{X}{300}$

$X = 259.81 m/s$

6. a. Draw the components of the box's 400 N weight that act parallel and perpendicular to the inclined plane on the drawing below.



b. Calculate the component of the weight vector that tends to make the box slide down the incline (the parallel component)

$\sin 30° = \frac{F_X'}{400N}$

$F_X' = 200N$