GSE PreCalculus – Unit 7: Vectors
WS 7.2: Finding direction of vectors

Name _____
Date _____ Day ___

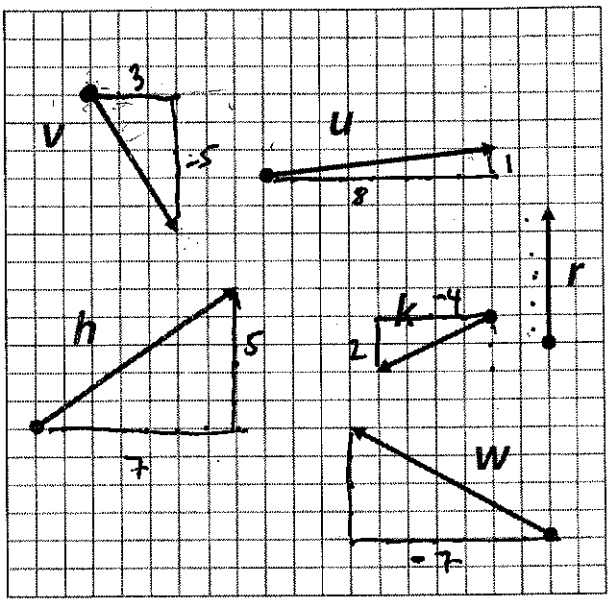
Use the vectors to the right to figure out the component form, magnitude, and direction. Show work!
Round to the nearest tenth for magnitude & to the nearest degree for direction.

Component Form $< a, b >$

Magnitude $|v| = \sqrt{a^2 + b^2}$

Direction = θ

Case 1	$v = < a, b >$
If $a > 0$, then	$\theta = tan^{-1}(\frac{b}{a})$
Case 2	$v = < a, b >$
If $a < 0$, then	$\theta = tan^{-1}(\frac{b}{a}) + 180°$
Case 3	$v = < a, b >$
If $a = 0$, then	$\theta = \pm 90°$



Round to the nearest tenths

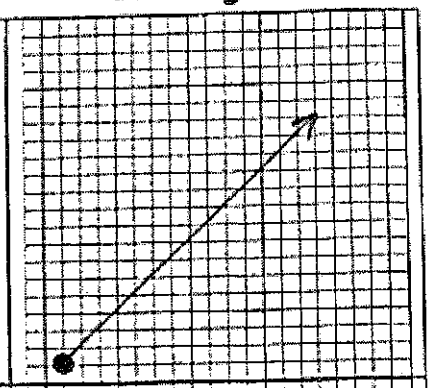
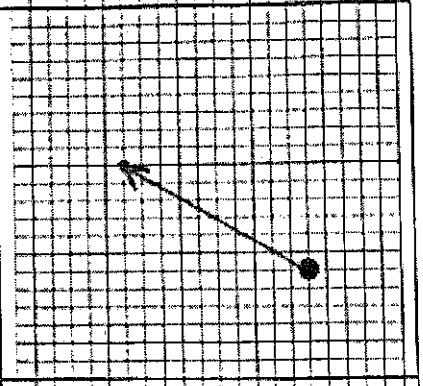
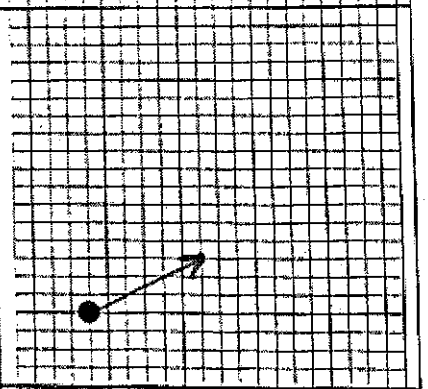
Round to the nearest degree

Component Form	Magnitude	Direction
$v = \langle 3, -5 \rangle$	$\|v\| = \sqrt{(3)^2 + (-5)^2}$ $\sqrt{34} \approx 5.8$ units	$\theta = tan^{-1}(\frac{b}{a})$ $= tan^{-1}(-\frac{5}{3})$ $\theta = -59°$
$u = \langle 8, 1 \rangle$	$\|v\| = \sqrt{(8)^2 + (1)^2}$ $= \sqrt{65} \approx 8.1$ units	$\theta = tan^{-1}(\frac{b}{a})$ $= tan^{-1}(\frac{1}{8})$ $\theta = 7°$
$h = \langle 7, 5 \rangle$	$\|v\| = \sqrt{(7)^2 + (5)^2}$ $= \sqrt{74}$ ≈ 8.6 units	$\theta = tan^{-1}(\frac{5}{7})$ $\theta = 36°$
$k = \langle -4, -2 \rangle$	$\|v\| = \sqrt{(-4)^2 + (-2)^2}$ $= 2\sqrt{5}$ ≈ 4.5 units	$\theta = tan^{-1}(\frac{b}{a}) + 180°$ $tan^{-1}(\frac{-2}{-4}) + 180°$ $\theta = 207°$
$r = \langle 0, 5 \rangle$	$\|v\| = \sqrt{(0)^2 + (5)^2}$ $= \sqrt{25}$ $= 5$ units	$\theta = 90°$
$w = \langle -7, 4 \rangle$	$\|v\| = \sqrt{(-7)^2 + (4)^2}$ $= \sqrt{49 + 16}$ $= \sqrt{65}$ ≈ 8.1 units	$\theta = tan^{-1}(\frac{b}{a}) + 180$ $= tan^{-1}(\frac{4}{-7}) + 180$ $\theta = 150°$

Name KEY Period _____ Date _____

$$\langle \underbrace{|v|\cos\theta}_{x}, \underbrace{|v|\sin\theta}_{y} \rangle$$

Find the component form and draw each vector. Round to the nearest whole number. Show work!

Given Magnitude + Direction	Component Form	Drawing
1) Magnitude $\lvert u\rvert = 20$ Angle $\theta = 45°$	$\lvert u\rvert\cos\theta$ $\lvert u\rvert\sin\theta$ $20\cos 45°$ $20\sin 45°$ 14 14 $\langle 14, 14 \rangle$	
2) Magnitude $\lvert v\rvert = 11$ Angle $\theta = 150°$	$\lvert v\rvert\cos\theta$ $\lvert v\rvert\sin\theta$ $11\cos 150°$ $11\sin 150°$ -9.5 5.5 -10 6 $\langle -10, 6 \rangle$	
3) Magnitude $\lvert u\rvert = 7$ Angle $\theta = 25°$	$\lvert u\rvert\cos\theta$ $\lvert u\rvert\sin\theta$ $7\cos 25°$ $7\sin 25°$ 6.3 2.9 6 3 $\langle 6, 3 \rangle$	
4) Magnitude $\lvert v\rvert = 9$ Angle $\theta = 120°$	$\lvert v\rvert\cos\theta$ $\lvert u\rvert\sin\theta$ $9\cos 120°$ $9\sin 120°$ -4.5 7.7 -5 8 $\langle -5, 8 \rangle$