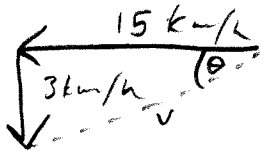
Relative Motion

(1)



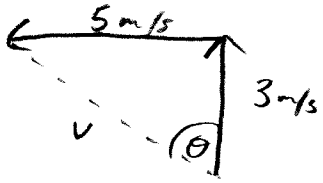
$$V = \sqrt{3^2 + 15^2} = 15.3$$

$$\tan\theta = \frac{3}{15}$$

$$\theta = 11.3$$

15.3 km/h 11.3° S of W

(2)



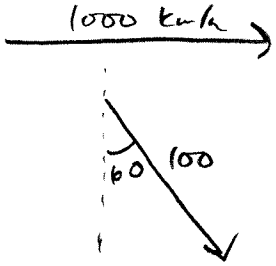
$$V = \sqrt{3^2 + 5^2} = 5.8$$

$$\tan\theta = \frac{5}{3}$$

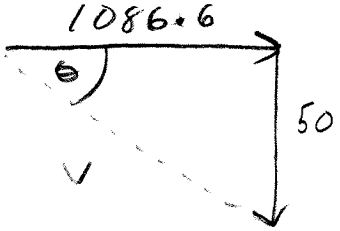
$$\theta = 59°$$

5.8 m/s 59° W of N

(3)



x	y
1000	0
$100 \sin 60$	$-100 \cos 60$
1086.6	−50



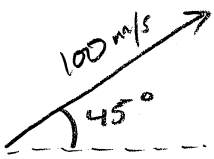
$$V = \sqrt{(1086.6)^2 + (50)^2} = 1088$$

$$\tan\theta = \frac{50}{1086.6}$$

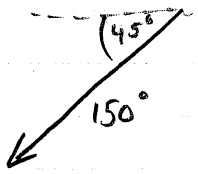
$$\theta = 30°$$

1088 km/h 30° S of E

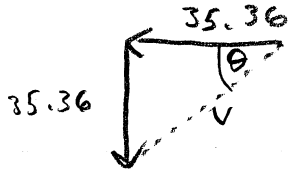
(4)



x	y
$100 \cos 45$	$100 \sin 45$



$-150 \cos 45$	$-150 \sin 45$
-35.36	-35.36



$$V = \sqrt{35.36^2 + 35.36^2} = 50$$

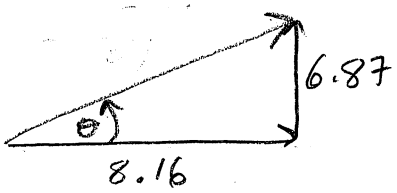
$$\tan\theta = \frac{35.36}{35.36}$$

$$\theta = 45°$$

50 m/s Southwest

(5)

x	y
$10 \cos 30$	$10 \sin 30$
0	1
$-1 \sin 30$	$1 \cos 30$
8.16	6.87



$$V = \sqrt{8.16^2 + 6.87^2} = 10.67$$

$$\tan\theta = \frac{6.87}{8.16}$$

$$\theta = 40°$$

10.7 m/s 40° N of W