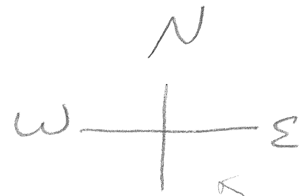
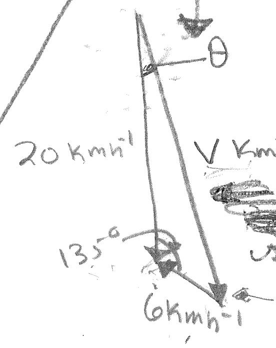
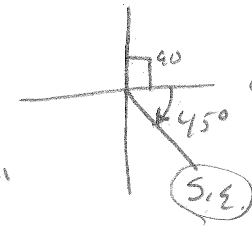
13 A

1 and 2 on Power point



3.





$90° + 45° = 135°$

S-A-S

a.) cosine rule

$V^2 = 20^2 + 6^2 - 2 \times 20 \times 6 \times \cos(135°)$

$V \approx 24.6$

The equivalent speed in still water is 24.6 kmh^{-1}

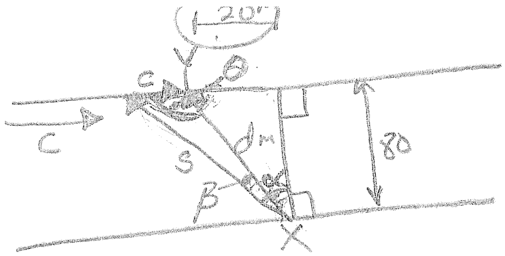
b.) Using the Sine rule

$\frac{\sin \theta}{6} \approx \frac{\sin(135)}{24.61} \quad \theta \approx \sin^{-1}\left(\frac{6 \times \sin(135)}{24.61}\right)$

$\theta \approx 9.93$

the boat should head 9.93^0 east of South.

4.



a.)

$d^2 = 80^2 + 20^2$

$d^2 = \sqrt{80^2 + 20^2}$ $\{d > 0\}$

$d \approx 82.5$

the distance from x to y is 82.5m.

b.) $\alpha = \tan^{-1}\left(\frac{20}{80}\right) \approx 14.04^\circ$

$\theta \approx 90^\circ + 14.04^\circ = 104.04^\circ$

In t seconds, Steph can swim 1.8t meters, and the current will move 0.3t meters.

$|S| = 1.8t$ and $|C| = 0.3t$

Using Sine Rule (why?) $\frac{\sin\beta}{0.3t} = \frac{\sin\theta}{1.8t}$

$\beta \approx \sin^{-1}\left(\frac{0.3 \times \sin(104.04^\circ)}{1.8}\right) \approx 9.31^\circ$

$\alpha + \beta \approx 23.3^\circ$. Steph should head 23.3° to the left of the perpendicular across the river.

c.) $\tan(\alpha + \beta) = \frac{20 + 0.3t}{80}$

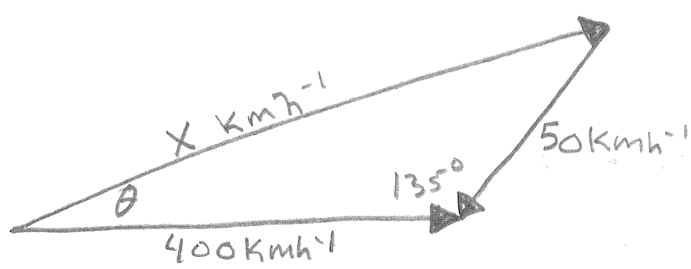
$20 + 0.3t \approx 80\tan(23.34^\circ)$

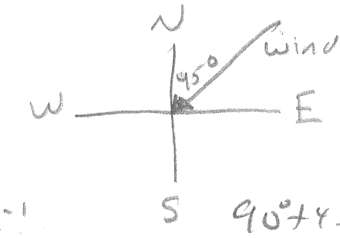
$t = \frac{80\tan(23.34^\circ) - 20}{0.3}$

$t \approx 48.4$

Steph will take 48.4 seconds to cross the river

5.)





$90° + 45° = 135°$

a.) cosine rule (why?)

$$X^2 = 50^2 + 400^2 - 2 \times 50 \times 400 \cos(135°)$$

$X \approx 436.79$

the airplane should fly so that the speed in still air would be 437 kmh^{-1}. The wind slows the airplane down to 400 kmh^{-1}.

b.) Sine rule (why?)

$$\frac{\sin\theta}{50} \approx \frac{\sin(135°)}{436.79} \qquad \theta \approx 4.64°$$

The airplane should head 4.64° north of East.