Phys 132 - HW 0.1 - Solutions

1) 5 mins, 427 cars east, 325 west

a) rate east: $427 \text{ cars}/5 \text{ min} = 85.4 \text{ cars/min}$

b) Net rate (east) = $(427-325)^{\text{c}}/_{5\text{ min}} = 20.4 \text{ cars/min}$ east

[Note we could also get rate of westbound cars = $\frac{325}{5} = 65 \text{ cars/min}$ and then take diff: $85.4 \text{ c/m (east)} - 65 \text{ cars/min (west)} = 20.4 \text{ c/m (east), net}$]

2) Rate west is $^{325\text{c}}/_{5\text{m}} = 65 \text{ cars/min}$

Uncertainty in 325 is $\sqrt{325} \approx 18$

so range of likely values is 307-343,

which gives a rate range from 61.4 to 68.6,

or $\boxed{\pm 3.6 \text{ cars/min}}$

Could also just take $^{18}/_{5} \text{ car/min} = 3.6 \text{ cars/min}$, so we would say rate is $65 \pm 3.6 \text{ cars/min}$.

CANNOT take square root of rate —

$\sqrt{65} \approx 8 \neq 3.6$!!

Square root is rule that applies to random events (i.e. the total number of events) —

NOT the rate.