Homework 2

1- Delivery: A text message sent from one device needs to arrive at the correct destination, in this case the person the message was sent to.

Accuracy: A video sent online shouldn't arrive with missing frames. All data packets need to arrive without any distortion

Timeliness: Data needs to be delivered in a continuous stream with minimum delay. With a GPS for example, the user needs to be aware of where they are exactly at all times in order to know when to make turns.

Jitter: Data packets need to arrive with the delay between them being consistent. Calls for example would be very messy with noticable jitter as users wouldn't know exactly when someone stops speaking.

2- Communication systems have 3 main components. A sender, transmitter and reciever. In the context of a GPS, the sender could be the user, the transmitter being the GPS which sends out a signal to a satellite and the reciever being the satellites themselves which relay the senders precise location through the same channel.

3- Analogue data can be represented continuously in levels by a sine wave that varies in size. Discrete data on the other hand can be represented by just 2 levels and can be represented by square waves. Its range is limited to just 0 and 1. Computers require that analogue data is converted to digital data for them to understand it. The human voice is an example of analogue data.

4. Bandwidth refers to maximum amount of data transmission over a period of time. It represents the amount of data that can be sent over ~~the period of~~ time during this set amount of time. online games for example are heavily reliant on bandwidth being high. Large amounts of data need to ~~~~ constantly be transmitted to the user and back in order to have a stable experience. ~~The~~ The same goes for any video or music streaming service. This is usually calculated in megabits per second (Mbps)

5. $25 \times 24 \times 80 \times 8 = 384000 = 0.384$ Mbps

6. 384 Kbps ÷ 25 = 15.36 Kbps for one page
200 Kbps ÷ 15.36 Kbps ≈ 13.02
= 13 pages

7. ~~10~~ 10 / 100,000 = 1×10^{-4} seconds
8 / 100,000 = 8×10^{-5} seconds
(8 × 100,000) / 100,000 = 8 seconds