

1. A high quality image requires a spatial resolution of 0.002 inch, which means that about 500 pixels per inch are required in a digital representation. Assuming 24 bits per pixel for a color image of size 8.5 by 11 inches, find the total number of bits required for such an image representation.
2. Imagine that you have trained your St. Bernard (Bernie the data dog) to carry a box of 3 tapes instead of a bottle of single malt. Each tape contains 7 gigabytes. The dog can travel to your side, wherever you may be, at 18 km/hour. For what range of distances does Bernie have a higher data rate than a 155-Mbps ATM line?
3. Suppose a **100 Mbps** point-to-point link is being set up between the earth and a new lunar colony. The distance from the moon to the earth is approximately **240,000 miles**, and data travels over the link at the speed of light - **186,000 miles per second**.
 - (a). Calculate the minimum **Round-Trip Time (RTT)** for the link.
 - (b). A camera on the lunar base takes pictures of the earth and saves them in digital format to disk. Suppose Mission Control on earth wishes to download the most current image, which is **25 MB**. What is the minimum amount of time that will elapse between when the request for the data goes out and the transfer is finished?