Math 12 – Workshop #26

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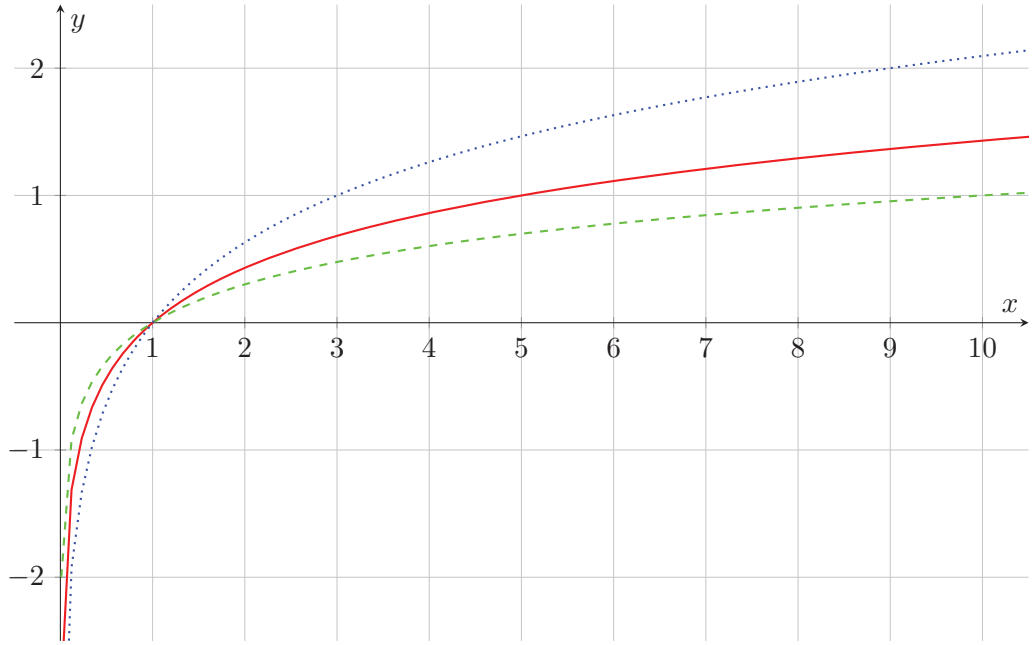
1. (a) Let $g(x) = \log_2 x$. Complete the chart:

x	$\frac{1}{32}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	1	2	4	8	16	32
$g(x)$			-3				1				

   (b) Use the points you generate to graph $g(x) = \log_2 x$

   (c) On the same set of axis graph $f(x) = 2^x$, how are the two graphs similar?

2. Which of the following is $f(x) = \log(x)$, $g(x) = \log_3(x)$ and $h(x) = \log_5(x)$?



3. Without a calculator find these values exactly

   (a) $\log(10)$

   (b) $\log(0.1)$

   (c) $\log_2(\sqrt{2})$

   (d) $\log_{\sqrt{2}}(2)$

   (e) $\log_3(3\sqrt{3})$

   (f) $\log_8(2)$

   (g) $\log_\pi(\pi^3)$

   (h) $\log_{\frac{1}{\sqrt{2}}}(2)$

4. The "loudness" of a sound is measured in decibels (dB). The decibel level of a sound is given by the formula

$$10 \cdot \log\left(\frac{I}{I_0}\right)$$

   where I is the intensity of the sound, and I_0 is the sound intensity at the threshold of hearing.

   (a) What is the decibel level of a sound if its intensity is the threshold of sound, that is when $I = I_0$?

   (b) The threshold of pain for a noise has intensity 10^{13} times the threshold of hearing, what is the decibel level is the threshold of pain?

   (c) Hobby cannons, like the one fired at Sacramento State football games, can have sound intensity that is $(10)^{21/2}$ times the threshold of hearing. What is the decibel level of these cannons?