

WED 9-14-05

GOOD MORNING!

HELLO

CA

LOGARITHMS ARE EXPONENTS.

$$\log \equiv \log_{10}$$

$$\log 100 = \log_{10} 100 = \underline{\underline{2}}$$

G.C.

$$\log(100) = \underline{\underline{2}}$$

$$\log 1 = 0$$

$$\log 0.1 = \log 10^{-1} = \underline{\underline{-1}}$$

DEFN:

$$\log_b a = c \implies b^c = a$$

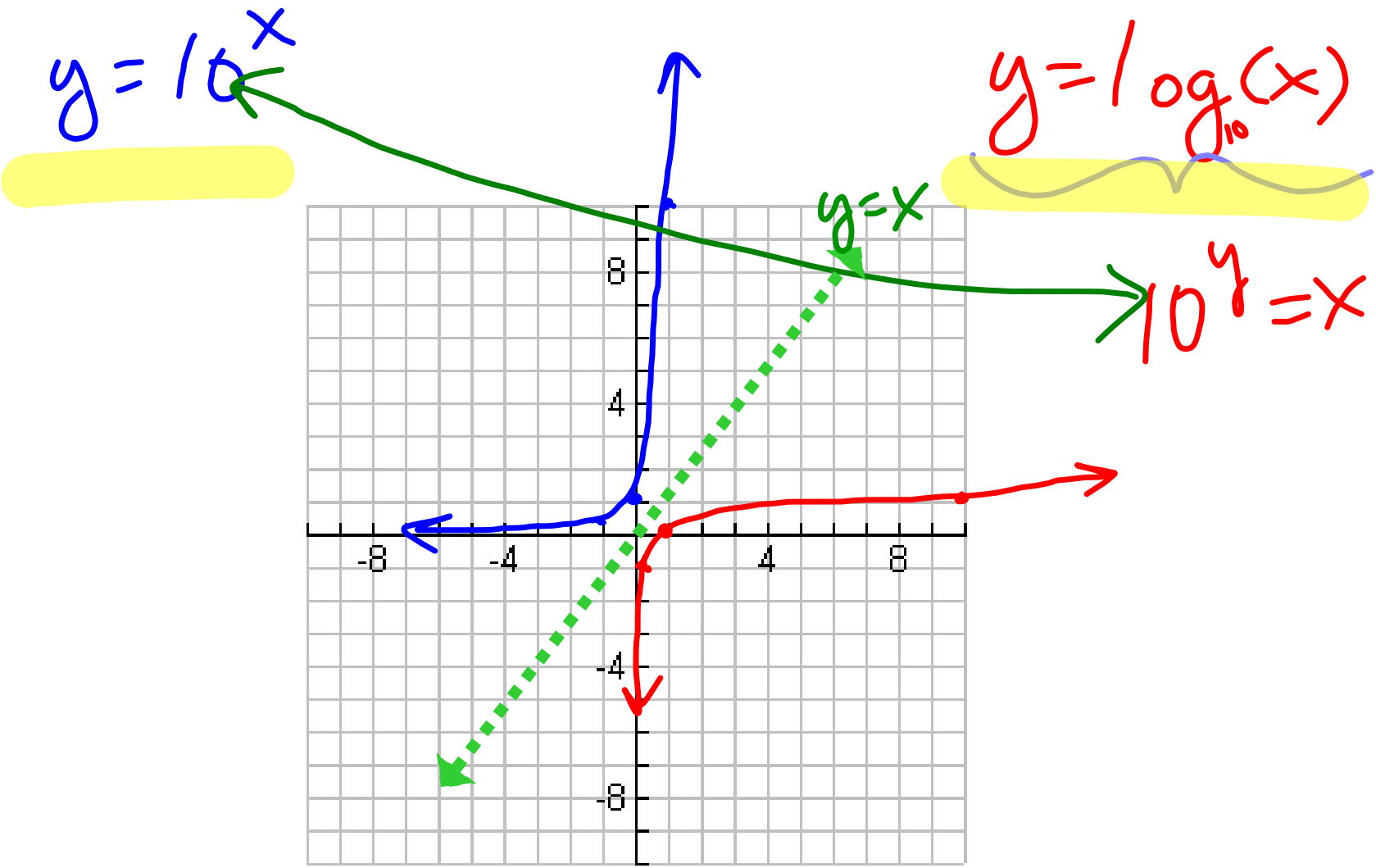
# LAWS OF LOGS

$$\textcircled{1} \log_b(a \cdot c) = \log_b a + \log_b c$$

|                                       |                    |
|---------------------------------------|--------------------|
| ■ $\log(2 \cdot 3)$                   | .778151            |
| ■ $\log(2) + \log(3)$                 | .778151            |
| <b><math>\log(2) + \log(3)</math></b> |                    |
| MAIN                                  | RAD AUTO FUNC 2/30 |

$$\textcircled{2} \log_b\left(\frac{a}{c}\right) = \log_b a - \log_b c$$

$$\textcircled{3} \log_b a^c = c \cdot \log_b a$$



Ex) SOLVE TO 3 DEC. PLACES.

$$5^{3x+2} = 80$$

$$\log 5^{3x+2} = \log 80$$

$$\frac{(3x+2) \cdot \log 5}{\log 5} = \frac{\log 80}{\log 5} = \frac{\log 80}{\log 5} = 16$$

$$3x+2 = \frac{\log 80}{\log 5}$$

$$\frac{1}{3} \cdot 3x = \left[ \frac{\log 80}{\log 5} - 2 \right] \cdot \frac{1}{3}$$

$$x = \frac{\log 80}{3 \log 5} - \frac{2}{3} \approx .241$$

EXACT ANSWER

```
log(80) - 2      .240902
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3 * log(5)      3.
.24090207743117 + x
.240902
ans(1)+x
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```
5^3 * x + 2      80.
5^(3x+2)
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$$\ln(x) \equiv \log_e(x)$$

$$\underline{\underline{y = \ln x}}$$

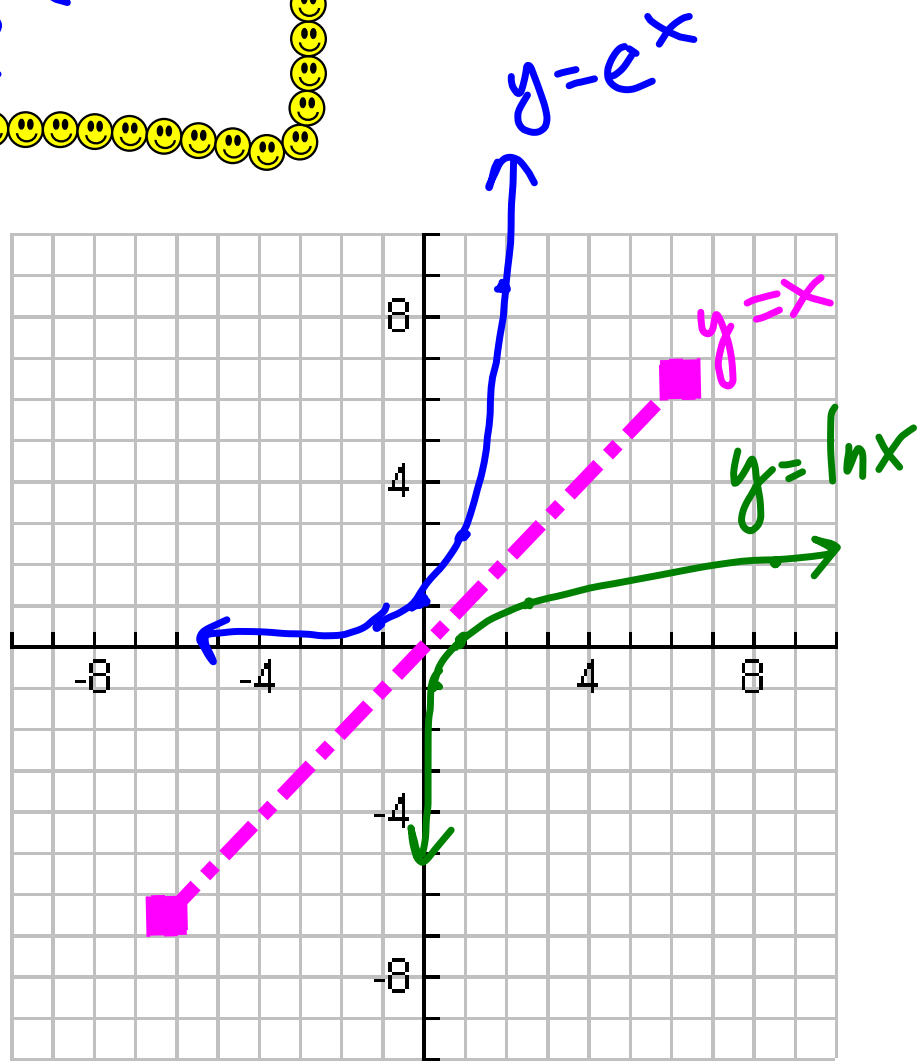
$$\ln 7 = \log_e 7$$

$$y = e^x$$



$$y = \ln x \rightarrow y = \log_e x$$

$$\rightarrow e^y = x$$



Ex) SOLVE:  $4 \cdot e^{2x-3} = 35$

$$e^{2x-3} = \frac{35}{4}$$

$$\ln e^{2x-3} = \ln\left(\frac{35}{4}\right)$$

$$(2x-3) \cdot \ln e = \ln\left(\frac{35}{4}\right)$$

$$2x-3 = \ln\left(\frac{35}{4}\right)$$

$$2x = \ln\left(\frac{35}{4}\right) + 3$$

$$x = \frac{\ln\left(\frac{35}{4}\right) + 3}{2} = \underline{\underline{2.585}}$$

ASIDE

$\ln e = ?$

$\log_e e = 1$

| F1+<br>Tools                | F2+<br>Algebra | F3+<br>Calc | F4+<br>Other | F5+<br>Prbr/O | F6+<br>Clean Up |
|-----------------------------|----------------|-------------|--------------|---------------|-----------------|
| $\ln(35/4) + 3$ ✓           |                |             |              |               |                 |
| 2.58453                     |                |             |              |               |                 |
| 2.5845268501848 → t         |                |             |              |               |                 |
| 2.58453                     |                |             |              |               |                 |
| $4 \cdot e^{2 \cdot t - 3}$ |                |             |              |               |                 |
| 35.                         |                |             |              |               |                 |
| $4e^{(2t-3)}$               |                |             |              |               |                 |
| MAIN                        |                | RAD/AUTO    |              | FUNC          |                 |
| 3/30                        |                |             |              |               |                 |

