

1.6

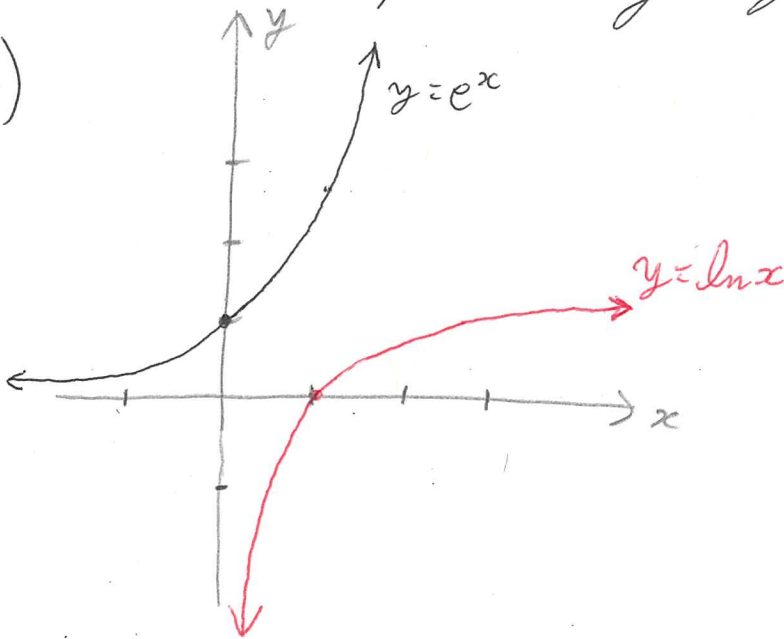
$$2-a) e^p = N \Rightarrow \underline{p = \ln N}$$

natural logarithm is the exponent value of a natural base (e) representing any value N.

$$2-b) 10^p = N \Rightarrow p = \log N$$

common logarithm is the exponent value of a base 10 representing any value N.

2-c)



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$$4-a) \log_2 8 = x \Rightarrow 8 = 2^x$$
$$(2)^3 = 2^x$$
$$3 \Downarrow = x$$

$$\underline{\underline{\log_2 8 = 3}}$$

$$4-a) \log_8 2 = x \Rightarrow 2 = 8^x \quad | \quad 2^1 = 2^{3x}$$

$$2 = (2^3)^x \quad | \quad \downarrow$$

$$2 = 2^{3x} \quad | \quad 1 = 3x$$

$$\quad \quad \quad | \quad \frac{1}{3} = x$$

$$\underline{\underline{\log_8 2 = \frac{1}{3}}}$$

$$12-a) \ln 12 \approx 2.4849 \Rightarrow \underline{\underline{12 \approx e^{(2.4849)}}}$$

$$12-b) C = \ln A \Rightarrow \underline{\underline{e^C = A}}$$

$$14-a) e^x = 2 \Rightarrow \underline{\underline{x = \ln 2}}$$

$$14-b) R = e^{3t} \Rightarrow \underline{\underline{\ln R = 3t}}$$

$$24) \ln(cd) = \ln c + \ln d \quad \underline{\underline{\text{true}}}$$

$$26) (\ln x)^2 = 2 \ln x \quad \underline{\underline{\text{false}}}$$

$$28) \ln 3 + 2 \ln x$$

$$= \ln 3 + \ln(x^2)$$

$$= \ln[(3)(x^2)]$$

$$= \underline{\underline{\ln[3x^2]}}$$

$$30) \ln x + a \ln y - b \ln z$$

$$= \ln x + \ln(y^a) - \ln(z^b)$$

$$= \ln[(x)(y^a)] - \ln(z^b)$$

$$= \ln \left\{ \frac{[(x)(y^a)]}{z^b} \right\} = \underline{\underline{\ln \left( \frac{xy^a}{z^b} \right)}}$$

$$34-a) e^{2x+3} - 7 = 0$$

$$e^{2x+3} = 7$$

⇓

$$2x+3 = \ln 7$$

$$2x = -3 + \ln 7$$

$$x = \frac{-3 + \ln 7}{2}$$

$$34-b) \ln(5-2x) = -3$$

⇓

$$5-2x = e^{-3}$$

$$5 - e^{-3} = 2x$$

$$\frac{5 - e^{-3}}{2} = x$$

$$\frac{5 - \frac{1}{e^3}}{2} = x$$

$$36) 1.13^x = 7.65$$

⇓

$$x = \frac{\log(7.65)}{1.13}$$

$$38) 10^{3-2x} = 42$$

⇓

$$3-2x = \log(42)$$

$$3 - \log(42) = 2x$$

$$\frac{3 - \log(42)}{2} = x$$

$$40) 450e^{0.15t} = 1200$$

$$e^{0.15t} = \frac{1200}{450}$$

$$e^{0.15t} = \frac{120}{45}$$

$$e^{0.15t} = \frac{24}{9}$$

$$e^{0.15t} = \frac{8}{3}$$

⇓

$$0.15t = \ln\left(\frac{8}{3}\right)$$

$$t = \frac{\ln\left(\frac{8}{3}\right)}{0.15}$$

$$42) 100\left(4^{\frac{-p}{5}}\right) = 8.8$$

$$4^{\frac{-p}{5}} = \frac{8.8}{100}$$

⇓

$$\frac{-p}{5} = \log_4\left(\frac{8.8}{100}\right)$$

$$p = -5 \log_4\left(\frac{8.8}{100}\right)$$