

# FINAL EXAM STUDY GUIDE

$$a) \frac{(4a^2b)^3}{4a^{-2}b} = \frac{64a^6b^3}{4a^{-2}b} = 16a^8b^2$$

$$b) \left( \frac{pq^3}{5p^{-3}q} \right)^{-2} = \left( \frac{5p^{-3}q}{pq^3} \right)^{+2}$$

$$= \frac{25p^{-6}q^2}{p^2q^6} = 25p^{-8}q^{-4}$$

OR  $\frac{25}{p^8q^4}$

$$c) x^3 = \frac{8}{125}$$

$$x = \sqrt[3]{\frac{8}{125}}$$

$$x = \frac{2}{5}$$

$$d) 32^{\frac{1}{5}} = x$$

$$\sqrt[5]{32} = x$$

$$2 = x$$

$$e) 2^x = \frac{1}{128}$$

$$2^x = 2^{-7}$$

$$x = -7$$



$$f) e^{5x} = 123 \Rightarrow \ln 123 = 5x$$

$$\frac{\ln 123}{5} = x$$

$$0.962 \approx x$$

$$g) 13^x = 204$$

$$\log(13^x) = \log 204$$

$$x \cdot \log 13 = \log 204$$

$$x = \frac{\log 204}{\log 13} \approx 2.073$$

$$h) 3^{5x} = 192$$

$$\log(3^{5x}) = \log 192$$

$$5x \cdot \log 3 = \log 192$$

$$x = \frac{\log 192}{5 \log 3} \approx 0.957$$

$$i) f(x) = (x+5)^3$$

$$y = (x+5)^3$$

$$\sqrt[3]{x} = \sqrt[3]{(y+5)^3}$$

$$\sqrt[3]{x} = y + 5$$

$$\sqrt[3]{x} - 5 = y$$

$$\Rightarrow f^{-1}(x) = \sqrt[3]{x} - 5$$



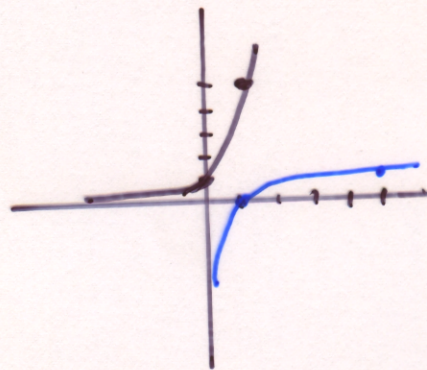
j)  $f(x) = 5^x$   
 $y = 5^x$   
 $x = 5^y \Rightarrow \log_5 x = y \Rightarrow f^{-1}(x) = \log_5 x$

$y = 5^x$

x	y
0	1
1	5

$y = \log_5 x$

x	y
1	0
5	1



k)  $y = n \cdot e^{kt}$

$n = 3500$ ,  $k = .025$ ,  $y = 10,500$ ,  $t = ?$

$10,500 = 3500 \cdot e^{.025t}$

$3 = e^{.025t}$

$\Rightarrow \ln 3 = .025t$

$\therefore \frac{\ln 3}{.025} = t$

$44 \text{ yr.} \approx t$