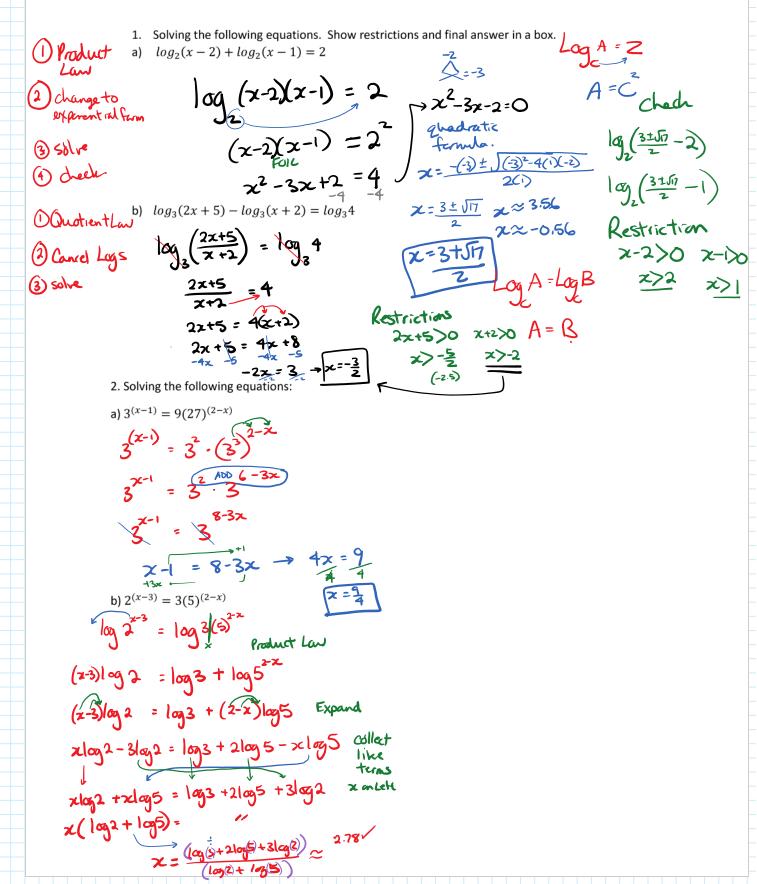
# xtra Practice for Chapter 8.4



## Extra Practice for Chapter 8.4

#### **Applications**

3. A scientist started with a culture of 20 bacteria in a dish. He noticed that after 80 hours, there were 1800 bacteria. What is the doubling time of this bacteria?

$$\frac{1800}{20} = \frac{20(2)}{20}$$

$$\frac{19}{20} = \frac{20(2)}{20}$$

$$\frac{19}{20} = \frac{80}{10} \frac{10}{20}$$

$$\frac{109}{10} = \frac{80 \frac{2}{109}}{10990} = \frac{12.32 \text{ hr.}}{10990}$$

- 4. At the beginning of the year, you deposit \$1000 into a bank account, with an annual interest rate of 5%. Assume no other deposits or withdrawals are made and the interest rate stays constant.
- a) what will be the value of the account after 5 years if interest is compounded annually?

$$A = 1000 (1 + 0.05)^{5}$$

$$= 1000 (1.05)^{5}$$

$$A = 41276.28$$

b) how long will it be when his money doubles in value?

## Extra Practice for Chapter 8.4

5. When people take a particular medicine, the drug is metabolised and eliminated at a certain rate. Suppose the initial amount of a drug in the body is 200 mg and is eliminated at a rate of 30% per hour. How long will it take to reach 10 mg?

$$\frac{10 = 200(1-0.3)^{t}}{200}$$

$$\frac{1}{20} = (0.7)^{t}$$

$$\frac{1}{100} = (0.7)^{t}$$

6. Certain bacteria, given favourable growth conditions, grow continuously at a rate of 4.6% a day. Find the bacterial population after thirty-six hours, if the initial population was 250 bacteria.

$$A = 250(1+0.046)^{\frac{36}{24}}$$

$$A = 250(1.046)^{\frac{3}{2}}$$

$$A = 267 \text{ bucteria}$$

$$(not 267.45)$$

# Extra Practice for Chapter 8.4

7. A penicillin solution has a half-life of 6 days. How long will it take for the concentration to drop to 70% of the initial concentration?

 $0.7 = 1 \left(\frac{1}{2}\right)^{\frac{1}{6}}$   $6 \times \log 0.7 = \frac{1}{6} \log \frac{1}{2}$   $109^{\frac{1}{2}} \log \frac{1}{2}$   $t = \frac{6 \log 0.7}{\log 0.5}$  t = 3.09 days

8. What is the magnitude of the earthquake in City A if the earthquake in City B has a magnitude of 5.7 on the Richter scale and is 4500 times as intense?

 $4500 = 10^{5.7-R_0}$   $log 4500 = (5.7-R_A) log 10$   $log 4500 = 5.7-R_A$   $R_A = 5.7-log 4500$   $R_A = 2.0$  Magnitude in City A

9. What is the pH of a tomato if it is 15000 times more acidic than hand soap with a pH of 9.5?

$$I = I_{o}(10)$$

$$I = I_{o}(10$$

10. It is said that the eardrum can rupture at a decibel level that is 100,000,000 times as intense as the normal sound level of a vacuum at 70Db on the Decibel scale (that would be like listening to a jet at take-off). At what Db value on the scale can the eardrum rupture?

$$I = I_{o}^{0}(10)$$

$$I =$$