NAME: _____

Unit 3 Assignment – Exponents and Logarithms

Knowledge	**50**	
Application	**45**	
Communication		

PART A: Knowledge

1. Simplify.

a) $\dfrac{5x^3\left(-3x^5\right)^3}{-9x^{-7}} =$

b) $\dfrac{5^{-1}-3^{-2}}{2^{-2}} =$

(3, 3)

c) $\left(\dfrac{625}{81}\right)^{\frac{-3}{4}} =$

d) $4^{-1}+\dfrac{1}{3^{-1}+\dfrac{1}{1+2^{-2}}} =$

(3, 3)

2. Solve.

a) $4^{3x-2}-1=15$

b) $-15\left(5^{2x+3}\right)=-375$

(3, 3)

c) $4^{2x}-20\left(4^{x}\right)+64=0$

d) $3^{3x-2}-27=0$

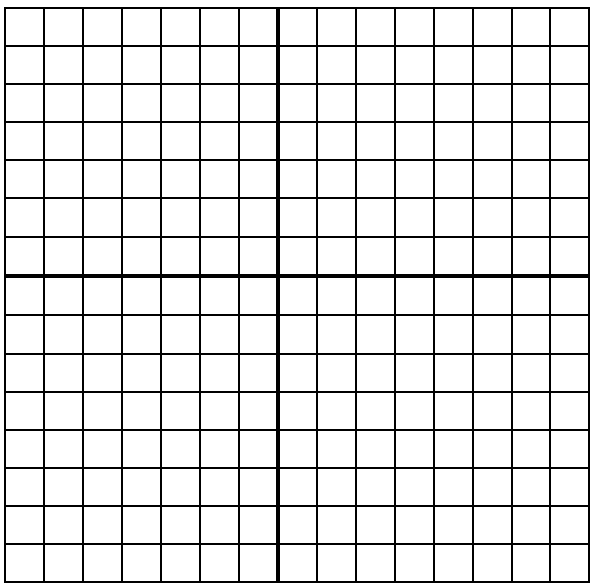
(3, 3)

3. Graph each of the following. Include descriptions as part of a full solution.

a) $y=-2^{x+4}+3$

Graph: (2)

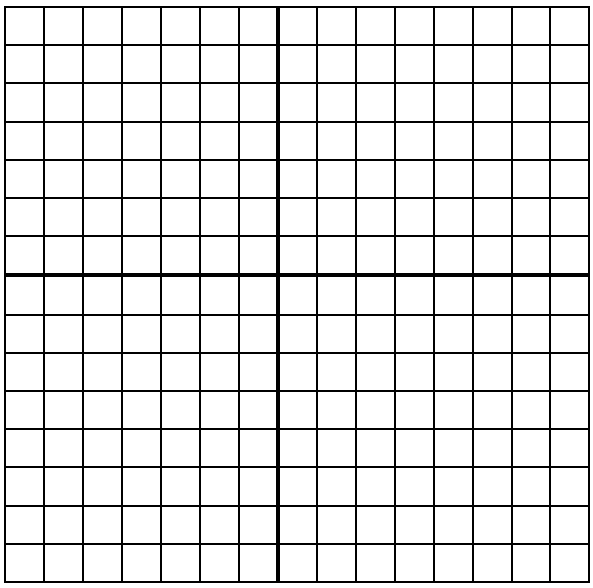
Descriptions: (3)



b) $y = 3 \bullet 2^{2x-4}$

Graph: (2)

Descriptions: (3)



4. Solve for x.

a) $\log_6 1296 = x$

(2, 2)

b) $\log_3 9\sqrt{27} = x$

c) $\log_2 4\sqrt[3]{32} = x$

(2, 2)

d) $\log_x 81 = 4$

e) $3^{\log_3 9} = x$

(2, 2)

f) $\log_x 49 = \frac{2}{3}$

g) $\log_{16} 2 = \frac{x}{4}$

(2, 2)

h) $\log_9 \left(\frac{1}{27}\right) = \frac{-x}{2}$

PART B: Application – all decimals rounded to four decimal places where necessary.

1. A bacteria culture starts with 100 000 bacteria. After 8 h the estimated count is 250. What is the half life (to the nearest tenth of an hour?

(3)

2. Tristan's bank account is assuring him fantastic interest over the next ten years. He has estimated the doubling period for the account is 15 years. If his account balance is currently $1000, how long will it be before he has $1250 in his account (to the nearest tenth of a year?

(3)

3. Evaluate using the rules for logarithms.

a) $\log_2 256 - \log_2 8 =$

b) $\log_3 9 + \log_3 27 =$

(2, 2)

c) $\frac{1}{2}\log_4 2\sqrt{64} + 3\log_4\left(\frac{1}{16}\right) =$

d) $\log_5\left(\frac{1}{625}\right) - 3\log_2 16 =$

(2, 2)

4. Solve. Show answers in both exact form and as a decimal rounded to the nearest four places.

a) $7 = 3^{x+2}$

b) $3^{-x+5} = 4$

(3, 3)

c) $2^{4x-3} = 7$

d) $\log_3 18 - \log_3 2 = x$

(3, 3)

5. For each of the following, draw the exponential function and the inverse on the same axes. Each graph will be fully labelled, showing at least three points. All work must be shown for full credit.

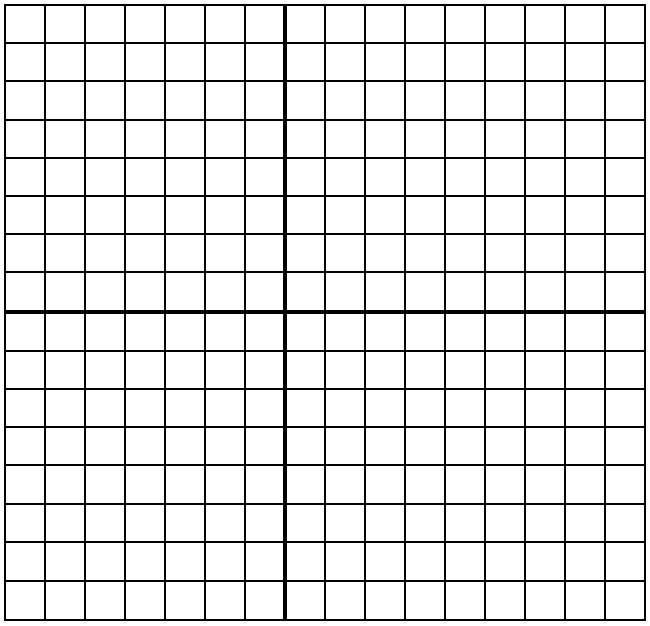
a) $y = \dfrac{\log(x-1)}{\log 3} + 2$

Corresponding exponential function: **Descriptions of exponential equivalent:**

(3, 2)

Graph:

(4)



b) $y = \dfrac{-\log(x-1)}{\log 2} + 3$

Corresponding exponential function: **Descriptions of exponential equivalent:**

(3, 3)

Graph:

(4)