

Name: KEY

Practice Exam

① a) Is this function exponential growth or decay?

$$f(x) = 80\left(\frac{4}{5}\right)^x$$

Decay because  $\frac{4}{5}$  is less than 1

b) Evaluate the function when  $x = 7$

$$f(7) = 80 \cdot \left(\frac{4}{5}\right)^7 \approx 16.777$$

② a) If Joe invests \$5000 into an account that gets 2.3% annual interest, write an equation to show how much money will be in the account after "t" years.

$$y = a(1+r)^t$$

$$y = 5000(1.023)^t$$

$$r = 2.3\% = 0.023$$

b) How much money would be in the account after 6 years?

$$y = 5000(1.023)^6 \approx 5730.91$$

③ Rewrite each expression/equation into exponential or logarithmic form.

Exponential

Logarithmic

a)  $4^3 = 64$

$$\log_4 64 = 3$$

b)  $2^x = 16$

$$\log_2 16 = x$$

c)  $3^5 = x$

$$\log_3 x = 5$$

d)  $x^2 = 100$

$$\log_x 100 = 2$$

④ Solve each equation:

a)  $\log_3 x = 4$

$$3^4 = x$$

$$81 = x$$

b)  $2^{3x} = 512$

$$\log_2 512 = 3x$$

$$\frac{\log(512)}{\log(2)} = 3x$$

$$\frac{9}{3} = \frac{3x}{3}$$

$$3 = x$$

⑤ Evaluate  $\log_4 \left( \frac{1}{64} \right) = \frac{\log(1/64)}{\log(4)} = -3$

⑥ Find the inverse of a function containing the points:  $\{(2, 3)(5, -4)(8, 1)\}$

Inverse:  $\{(3, 2), (-4, 5), (1, 8)\}$

⑦ Find the inverse of  $f(x) = 4x - 12$

$$y = 4x - 12$$

$$x = \frac{y + 12}{4}$$

$$f^{-1}(x) = \frac{x + 12}{4}$$

$$\frac{x + 12}{4} = \frac{4y}{4}$$

⑧ Find the inverse of  $f(x) = \frac{x}{3} + 8$

$$y = \frac{x}{3} + 8$$

$$x = 3(y - 8)$$

$$3 \cdot (x - 8) = \frac{y}{3} \cdot 3$$

$$3x - 24 = y$$

$$f^{-1}(x) = 3x - 24$$

⑨ Write a rule to find  $a_n$  for the sequence : 5, 10, 20, 40, 80, ...

$$a_1 = 5$$

$$r = 2$$

$$r = \frac{10}{5} = 2$$

$$a_n = 5(2)^{n-1}$$

⑩ Write the rule to find the  $a_n$  term and then find  $a_{12}$ .

2, -6, 18, -54, 162, ...

$$a_1 = 2$$

$$r = -3$$

$$a_n = 2(-3)^{n-1}$$

$$r = \frac{-6}{2} = -3$$

$$a_{12} = 2(-3)^{12-1} = -354294$$

⑪ If  $a_5 = -81$  and  $r = -3$  Find  $a_1$  and write the rule for  $a_n$ .

$$a_n = a_1 (r)^{n-1}$$

$$a_5 = a_1 (-3)^{5-1}$$

$$-81 = a_1 (-3)^4$$

Rule

$$\frac{-81}{81} = a_1 \frac{81}{81}$$

$$a_n = -1(-3)^{n-1}$$

$$-1 = a_1$$