

Exponential Functions: EOC Prep

Spring 2013

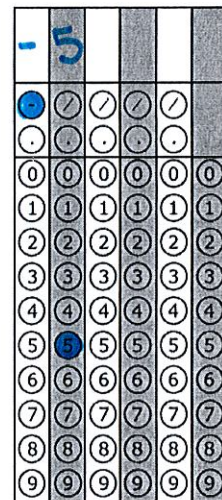
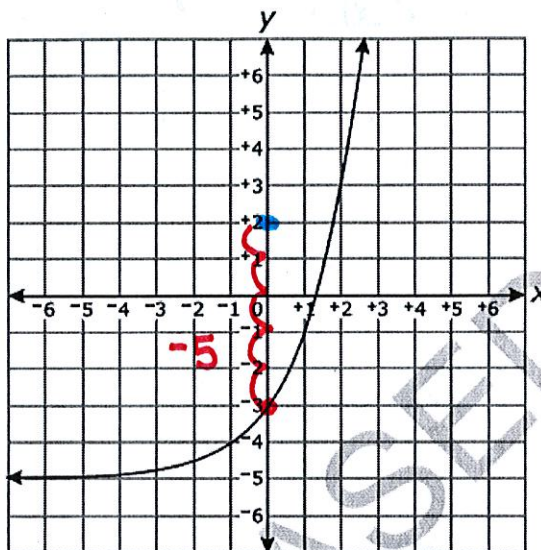
Name: Key

Directions: The following questions are sample items similar to those found on the EOC Exam. Answer each to the best of your ability.



1. The function $f(x) = 2(2)^x$ was replaced with $f(x) + k$, resulting in the function graphed below.

$f(x) = 2(2)^x$
 ↑
 y-int
 5
 shifted down
 5
 $k = -5$



What is the value of k ?

2. Monica did an experiment to compare two methods of warming an object. The results are shown in the table below.



Time (Hours)	Method 1 Temperature (°F)	Method 2 Temperature (°F)
0	0	1.5
1	5	3
2	11	6
3	15	12
4	19	24
5	25	48

constant +
 rate = add
 exponential =
 multiply

Which statement **best** describes her results?

- A The temperature using both methods changed at a constant rate.
- B The temperature using both methods changed exponentially.
- C The temperature using Method 2 changed at a constant rate.
- D** The temperature using Method 2 changed exponentially.



3. The value of an antique car is modeled by the function $V(x) = 107,000(1.009)^{\frac{2}{3}x}$ where x is the number of years since 2005. By what **approximate** percent rate is the value of the car increasing per year?

- A 0.04%
- B 0.14%
- C 0.60%
- D 1.40%

$(X^a)^b = X^{ab}$
 so $(1.009)^{\frac{2}{3}x} = (1.009^{\frac{2}{3}})^x = 1.006^x$

$1+r = 1.006$
 $r = 0.006 \times 100 = 0.6\%$

Simplify in calc

4. Which expression is equivalent to $(x^{\frac{1}{3}})^{-3}$?

- A \sqrt{x}
- B $\frac{1}{x}$
- C $\frac{1}{x^9}$
- D $\frac{1}{x^{27}}$

$x^{-\frac{3}{3}} = x^{-1} = \frac{1}{x}$

5. Which expression is equivalent to $\left(\frac{16x^{\frac{1}{6}}y^{-2}}{x^{-\frac{1}{6}}y^6}\right)^{\frac{3}{2}}$?

- A $24x^{\frac{9}{2}}y^{\frac{9}{2}}$
- B $\frac{24x^{\frac{3}{4}}}{y^9}$
- C $\frac{64}{x^{\frac{1}{2}}y^8}$
- D $\frac{64x^{\frac{1}{2}}}{y^{12}}$

$$\frac{16^{\frac{3}{2}} x^{\frac{3}{12}} y^{-\frac{6}{2}}}{x^{-\frac{3}{12}} y^{\frac{18}{2}}} = \frac{64 x^{\frac{3}{12} + \frac{3}{12}}}{y^9 + y^3} = \frac{64 x^{\frac{6}{12}}}{y^{12}}$$

$$= \frac{64 x^{\frac{1}{2}}}{y^{12}}$$

6. The value, V , of a car can be modeled by the function $V(t) = 13,000(0.82)^t$, where t is the number of years since the car was purchased. To the nearest tenth of a percent, what is the monthly rate of depreciation?

- A 1.5%
- B 1.6%
- C 9.2%
- D 18.0%

$1-r = 0.82$
 $-r = -0.18$
 $r = 0.18 \times 100 = 18\%$

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



7. The current student population of the Brentwood Student Center is 2,000. The enrollment at the center increases at a rate of 4% each year. To the *nearest whole number*, what will the student population be closest to in 3 years?

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

$$y = 2000(1+0.04)^3$$

$$y \approx 2250$$

- (1) 2,240
 (2) 2,250
 (3) 5,488
 (4) 6,240

8. Mr. Smith invested \$2,500 in a savings account that earns 3% interest compounded annually. He made no additional deposits or withdrawals. Which expression can be used to determine the number of dollars in this account at the end of 4 years?

$$y = P(1 + \frac{r}{n})^{nt}$$

$$y = 2500(1 + \frac{0.03}{1})^{1 \cdot 4}$$

- (1) $2500(1 + 0.03)^4$
 (2) $2500(1 + 0.3)^4$
 (3) $2500(1 + 0.04)^3$
 (4) $2500(1 + 0.4)^3$

9. Which expression is equivalent to $\sqrt[3]{8x^2y^3z^4}$?

A $2x^{\frac{3}{2}}yz^{\frac{3}{4}}$

B $2x^{\frac{2}{3}}yz^{\frac{4}{3}}$

C $\frac{2z}{x}$

D $\frac{2x}{z}$

$$= 8^{\frac{1}{3}} x^{\frac{2}{3}} y^{\frac{3}{3}} z^{\frac{4}{3}}$$

$$= 2x^{\frac{2}{3}} yz^{\frac{4}{3}}$$

10. The table below shows the average weight of a type of plankton after several weeks.

Time (weeks)	Weight (ounces)
8	0.04
9	0.07
10	0.14
11	0.25
12	0.49

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{0.49 - 0.04}{12 - 8} = \frac{0.45}{4}$$

$$m = 0.1125$$

What is the average rate of change in weight of the plankton from week 8 to week 12?

Slope

- A 0.0265 ounce per week
 B 0.0375 ounce per week
 C 0.055 ounce per week
 D 0.1125 ounce per week

11. Trina has a college fund started with a deposit of \$10,000 which earns 5% annually. If no other monies are deposited, how much money will Trina have in her fund at the end of three years?

$$y = P(1 + \frac{r}{n})^{nt}$$

$$y = 10000(1 + 0.05)^3$$

$$y = \$11576.25$$

- [1] \$11,500
 [2] \$11,576.25
 [3] \$15,000
 [4] \$25,000