

## Review 7 Day 2

### FRQ 1: Calculator NOT Permitted

Pictured below is a table of values that represents the graph of an exponential function,  $G(x) = a \cdot b^{c(x-h)} + k$ . Use the table to answer the questions below.

$x$	-9	-5	-1	1	3	5	9
$G(x)$	-510	-30	0	1.5	1.875	1.969	1.998

- a. Describe the behavior of  $G(x)$  as  $x \rightarrow -\infty$  and as  $x \rightarrow \infty$  using the words increasing, decreasing, bounded or unbounded.

$\lim_{x \rightarrow -\infty} G(x) = -\infty \therefore$  As  $x$  goes left,  $G(x)$  decreases without bound. +1/2

$\lim_{x \rightarrow \infty} G(x) = 2 \therefore$  As  $x$  goes right,  $G(x)$  increases with bound at  $y = 2$ . +1/2

- b. Does  $G(x)$  represent an exponential growth or decay? Give a reason for your answer.

$G(x)$  increases +1  $\therefore$   $G(x)$  represents exponential growth. +1

- c. What is the value of  $k$ ? Explain your reasoning.

$\lim_{x \rightarrow \infty} G(x) = 2 \therefore$   $G(x)$  has a horizontal asymptote at  $y = 2$ . +1  
 $\therefore k = 2$  +1

- d. What can be concluded about the value of  $a$ ? Explain your reasoning.

All the  $y$ -values of  $G(x)$  are below HA  $y = 2$ . +1  
 $\therefore a < 0$  +1

- e. State the domain and range of  $G(x)$ .

Domain  $(-\infty, \infty)$  +1  
 Range  $(-\infty, 2)$

## FRQ 2: Calculator NOT Permitted

The graph of an exponential function,  $g(x) = a \cdot b^{c(x-h)} + k$ , is pictured to the right. Use the graph to answer the following questions.

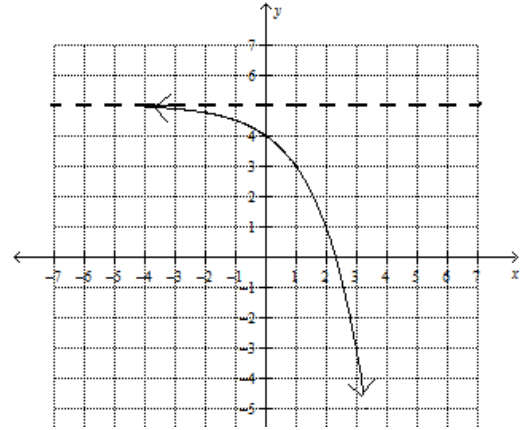
- a. Describe the behavior of  $g(x)$  as  $x \rightarrow -\infty$  and as  $x \rightarrow \infty$ .

$$\lim_{x \rightarrow -\infty} g(x) = 5$$

+1/2

$$\lim_{x \rightarrow \infty} g(x) = -\infty$$

+1/2



- b. Is  $g(x)$  an exponential growth or decay? Explain your reasoning.

$g(x)$  is decreasing +1

$\therefore g(x)$  is exponential decay. +1

- c. What is the value of  $k$ ? Explain your reasoning.

$g(x)$  has a horizontal asymptote at  $y = 5$  +1

$$\therefore k = 5 \quad +1$$

- d. What can be concluded about the value of  $a$ ? Explain your reasoning.

$g(x)$  is below the HA. +1

$$\therefore a < 0 \quad +1$$

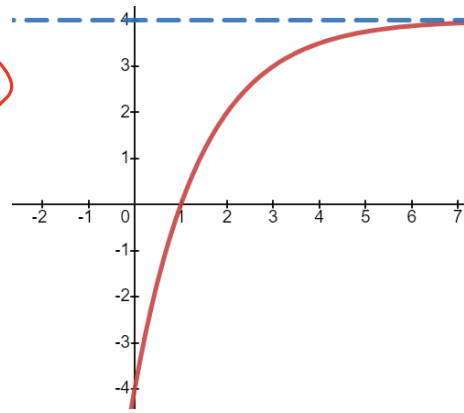
- e. What can be concluded about the value of  $c$ ? Explain your reasoning.

$$\lim_{x \rightarrow \infty} g(x) = -\infty \quad +1$$

$$\therefore c > 0 \quad +1$$

1. The graph of an exponential function,  $f(x) = a(b)^{c(x-h)} + k$ , is pictured to the right. Which of the following statements is/are true?

- I. The range of  $f(x)$  is  $(4, \infty)$ . *False,  $(-\infty, 4)$*
- II. The value of  $k$  is 4. *True, HA @  $y=4$*
- III. The value of  $a < 0$ . *True, below*



- A. I only
- B. II only
- C. III only
- D. II and III only**
- E. I, II, and III

2. What is the range of the graph of the exponential function  $f(x) = -(2)^{-(x+4)} + 5$ ?

- A.  $(-\infty, 4)$
- B.  $(4, \infty)$
- C.  $(-\infty, 5)$
- D.  $(5, \infty)$
- E. None of these

*HA @  $y=5$*

*$a < 0 \therefore f$  is below HA*

3. Which of the following statements can be made about the graph of  $G(x) = -(2)^{-x-7} - 1$ ?

I. The graph of  $G(x)$  has a horizontal asymptote at  $y = 7$ . *False, HA @  $y = -1$*

II. The function is an example of an exponential growth function. *True,  $\rightarrow$*

III. The range of  $G(x)$  is  $(-1, \infty)$ . *False*

A. I only

B. II only

C. I and III only

D. III only

E. I, II and III

4. Completely simplify the following expression using the properties of exponents  $\sqrt{\frac{b^{4n+2} \cdot b^{n-3}}{b^{n-5}}}$ .  *$2-3+5$*

A.  $b^{n+2}$

B.  $b^{n-3}$

C.  $b^{2n+2}$

D.  $b^{2n-7}$

E.  $b^{\sqrt{2n+2}}$

$$\begin{aligned}
 &= \left( b^{(4n+2)+(n-3)-(n-5)} \right)^{1/2} \\
 &= \left( b^{4n+4} \right)^{1/2} \\
 &= b^{2n+2}
 \end{aligned}$$

The table of values below represent the graph of an exponential function,  $H(x) = a \cdot b^{cx} + k$ . Use the table to answer questions 5 – 6.

$x$	-7	-4	-1	2	5	8	11
$H(x)$	-125	-13	1	2.75	2.969	2.996	2.999

5. Which of the following statements is/are true?

*limit = 3  
x → ∞*

- I. ~~False~~ As  $x \rightarrow -\infty$ , the graph of  $H(x)$  increases without bound. *decreases going left*
- II. *True* As  $x \rightarrow \infty$ , the graph of  $H(x)$  increases with bound.
- III. *True*  $H(x)$  represents an exponential growth because the graph is increasing

- A. I only
- B. II only
- C. I and II only
- D. II and III only**
- E. I, II and III

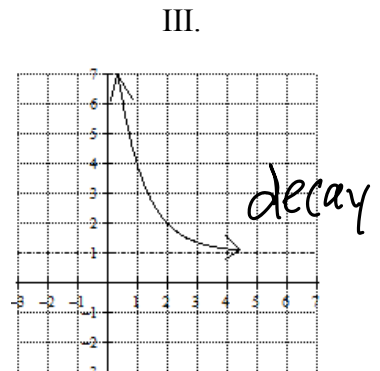
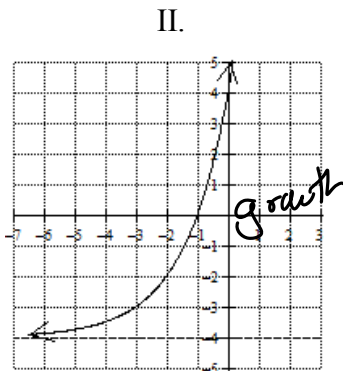
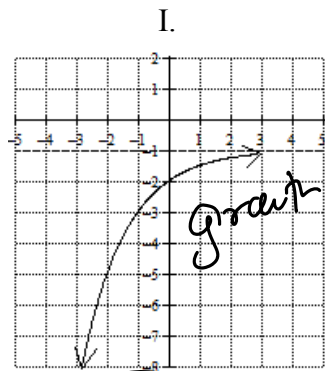
6. Which of the following statements is/are true about the equation of  $H(x)$ ?

*False (-∞, 3)*

- I. The value of  $c > 0$ . *False towards left*
- II. The value of  $k = 3$ . *True*
- III. The graph of  $H(x)$  has a range of  $(3, \infty)$ .

- A. I and II only
- B. II and III only
- C. I only
- D. II only**
- E. I, II and III

7. Which of the following are examples of exponential decay functions?



- A. III only**
- B. I and II only
- C. I and III only
- D. II and III only
- E. I, II, and III