

SCORE: \_\_\_\_ / 111 POINTS

**NO CALCULATORS ALLOWED**

- YOU MUST SHOW LOGICAL, NEAT AND ORGANIZED WORK TO EARN FULL CREDIT (NO GUESS & CHECK)
- IT MUST BE CLEAR HOW YOU ARRIVED AT YOUR ANSWER
- ALL FRACTIONS MUST BE IN SIMPLEST FORM

Fill in the blanks. Write "UNDEFINED" if the value does not exist. **YOU DO NOT NEED TO SHOW WORK.** SCORE: \_\_\_\_ / 30 PTS

$\log_5 5^{-8} = -8$

$\log_3 81 = 4$

$4^{\log_4 0} = \text{UNDEFINED}$

$\log_8 1 = 0$

$7^{\log_7 9} = 9$

$\log_2 \frac{1}{8} = -3$

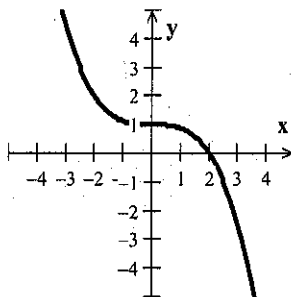
$\log 100,000 = 5$

$\log_6(-36) = \text{UNDEFINED}$

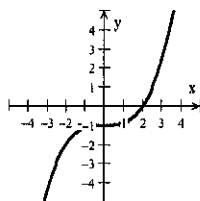
For the logarithm curve  $f(x) = \log_5 x$ , as the value of  $x \rightarrow 0$ , the value of  $y \rightarrow -\infty$ For the exponential curve  $f(x) = \left(\frac{2}{3}\right)^x$ , as the value of  $x \rightarrow \infty$ , the value of  $y \rightarrow 0$ 

Circle the graph of the inverse of the following function.

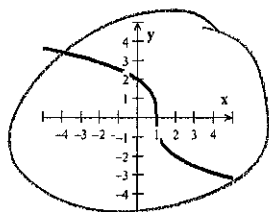
SCORE: \_\_\_\_ / 6 PTS



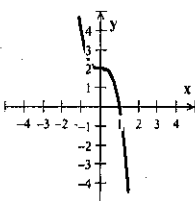
[a]



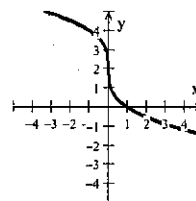
[b]



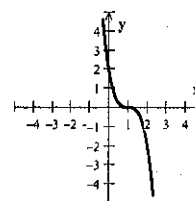
[c]



[d]



[e]

Circle the asymptote of  $f(x) = 7^x$ .

SCORE: \_\_\_\_ / 3 PTS

[a]  $x = 0$ [b]  $y = 7$ [c]  $y = 0$ [d]  $x = 7$ 

[e] none of the above

Circle the range of  $f(x) = (0.5)^x$ .

SCORE: \_\_\_\_ / 3 PTS

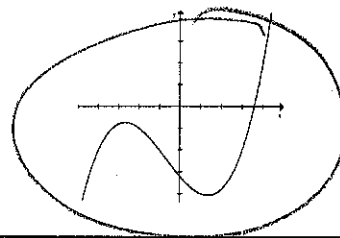
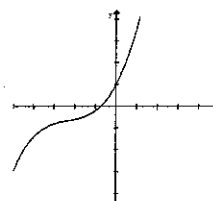
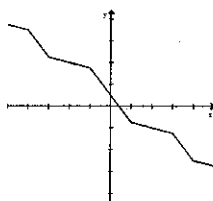
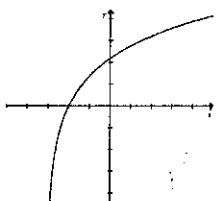
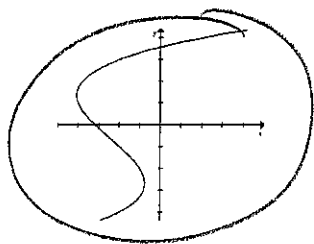
[a]  $\{y = 0\}$ [b]  $\{y > 0\}$ [c]  $\{x > 0.5\}$ [d]  $\{x > 0\}$ [e]  $\mathbb{R}$ Circle the domain of  $f(x) = \left(\frac{3}{2}\right)^x$ .

SCORE: \_\_\_\_ / 3 PTS

[a]  $\{y = 0\}$ [b]  $\{y > 0\}$ [c]  $\{x > \frac{3}{2}\}$ [d]  $\{x > 0\}$ [e]  $\mathbb{R}$

Circle the **two** graphs below which **DO NOT** represent one-to-one functions.

SCORE: \_\_\_\_ / 6 PTS



➡➡➡➡ PUT EACH FINAL ANSWER IN THE SPACE PROVIDED ⬅️⬅️⬅️⬅️

Write  $\log 40 - \log 4 + \log 2$  as the logarithm of a single quantity. **SHOW PROPER WORK.**

SCORE: \_\_\_\_ / 6 PTS

$$\begin{aligned} &= \log \frac{40}{4} + \log 2 \\ &= \log 10 + \log 2 \\ &= \log (10 \times 2) = \log 20 \end{aligned}$$

FINAL ANSWER:  $\log 20$

Find the domain of the function  $f(x) = 9 - \frac{3}{4x+5}$ . **SHOW PROPER WORK.**

SCORE: \_\_\_\_ / 6 PTS

$$\begin{aligned} 4x+5 &\neq 0 \\ 4x &\neq -5 \\ x &\neq -\frac{5}{4} \end{aligned}$$

FINAL ANSWER:  $\{x \neq -\frac{5}{4}\}$

Find the range of the function  $f(x) = 9 + \sqrt{2-x}$ . **SHOW PROPER WORK.**

SCORE: \_\_\_\_ / 6 PTS

$$\begin{aligned} \sqrt{2-x} &\geq 0 \\ 9 + \sqrt{2-x} &\geq 9 + 0 \\ y &\geq 9 \end{aligned}$$

FINAL ANSWER:  $\{y \geq 9\}$

Find the inverse of the function  $f(x) = 8 - 2\sqrt{x+1}$ . **SHOW PROPER WORK.**

SCORE: \_\_\_\_ / 9 PTS

$$\begin{aligned} x &= 8 - 2\sqrt{y+1} \\ x - 8 &= -2\sqrt{y+1} \\ \frac{x-8}{-2} &= \sqrt{y+1} \end{aligned}$$

$$\left(\frac{x-8}{-2}\right)^2 = y+1 \quad y = \left(\frac{x-8}{-2}\right)^2 - 1$$

FINAL ANSWER:  $\left(\frac{x-8}{-2}\right)^2 - 1$

Write  $\log \frac{a^5}{md^7}$  as the sums and/or differences and/or multiples of logarithms of single variables.

SCORE: \_\_\_\_ / 6 PTS

$$\begin{aligned}\log a^5 - \log md^7 \\&= 5 \log a - (\log m + \log d^7) \\&= 5 \log a - (\log m + 7 \log d)\end{aligned}$$

$$= 5 \log a - \log m - 7 \log d$$

FINAL ANSWER:  $5 \log a - \log m - 7 \log d$

Solve for  $x$ :  $4^{x+2} = 8^{2x+8}$ . SHOW PROPER WORK. CHECK YOUR ANSWER(S).

SCORE: \_\_\_\_ / 9 PTS

$$(2^2)^{x+2} = (2^3)^{2x+8}$$

$$4^{-5+2} = 4^{-3} = \frac{1}{64}$$

$$2(x+2) = 3(2x+8)$$

$$8^{2(-5)+8} = 8^{-2} = \frac{1}{64}$$

$$2x+4 = 6x+24$$

$$-4x = 20$$

$$x = -5$$

FINAL ANSWER:  $x = -5$

Solve for  $x$ :  $3 - 2 \log_9 x = 2$ . SHOW PROPER WORK. CHECK YOUR ANSWER(S).

SCORE: \_\_\_\_ / 9 PTS

$$-2 \log_9 x = -1$$

$$3 - 2 \log_9 3$$

$$\log_9 x = \frac{1}{2}$$

$$= 3 - 2\left(\frac{1}{2}\right)$$

$$x = 9^{\frac{1}{2}} = \sqrt{9} = 3$$

$$= 3 - 1$$

$$= 2$$

FINAL ANSWER:  $x = 3$

Solve for  $x$ :  $\log_2(6x+7) - \log_2(x+1) = 3$ . SHOW PROPER WORK. CHECK YOUR ANSWER(S).

SCORE: \_\_\_\_ / 9 PTS

$$\log_2 \frac{6x+7}{x+1} = 3$$

$$\log_2(6(-\frac{1}{2})+7) - \log_2(-\frac{1}{2}+1)$$

$$\frac{6x+7}{x+1} = 2^3 = 8$$

$$= \log_2 4 - \log_2 \frac{1}{2}$$

$$6x+7 = 8x+8$$

$$= 2 - -1$$

$$-2x = 1$$

$$= 3$$

$$x = -\frac{1}{2}$$

FINAL ANSWER:  $x = -\frac{1}{2}$