

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

$7^{\log_7 9} = 9$

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

$\log 100,000 = 5$

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

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

$\log_3 81 = 4$

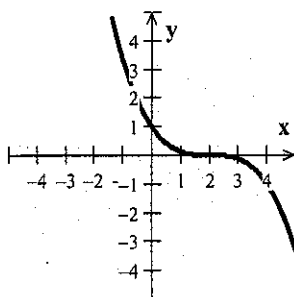
$4^{\log_4 0} = \text{UNDEFINED}$

$\log_8 1 = 0$

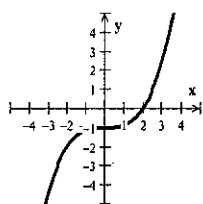
For the exponential curve $f(x) = \left(\frac{2}{3}\right)^x$, as the value of $x \rightarrow \infty$, the value of $y \rightarrow 0$ For the logarithm curve $f(x) = \log_5 x$, as the value of $x \rightarrow 0$, the value of $y \rightarrow -\infty$

Circle the graph of the inverse of the following function.

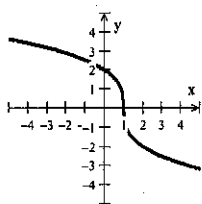
SCORE: ____ / 6 PTS



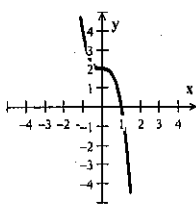
[a]



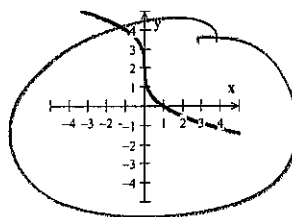
[b]



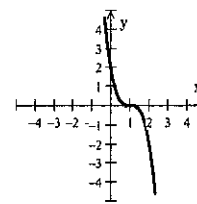
[c]



[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

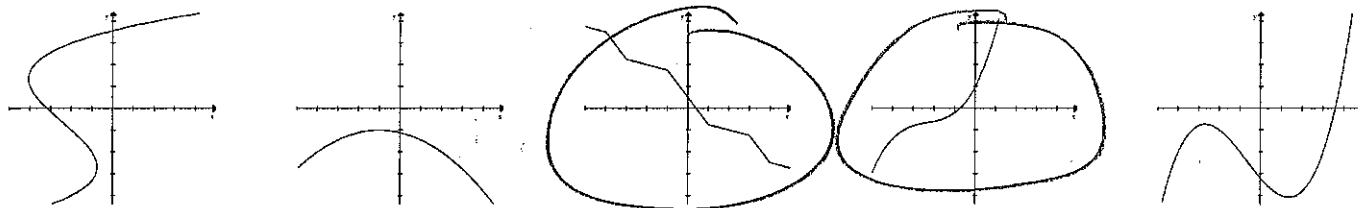
[a] $\{y = 0\}$ [b] $\{y > 0\}$ [c] $\{x > 0.5\}$ [d] $\{x > 0\}$ [e] \mathbb{R} Circle the domain of $f(x) = \left(\frac{3}{2}\right)^x$.

SCORE: ____ / 3 PTS

[a] $\{y = 0\}$ [b] $\{y > 0\}$ [c] $\{x > \frac{1}{2}\}$ [d] $\{x > 0\}$ [e] \mathbb{R}

Circle the two graphs below which 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

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

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

$$\begin{aligned} x &= 8 - 2\sqrt{y+1} \\ x-8 &= -2\sqrt{y+1} \\ \frac{x-8}{-2} &= \sqrt{y+1} \\ \left(\frac{x-8}{-2}\right)^2 &= y+1 \\ y &= \left(\frac{x-8}{-2}\right)^2 - 1 \end{aligned}$$

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

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

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

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

$$3 - 2 \log_9 3$$

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

$$= 3 - 1$$

$$= 2$$

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

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

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

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

$$-2x = 1$$

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

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

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

$$= 2 - -1$$

$$= 3$$

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