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a b c d e

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GOOD LUCK!

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For grading use:

Number Correct	
(out of 20 problems)	

Total	
(out of 100 points)	

Multiple Choice Questions

*Show all your work on the page where the question appears.
Clearly mark your answer both on the cover page on this exam
and in the corresponding questions that follow.*

1. Find an equation for a line whose slope is 11 that goes through the point (3, 7).

Possibilities:

- (a) $y = 11(x - 3) + 7$
- (b) $y = 7(x - 3) - 11$
- (c) $y = 3(x + 11) - 7$
- (d) $y = 11(x + 7) + 3$
- (e) $y = 11(x - 3)^2 + 7$

2. Which of these points (x, y) is on the graph $y = \log_{13}(x - 5) + 11$?

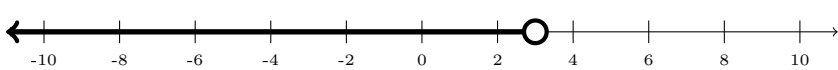
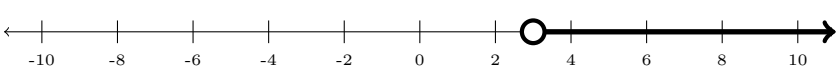
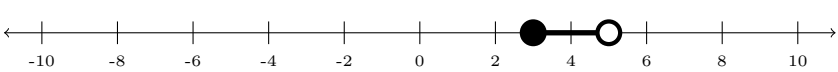
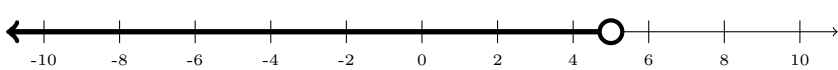
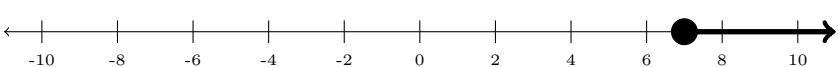
You may use the fact that $(1, 0)$ is on the graph of $y = \log_{13}(x)$.

Possibilities:

- (a) (0, 1)
- (b) (13, 16)
- (c) (11, 5)
- (d) (5, 0)
- (e) (6, 11)

3. What is the domain of $\log_7(x - 3) + 5$?

Possibilities:

- (a) 
- (b) 
- (c) 
- (d) 
- (e) 

4. Consider $f(x) = 2(3^x)$. What is the end behavior on the left?

Possibilities:

- (a) $y \rightarrow \infty$ as $x \rightarrow -\infty$
- (b) $y \rightarrow 0$ as $x \rightarrow -\infty$
- (c) $y \rightarrow 3$ as $x \rightarrow -\infty$
- (d) $y \rightarrow -\infty$ as $x \rightarrow -\infty$
- (e) $y \rightarrow 2$ as $x \rightarrow -\infty$

5. What is the y -intercept of $f(x) = 5 \log_2(x + 8) + 1$?

Possibilities:

- (a) 0
- (b) 16
- (c) 8
- (d) 6
- (e) 1

6. What asymptote does the graph of $y = \log_{999}(55 - x) + 7$ have and what is its equation?

Possibilities:

- (a) Vertical: $x = 0$
- (b) Vertical: $x = -999$
- (c) Horizontal: $y = 7$
- (d) Vertical: $x = 55$
- (e) Horizontal: $y = 999$

7. Write

$$2 \ln(x) - \frac{1}{3} \ln(y) + 4 \ln(z + 1)$$

as a single logarithm.

Possibilities:

(a) $\ln\left(\frac{x^2 \sqrt[3]{y}}{z^4}\right)$

(b) $\ln(2x - y + 4z + 4)$

(c) $\ln\left(\frac{x^2(z+1)^4}{\sqrt[3]{y}}\right)$

(d) $-\frac{2}{3} \ln\left(\frac{xy}{z+1}\right)$

(e) $\ln(x^2 - y^{1/3} + (z+1)^4)$

8. Solve $5x^3 = 40$.

Possibilities:

(a) 2 and -2

(b) 2 only

(c) $40/3 + \sqrt{5}$

(d) $\log_3(40)$

(e) $\log_{40}(5)$

9. Solve $3^x + 4 = 50$.

Possibilities:

(a) $8/3$

(b) $\frac{\sqrt[3]{50}}{4}$ only

(c) $\log_3(46)$ only

(d) $\log_3(50) - 4$ only

(e) 2 and -2

10. Solve $\log_3(x) = A$ for x assuming A is a real number.

Possibilities:

- (a) $x = \sqrt{3}$
- (b) $x = A^3$
- (c) $x = 3A/\log$
- (d) $x = \sqrt[3]{A}$
- (e) $x = 3^A$

11. Solve $\log_3(x) - \log_3(4) = \log_3(5)$.

Possibilities:

- (a) $x = \sqrt[3]{9}$
- (b) $x = 3$
- (c) $x = 3^{5/4}$
- (d) $x = 5/4$
- (e) $x = 20$

12. Solve $\ln(x + 9) - \ln(x + 2) = \ln(4)$ for x .

Possibilities:

- (a) $x = 1/3$
- (b) $x = \sqrt{9/2}$
- (c) $x = \ln(9/2)$
- (d) $x = \ln(1/2)$
- (e) $x = \ln(3)$

-
13. How much 3% solution should be mixed with 13% solution in order to get 250g of 7% solution?
(While the amount of 13% solution is important, this question only asks for the amount of 3% solution.)

Possibilities:

- (a) 370g of 3% solution
- (b) 235g of 3% solution
- (c) 102g of 3% solution
- (d) 150g of 3% solution
- (e) 193g of 3% solution

-
14. Which function is an exponential function with initial value 99?

Possibilities:

- (a) $f(x) = 99x + 5$
- (b) $f(x) = 2(99)^x$
- (c) $f(x) = 99(25)^x$
- (d) $f(x) = (1/2)^{x/99}$
- (e) $f(x) = (25)^x + 99$

-
15. A town's population starts at 567 people and increases by 4 people each year. Which of these functions gives the population after t years?

Possibilities:

- (a) $f(t) = 567(.04)^t$
- (b) $f(t) = 567(1.04)^t$
- (c) $f(t) = 567(4)^t$
- (d) $f(t) = 4t + 567$
- (e) $f(t) = 567(0.96)^t$

16. A substance is decaying over time with a half-life of 3 years. How long before only 1% of it is left?

Possibilities:

- (a) 30 years
- (b) $\frac{\ln(3)}{\ln(0.01)}$ years
- (c) $\ln\left(\frac{2}{3}\right)$ years
- (d) $\frac{3}{10}$ years
- (e) $3\frac{\ln(0.01)}{\ln(1/2)}$ years

17. Let

$$f(x) = 5^x + 7$$

Compute $f(x+h) - f(x)$.

Possibilities:

- (a) $5^{x+h} - 5^x$
- (b) $5x + 7 + h$
- (c) $(5h + 7)/h$
- (d) $5 + h$
- (e) 5

18. Solve for x in the following system:
$$\begin{cases} 2x - y = 1 \\ 9x - 4y = 7 \end{cases}$$

Possibilities:

- (a) $x = 3$
- (b) $x = 2$
- (c) $x = 1$
- (d) no solution
- (e) $x = 9/4$

-
19. There are 95 calories in each Apple and 115 calories in each Banana. There are 2g of fiber in each Apple, and 3g of fiber in each Banana. Which system of equations can be solved to find how many Apples (A) and Bananas (B) should be selected to have a total of 2480 calories and 58 g of fiber?

Possibilities:

(a)
$$\begin{cases} A + B & = 2480 \\ 95A + 115B & = 58 \end{cases}$$

(b)
$$\begin{cases} A & = 95 + 2 + 2480 \\ B & = 115 + 3 + 58 \end{cases}$$

(c)
$$\begin{cases} A + B & = 1 \\ 210A + 5B & = 2538 \end{cases}$$

(d)
$$\begin{cases} 95A + 115B & = 2480 \\ 2A + 3B & = 58 \end{cases}$$

(e)
$$\begin{cases} 95A + 2B & = 2480 \\ 115A + 3B & = 58 \end{cases}$$

-
20. Let $f(x) = 2 \cdot 3^x$ and $g(x) = \log_3(x)$. Which of these is a formula for $(f \circ g)(x)$, or $f(g(x))$?

Possibilities:

(a) $\log_3(x) + 2$

(b) $\ln(3^x)$

(c) $2x$

(d) $\log_3(x) \cdot 2^x$

(e) x

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