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GOOD LUCK!

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For grading use:

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|-------------------|----------------------|
| Number Correct | |
| | (out of 20 problems) |

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| Total | |
| | (out of 100 points) |

Name: _____

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 2 that goes through the point $(-3, -4)$.

Possibilities:

- (a) $y - 4 = 2(x - 3)$
 - (b) $y + 4 = 2(x + 3)$
 - (c) $y - 2 = -3(x + 4)$
 - (d) $y = 2x + 4$
 - (e) $y + 3 = 2(x + 4)$
-

2. The point $(2, 3)$ is on the graph of which of the following equations?

Possibilities:

- (a) $y = \log_x(8)$
 - (b) $y = 2x + 3$
 - (c) $y = (x - 2)(x - 3)$
 - (d) $y = \log_8(x)$
 - (e) $y = \log_9(x)$
-

3. What is the domain of $\log(x - 3)$?

Possibilities:

- (a) $[3, \infty)$
 - (b) $(-\infty, 3)$
 - (c) $(-\infty, 3]$
 - (d) $(-\infty, \infty)$
 - (e) $(3, \infty)$
-

4. Consider $f(x) = 2 \log_3(x)$. What is the end behavior on the right?

Possibilities:

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

5. What is y -intercept of $f(x) = 9 \log_8(x + 8) + 1$?

Possibilities:

- (a) 0
- (b) 8
- (c) 1
- (d) 10
- (e) 9

6. What asymptote does the graph of $y = \log_2(x - 3) + 4$ have and what is its equation?

Possibilities:

- (a) Vertical: $x = 3$
 - (b) Horizontal: $y = 4$
 - (c) Vertical: $x = -3$
 - (d) Vertical: $x = 2$
 - (e) Horizontal: $y = 2$
-

7. Write

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

as a single logarithm.

Possibilities:

(a) $\ln\left(\frac{8xy}{3z}\right)$

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

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

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

(e) $-\frac{2}{3} \ln\left(\frac{xy}{z}\right)$

8. Solve $x^3 = 8$.

Possibilities:

(a) 2 and -2

(b) $8/3$

(c) 2 only

(d) $\log_3(8)$

(e) $\log_8(3)$

9. Solve $3^x = 8$.

Possibilities:

(a) 2 and -2

(b) $8/3$

(c) 2 only

(d) $\log_3(8)$

(e) $\log_8(3)$

10. Solve $\log_3(x) = 2$.

Possibilities:

- (a) 8
- (b) 9
- (c) $\sqrt{3}$
- (d) $\sqrt[3]{2}$
- (e) 6

11. Solve $\log_3(4) + \log_3(x) = 2$.

Possibilities:

- (a) 5
- (b) 2
- (c) 4
- (d) 9
- (e) $9/4$

12. Solve $(\sqrt{7})^x = 1.1$. Give an exact answer.

Possibilities:

- (a) $\ln(\sqrt{7})/\ln(1.1)$
- (b) $(1.1)^{1/\sqrt{7}}$
- (c) $(\sqrt{1.1})^{1/7}$
- (d) $(\ln 7)^{1.1}$
- (e) $\ln(1.1)/\ln(\sqrt{7})$

13. Solve $\log_x(5) = 3$.

Possibilities:

- (a) $\sqrt[5]{3}$
- (b) $\sqrt[3]{5}$
- (c) 3^5
- (d) 5^3
- (e) $\log_3(5)$

14. Find an equation for an exponential function whose initial value is 2 that goes through the point $(1/2, 10)$.

Possibilities:

- (a) $f(x) = 16x + 2$
- (b) $f(x) = 2(10)^x$
- (c) $f(x) = 2(1/2)^x$
- (d) $f(x) = 2(25)^x$
- (e) $f(x) = (25)^x + 2$

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

Possibilities:

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

-
16. A substance is decaying over time with an annual decay factor of $3/4$. When will half of the substance be left?

Possibilities:

- (a) $\frac{\ln(1/2)}{\ln(3/4)}$ years
- (b) 2 years
- (c) $\frac{\ln(3/4)}{\ln(1/2)}$ years
- (d) $\ln\left(\frac{2}{3}\right)$ years
- (e) $\frac{3}{8}$ years

-
17. Let

$$f(x) = 3x - 4$$

Compute $\frac{f(x+h) - f(x)}{h}$.

Possibilities:

- (a) $1 + h$
- (b) $3x - 4 + h$
- (c) $3x - 4h$
- (d) 3
- (e) $(3h - 8)/h$

-
18. Solve for x in the following system:
$$\begin{cases} x + y & = 1 \\ 3x - 7y & = 7 \end{cases}$$

Possibilities:

- (a) $7/10$
- (b) 1
- (c) $7/5$
- (d) $3/7$
- (e) no solution

-
19. Food A contains 68 calories and 7 g of fiber. Food B contains 3 calories and 15 g of fiber. Set up a system of equations that could be solved to determine the number of food A and food B that should be eaten to obtain 949 calories and 175 g of fiber.

Possibilities:

(a)
$$\begin{cases} 68A + 3B = 949 \\ 7A + 15B = 175 \end{cases}$$

(b)
$$\begin{cases} 68A + 7B = 949 \\ 3A + 15B = 175 \end{cases}$$

(c)
$$\begin{cases} A = 68 + 3 + 949 \\ B = 7 + 15 + 175 \end{cases}$$

(d)
$$\begin{cases} A + B = 949 \\ 75A + 18B = 175 \end{cases}$$

(e)
$$\begin{cases} A + B = 1 \\ 71A + 22B = 1124 \end{cases}$$

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

Possibilities:

(a) x

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

(c) $\log_3(2) \cdot x + 1$

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

(e) $\log_2(x) + 3$

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