

Part I: Multiple Choice. Place the correct answer in the corresponding blank at the end of this section.

1. What is the exponential form of $\log_8 x = \pi$?

(A) $8^\pi = x$

(B) $8^x = \pi$

(C) $x^\pi = 8$

(D) $x^8 = \pi$

$$8^\pi = x$$

2. What is the logarithmic form of $3^{-2} = \frac{1}{9}$?

(A) $\log_3\left(\frac{1}{9}\right) = -2$

(B) $\log_{\frac{1}{3}}(3) = -2$

(C) $\log_3(-2) = \frac{1}{9}$

(D) $\log_{\frac{1}{3}}(-2) = 3$

$$\log_3\left(\frac{1}{9}\right) = -2$$

3. Evaluate: $\log_3 \frac{1}{81}$.

(A) -27

(B) -4

(C) $\frac{1}{4}$

(D) 4

$$y = \log_3 \frac{1}{81} \rightarrow 3^y = \frac{1}{81}$$

$$3^y = \frac{1}{3^4}$$

$$3^y = 3^{-4}$$

$$y = -4$$

4. What is the exponential form of $y = \log_{10} 50$?

(A) $50^y = 10$

(B) $10^y = 50$

(C) $y^{50} = 10$

(D) $y^{10} = 50$

$$10^y = 50$$

5. What is the logarithmic form of $y = \ln 20$? $y = \log_e 20$
- (A) $20^y = e$
- (B) $e^y = 20$ $e^y = 20$
- (C) $y^{20} = e$
- (D) $y^e = 20$

6. Evaluate the following: $\log_5 15625 = y$
- (A) 6 $5^y = 15625 \rightarrow y = 6$
- (B) 7
- (C) 8
- (D) 9 $5^y = 5^6$

7. Evaluate the following: $\log_{11} 1331 = y$
- (A) 0
- (B) 1 $11^y = 1331$
- (C) 2 $11^y = 11^3$
- (D) 3 $y = 3$

8. Evaluate the following: $\log_2 \frac{1}{8} = y$
- (A) 3
- (B) 0.25
- (C) -0.25
- (D) -3 $2^y = \frac{1}{8} \rightarrow y = -3$
- $2^y = \frac{1}{2^3}$
- $2^y = 2^{-3}$

**Part II: Constructed Response. Answer each question in the space provided.
Show all workings.**

9. Evaluate: $\log_2 16 + \log_{\frac{1}{3}} 27$

$$y = \log_2 16$$

$$2^y = 16$$

$$2^y = 2^4$$

$$y = 4$$

$$y = \log_{\frac{1}{3}} 27$$

$$\left(\frac{1}{3}\right)^y = 27$$

$$3^{-y} = 3^3$$

$$-y = 3$$

$$y = -3$$

$$4 + (-3) = 1$$

10. Evaluate $\log_7 343 - \log_2 128$

$$y = \log_7 343$$

$$7^y = 343$$

$$7^y = 7^3$$

$$y = 3$$

$$y = \log_2 128$$

$$2^y = 128$$

$$2^y = 2^7$$

$$y = 7$$

$$3 - 7 = -4$$