

Summative Assessment Exponential and Logarithmic Functions

Simplify.

1) $64^{-\frac{1}{2}}$

- A) 9 B) 8
C) 512 D) $\frac{1}{8}$

2) $81^{-\frac{5}{4}}$

- A) $\frac{1}{243}$ B) $\frac{1}{7}$
C) 49 D) $\frac{1}{7776}$

Write each expression in exponential form.

3) $(\sqrt[3]{4})^5$

- A) $4^{\frac{5}{3}}$ B) $2^{\frac{3}{2}}$
C) $7^{\frac{4}{3}}$ D) $5^{\frac{3}{2}}$

4) $\frac{1}{(\sqrt[3]{7})^4}$

- A) $7^{-\frac{4}{3}}$ B) $2^{-\frac{4}{5}}$
C) $5^{\frac{3}{2}}$ D) $7^{-\frac{5}{2}}$

Solve each equation.

5) $6^{2b} = 6^{-b-3}$

- A) $\{6\}$ B) $\{-1\}$
C) No solution. D) $\{-6\}$

6) $4^{3v-1} = 4^{v-1}$

- A) $\{0\}$ B) $\left\{\frac{3}{4}\right\}$
C) $\{6\}$ D) $\{-4\}$

7) $6^{-3x} = 6^{2x}$

- A) $\{2\}$ B) $\{0\}$
C) $\{-1\}$ D) $\left\{\frac{6}{7}\right\}$

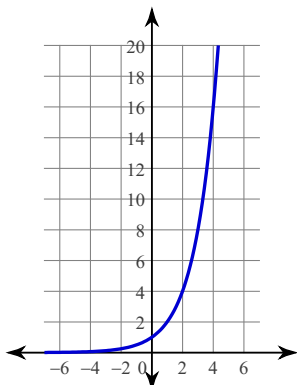
8) $2^{-2n-2} = 8$

- A) $\left\{-\frac{5}{2}\right\}$ B) $\left\{\frac{3}{2}\right\}$
C) $\left\{\frac{4}{7}\right\}$ D) $\{4\}$

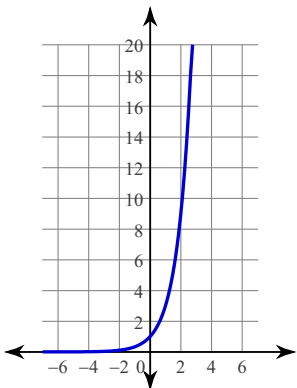
Sketch the graph of each function.

9) $y = \left(\frac{1}{2}\right)^x$

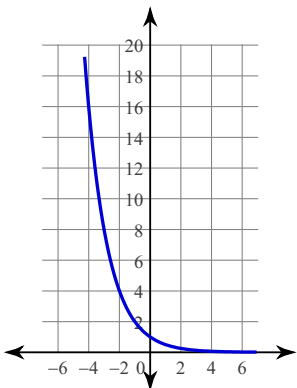
A)



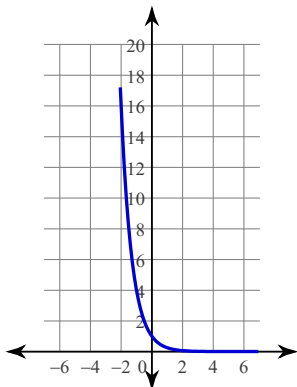
B)



C)

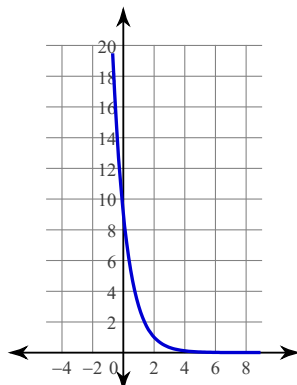


D)

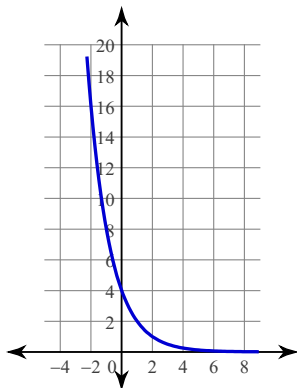


10) $y = \left(\frac{1}{4}\right)^{x-1}$

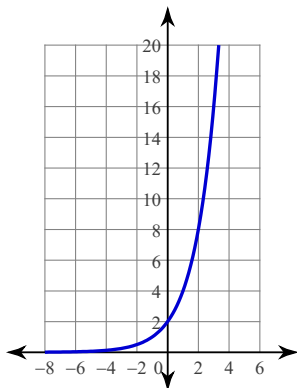
A)



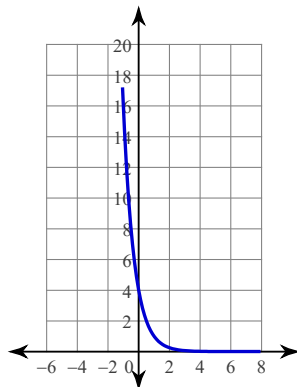
B)



C)

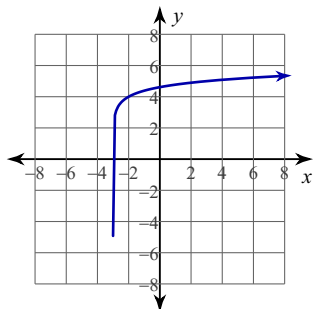


D)

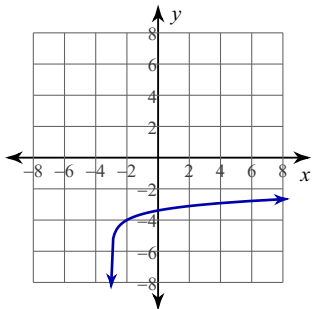


11) $y = \log_6 (x + 3) - 4$

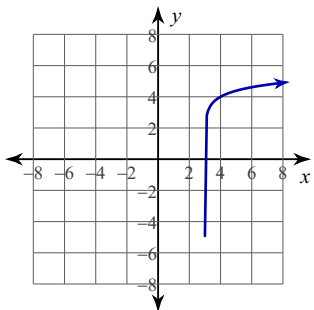
A)



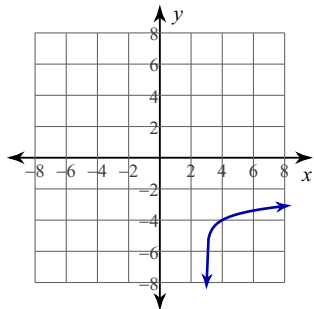
B)



C)

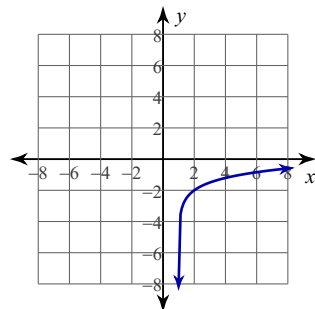


D)

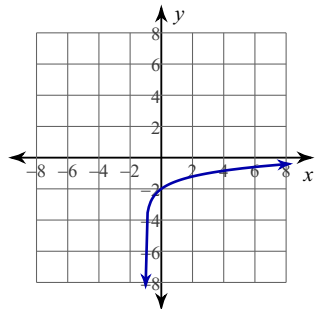


12) $y = \log_4 (x - 1) - 2$

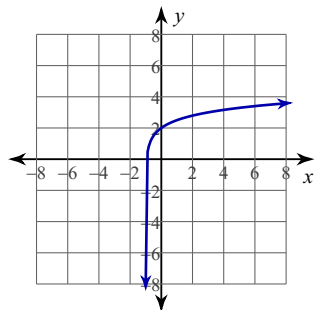
A)



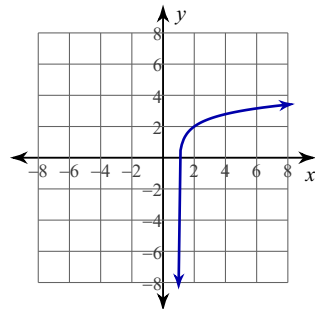
B)



C)



D)



Identify the domain and range of each.

13) $y = \log_4 (x + 6) - 4$

- A) Domain: All reals
Range: $x > 6$
- B) Domain: $x < -6$
Range: All reals
- C) Domain: $x > -6$
Range: All reals
- D) Domain: $x > 6$
Range: All reals

14) $y = \log_5 (x - 1) - 1$

- A) Domain: $x < -1$
Range: All reals
- B) Domain: $x > -1$
Range: All reals
- C) Domain: All reals
Range: $x < 1$
- D) Domain: $x > 1$
Range: All reals

Rewrite each equation in logarithmic form.

15) $17^0 = 1$

- A) $\log_{17} 0 = 1$
- B) $\log_1 17 = 0$
- C) $\log_{17} 1 = 0$
- D) $\log_0 17 = 1$

16) $256^{-\frac{1}{2}} = \frac{1}{16}$

- A) $\log_{-\frac{1}{2}} \frac{1}{16} = 256$
- B) $\log_{256} \frac{1}{16} = -\frac{1}{2}$
- C) $\log_{\frac{1}{16}} -\frac{1}{2} = 256$
- D) $\log_{-\frac{1}{2}} 256 = \frac{1}{16}$

17) $\left(\frac{1}{3}\right)^4 = \frac{1}{81}$

- A) $\log_{\frac{1}{3}} \frac{1}{81} = 4$
- B) $\log_{\frac{1}{3}} 4 = \frac{1}{81}$
- C) $\log_4 \frac{1}{3} = \frac{1}{81}$
- D) $\log_{\frac{1}{81}} 4 = \frac{1}{3}$

18) $17^{-2} = \frac{1}{289}$

- A) $\log_{\frac{1}{289}} 17 = -2$
- B) $\log_{-2} 17 = \frac{1}{289}$
- C) $\log_{17} -2 = \frac{1}{289}$
- D) $\log_{17} \frac{1}{289} = -2$

Evaluate each expression.

19) $\log_2 \frac{1}{8}$

- A) $-\frac{1}{3}$ B) 3
C) $\frac{1}{3}$ D) -3

20) $\log_{\frac{1}{4}} \frac{1}{64}$

- A) $\frac{1}{16}$ B) -3
C) $\frac{1}{3}$ D) 3

Condense each expression to a single logarithm.

21) $\log_6 11 + \frac{\log_6 7}{2} + \frac{\log_6 3}{2}$

- A) $\log_6 (11\sqrt{21})$
B) $\log_6 \sqrt{231}$
C) $\log_6 (3^9 \cdot 7^3)$
D) $\log_6 (21 \cdot 11^3)$

22) $3\log_6 u - 18\log_6 v$

- A) $\log_6 \frac{u^3}{v^{18}}$ B) $\log_6 (v^{18}u^3)$
C) $\log_6 \frac{u^{18}}{v^3}$ D) $\log_6 (w^6\sqrt[3]{u})$

Expand each logarithm.

23) $\log_4 \left(\frac{u}{v^4} \right)^6$

- A) $24\log_4 u + 6\log_4 v$
B) $6\log_4 u - 24\log_4 v$
C) $24\log_4 u - 6\log_4 v$
D) $4\log_4 u + 6\log_4 v$

24) $\log_5 (x \cdot y \cdot z^5)$

- A) $\log_5 x + \log_5 y + 5\log_5 z$
B) $5\log_5 x - 25\log_5 y$
C) $\log_5 z + \frac{\log_5 x}{2} + \frac{\log_5 y}{2}$
D) $5\log_5 z + \frac{\log_5 x}{2}$

Simplify. Your answer should contain only positive exponents with no fractional exponents in the denominator.

25) $x^{-\frac{1}{4}}y^{\frac{3}{2}} \cdot 4x^{\frac{3}{2}}y^{\frac{3}{2}}$

- A) $\frac{2x^{\frac{1}{2}}y^{\frac{1}{2}}}{x^3}$ B) $\frac{6x^{\frac{1}{4}}}{x^2}$
C) $4y^3x^{\frac{5}{4}}$ D) $4y^{\frac{7}{3}}$

26) $\left(x^{-\frac{2}{3}} \cdot yx^{-2} \right)^{-\frac{5}{3}}$

- A) $\frac{x^{\frac{1}{4}}}{yx^3}$ B) $\frac{x^{\frac{19}{12}}}{y}$
C) $\frac{x^{\frac{40}{9}}y^{\frac{1}{3}}}{y^2}$ D) $\frac{y^{\frac{1}{6}}}{y^2}$

Simplify.

27) $8\sqrt[5]{256uv^2}$

A) $14u\sqrt[5]{8v^2}$

C) $12uv\sqrt[5]{5u^3v^2}$

B) $8u\sqrt[5]{8v^2}$

D) $16\sqrt[5]{8uv^2}$

28) $5\sqrt[3]{750u^2v}$

A) $25\sqrt[3]{6u^2v}$

B) $-20v\sqrt[3]{3u^2v}$

C) $-60u^2\sqrt[3]{u^2v}$

D) $-4\sqrt[3]{60uv^2}$

Use a calculator to approximate each to the nearest thousandth.

29) $\log_2 4.8$

A) 1.3

B) 3.174

C) 2.263

D) 2.151

30) $\log_6 1.5$

A) -0.089

B) 0.226

C) 0.355

D) 0.097

Solve each equation. Round your answers to the nearest ten-thousandth.

31) $12^{4v} = 90$

A) 0.4527

B) 0.4886

C) No solution.

D) 1.125

32) $2^{x+9} = 95$

A) -7.0223

B) -4.4781

C) -4.4461

D) -2.4301

Solve each equation.

33) $\log_7 -7x = 1$

A) $\left\{\frac{1}{40}\right\}$

B) $\left\{\frac{193}{64}\right\}$

C) $\left\{\frac{20736}{5}\right\}$

D) $\{-1\}$

34) $\log_{16} (2a + 9) = \log_{16} (4a + 5)$

A) $\left\{\frac{10}{7}\right\}$

B) $\left\{-\frac{4}{15}\right\}$

C) $\{2\}$

D) $\{4\}$

35) $\log_8 (x - 6) - \log_8 x = 2$

A) $\left\{-\frac{2}{21}, 15\right\}$

B) $\left\{-\frac{3}{79}\right\}$

C) No solution.

D) $\left\{-\frac{2}{21}\right\}$

36) $\log_9 (x - 1) - \log_9 x = 2$

A) No solution.

B) $\left\{-\frac{1}{80}\right\}$

C) $\{2\}$

D) $\left\{\frac{1}{182}\right\}$

Solve each equation. Round your answers to the nearest ten-thousandth.

37) $7e^{7x} - 0.6 = 88.4$

A) 0.3632

B) 0.1441

C) No solution.

D) 0.1578

Answers to Summative Assessment Exponential and Logarithmic Functions

- | | | | |
|-------|-------|-------|-------|
| 1) D | 2) A | 3) A | 4) A |
| 5) B | 6) A | 7) B | 8) A |
| 9) C | 10) D | 11) B | 12) A |
| 13) C | 14) D | 15) C | 16) B |
| 17) A | 18) D | 19) D | 20) D |
| 21) A | 22) A | 23) B | 24) A |
| 25) C | 26) C | 27) D | 28) A |
| 29) C | 30) B | 31) A | 32) D |
| 33) D | 34) C | 35) C | 36) A |
| 37) A | | | |