Worksheet A: (Topic 2.4) Exponential Function Manipulation Name: Solutions

Directions: Rewrite each of the following exponential functions in the equivalent general form $y = ab^x$, where a and b are positive constants.

1. $f(x) = 7^{x-2}$

   $f(x) = 7^2 \cdot 7^x = 49 \cdot 7^x$

2. $g(x) = 5^{x-1}$

   $g(x) = 5^{-1} \cdot 5^x = \frac{1}{5} \cdot 5^x$

3. $h(x) = 2^{x-3}$

   $h(x) = 2^3 \cdot 2^x = 8 \cdot 2^x$

4. $k(x) = 3^{x-3}$

   $k(x) = 3^{-3} \cdot 3^x = \frac{1}{27} \cdot 3^x$

5. $p(x) = 2 \cdot 4^{-x-1}$

   $p(x) = 2 \cdot 4^{-1} \cdot 4^x = \frac{2}{4} \cdot 4^x = \frac{1}{2} \cdot 4^x$

6. $m(x) = 3^{2x}$

   $m(x) = (3^2)^x = 9^x$

7. $r(x) = 4^{x/2}$

   $r(x) = \left(4^{1/2}\right)^x = 2^x$

8. $n(x) = 8^{x/3}$

   $n(x) = \left(8^{1/3}\right)^x = 2^x$

9. $s(x) = 5 \cdot 2^{3x}$

   $s(x) = 5(2^3)^x = 5 \cdot 8^x$

10. Which of the following functions is an equivalent form of the function $f(x) = 4 \cdot 36^x$?

(A) $f(x) = 2 \cdot 6^{x/2}$

(B) $f(x) = 2 \cdot 6^{2x}$

(C) $f(x) = 4 \cdot 6^{x/2}$

(D) $f(x) = 4 \cdot 6^{2x}$

11. Which of the following functions is an equivalent form of the function $g(x) = 5 \cdot 3^{2x}$?

(A) $g(x) = 45^x$

(B) $g(x) = 5 \cdot 9^x$

(C) $g(x) = 25 \cdot 3^x$

(D) $g(x) = 25 \cdot 9^x$

12. The function h is given by $h(x) = 9 \cdot 4^{x/2}$. Which of the following is an equivalent form for $h(x)$?

(A) $h(x) = 6 \cdot 2^x$

(B) $h(x) = 9 \cdot 2^x$

(C) $h(x) = 18 \cdot 2^x$

(D) $h(x) = 9 \cdot 16^x$

13. The function k is given by $k(x) = a^2 \cdot 4^x$, where a is a positive constant. Which of the following is an equivalent form for $k(x)$?

(A) $k(x) = a \cdot 2^{(x/2)}$

(B) $k(x) = a^2 \cdot 2^{(x/2)}$

(C) $k(x) = a \cdot 16^{(x/2)}$

(D) $k(x) = a^2 \cdot 16^{(x/2)}$

14. Which of the following functions is an equivalent form of the function $p(x) = 3^{-2x}$?

(A) $p(x) = -9^{-x}$

(B) $p(x) = 9^{-x}$

(C) $p(x) = -\left(\frac{1}{9}\right)^x$

(D) $p(x) = \left(\frac{1}{9}\right)^x$

15. The function m is given by $m(x) = 8 \cdot 9^{(x/3)}$. Which of the following is an equivalent form for $m(x)$?

(A) $m(x) = 2 \cdot 3^x$

(B) $m(x) = 2 \cdot \sqrt[3]{9}^{-x}$

(C) $m(x) = 8 \cdot 3^x$

(D) $m(x) = 8 \cdot \sqrt[3]{9}^{-x}$