

Algebra 2

Homework—Operations of Functions

Name: _____

Find each of the following functions.

1. Let $f(x) = 2x - 5$ and $g(x) = x^2 - 3x - 10$.

a. $(f + g)(x)$

a. _____

b. $(f - g)(x)$

b. _____

c. $(fg)(x)$

c. _____

d. $\left(\frac{f}{g}\right)(x)$

d. _____

2. Let $f(x) = x^2 - 8x + 16$ and $g(x) = 4x - 7$.

a. $(f + g)(x)$

a. _____

b. $(f - g)(x)$

b. _____

c. $(fg)(x)$

c. _____

d. $\left(\frac{f}{g}\right)(x)$

d. _____

3. Let $f(x) = 6x^{\frac{1}{3}}$ and $g(x) = -8x^{\frac{1}{3}}$.

a. $(f + g)(x)$

a. _____

b. $(f - g)(x)$

b. _____

c. $(fg)(x)$

c. _____

d. $\left(\frac{f}{g}\right)(x)$

d. _____

For questions 4-8, simplify each expression.

4. $\sqrt[3]{6x^{10}} \cdot \sqrt[3]{36x^{11}}$

4. _____

5. $\sqrt[4]{x^3} \cdot \sqrt[3]{x}$

5. _____

6. $\frac{\sqrt[4]{64m^{15}}}{\sqrt[4]{4m^3}}$

6. _____

7. $\frac{4^{-7} \cdot \sqrt[3]{72m^{13}}}{4^{-9} \cdot \sqrt[3]{9m^7}}$

7. _____

8. $\frac{\left(9m^{\frac{1}{6}}\right)^2}{27m^{\frac{3}{4}}}$

8. _____

9. Which of the following expressions is equivalent to $8m^2$?

9. _____

a. $\frac{8^{-4} \cdot \sqrt[3]{m^{15}}}{8^{-3} \cdot \sqrt[3]{m^9}}$

b. $\frac{\left(4m^{\frac{2}{5}}\right)^3}{8m^{\frac{7}{10}}}$

c. $\frac{1}{\left(16^{\frac{1}{4}}m^{\frac{2}{3}}\right)^{-3}}$

d. $\frac{12 \cdot \sqrt[3]{3m^8}}{\sqrt[3]{81m^2}}$

10. Explain which student's work and claim is correct:

Student #1:

Claim: $y^{\frac{4}{3}} = \left(\sqrt[4]{y}\right)^3$

Work: $\left(y^{\frac{1}{4}} \cdot y^{\frac{1}{4}} \cdot y^{\frac{1}{4}}\right)$
 $\left(\sqrt[4]{y} \cdot \sqrt[4]{y} \cdot \sqrt[4]{y}\right)$
 $\left(\sqrt[4]{y}\right)^3$

Student #2:

Claim: $y^{\frac{4}{3}} = \sqrt[3]{y^4}$

Work: $(y \cdot y \cdot y \cdot y)^{\frac{1}{3}}$
 $\sqrt[3]{y \cdot y \cdot y \cdot y}$
 $\sqrt[3]{y^4}$