

Review

Find each sum or difference.

1. $(7x^2 + 2x - 5) - (4x^2 - 2x + 5) = 3x^2 + 4x - 10$

2. $(20k^6 + 4k^4 - 3) + (k^7 - 4k^4 + 6) = k^7 + 20k^6 + 3$

3. $(9b^4 - 12b^2 + 10) - (3b^4 + b^2 - 2b) = 6b^4 - 13b^2 + 2b + 10$

Find each product.

4. $(a - 3)(6a^4 + a + 1) = 6a^5 - 18a^4 + a^2 - 2a - 3$

5. $(x^2 - 1)(4x^2 + x) = 4x^4 + x^3 - 4x^2 - x$

6. $(2y + 6)^2 = 4y^2 + 24y + 36$

Factor the numerator and denominator, and simplify each expression.

~~X~~ $\frac{4x - 12}{x^2 - 9} = \underline{\hspace{2cm}}$

~~X~~ $\frac{x^2 + 4x - 5}{x - 1} = \underline{\hspace{2cm}}$

~~X~~ $\frac{x^2 + 4x + 4}{2x^2 + 6x + 4} = \underline{\hspace{2cm}}$

Choose the best answer.

10. Which of the following is equivalent

to $\frac{x^2 + 4x^2 - 8}{x + 2}$?

A. $x^2 + 2x - 4$

B. $\frac{x^2 + 2x - 4 + 16}{x + 2}$

C. $x^2 + 2x - 13$

D. $\frac{x^2 + 2x - 13 + 16}{x + 2}$

11. Which of the following is not always equal to a polynomial?

A. the sum of two polynomials

B. the difference of two polynomials

C. the product of two polynomials

D. the quotient of two polynomials

Find the inverse of each relation. Write function or not a function to describe each inverse relation.

23. $y = 5x - 2$ $x = 5y - 2$

$$f^{-1}(x) = \frac{x+2}{5}$$

24. $y = x^2 - 3$ $x = y^2 - 3$

$$f^{-1}(x) = \sqrt{x+3}$$

25. $y = 16x^2$ $x = 16y^2$

$$f^{-1}(x) = \sqrt{\frac{x}{16}} = \frac{\sqrt{x}}{4}$$

26. $y = \frac{5}{x}$ $\frac{x}{1} = \frac{5}{y} \Rightarrow \frac{1}{x} = \frac{5}{y}$

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

Compose each pair of functions to determine whether they are inverses. Show your work. Then, write *inverses* or *not inverses*.

27. $f(x) = 2x + 6$ and $g(x) = \frac{1}{2}x - 6$

$f(g(x)) =$ _____

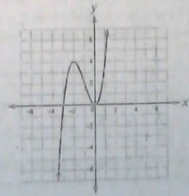
$g(f(x)) =$ _____

28. $f(x) = \sqrt[3]{x-1}$ and $g(x) = x^3 + 1$

$f(g(x)) =$ _____

$g(f(x)) =$ _____

Use the provided graph to solve problems 29 and 30.



29. Is the graphed relation a function? Explain.

yes - vertical line test

30. Is the inverse of the graphed relation a function? Explain.

NO - It will fail the vertical line test

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$$1. \quad 7x^3 + 2x - 5 - 4x^3 + 2x - 5$$

$$= 3x^3 + 4x - 10$$

$$2. \quad 20k^6 + 4k^4 - 3 + k^7 - 4k^4 + 6$$

$$= k^7 + 20k^6 + 3$$

$$3. \quad 9b^4 - 12b^2 + 10 - 3b^4 - b^2 + 2b$$

$$= 6b^4 - 13b^2 + 2b + 10$$

$$4. \quad \begin{array}{r} 6a^4 \quad a \quad 1 \\ a \quad \begin{array}{|c|c|c|} \hline 6a^5 & a^2 & a \\ \hline \end{array} \\ -3 \quad \begin{array}{|c|c|c|} \hline -18a^4 & -3a & -3 \\ \hline \end{array} \end{array}$$

$$5. \quad x^2 - 1$$

$$4x^2 \quad \begin{array}{|c|c|} \hline 4x^4 & -4x^2 \\ \hline \end{array}$$

$$x \quad \begin{array}{|c|c|} \hline x^3 & -x \\ \hline \end{array}$$

$$6. \quad 2y \quad 6$$

$$2y \quad \begin{array}{|c|c|} \hline 4y^2 & 12y \\ \hline \end{array}$$

$$6 \quad \begin{array}{|c|c|} \hline 12y & 36 \\ \hline \end{array}$$

$$10. \quad -2 \left| \begin{array}{cccc} 1 & 4 & 0 & -8 \\ \downarrow & -2 & -4 & 8 \\ \hline 1 & 2 & -4 & 0 \end{array} \right.$$

$$12. \begin{array}{r} 1x^3y^0 \\ 3x^2y^1 \\ 3x^1y^2 \\ 1x^0y^3 \end{array} = x^3 + 3x^2y + 3xy^2 + y^3$$

$$13. \begin{array}{r} 1x^3y^0 \\ -3x^2y^1 \\ 3x^1y^2 \\ -1x^0y^3 \end{array} = x^3 - 3x^2y + 3xy^2 - y^3$$

$$14. \begin{array}{r} 1x^6z^0 \\ 6x^5z^1 \\ 15x^4z^2 \\ 20x^3z^3 \\ 15x^2z^4 \\ 6xz^5 \\ 1x^0z^6 \end{array} = x^6 + 12x^5z + 60x^4z^2 + 160x^3z^3 + 240x^2z^4 + 192xz^5 + 64z^6$$

$$15. \begin{array}{r} 1a^7b^0c^0 \\ -7a^6b^1c^0 \\ 21a^5b^2c^0 \\ -35a^4b^3c^0 \\ 35a^3b^4c^0 \\ -21a^2b^5c^0 \\ 7a^1b^6c^0 \\ -1a^0b^7c^0 \end{array} = a^7 - 7a^6b + 21a^5b^2 - 35a^4b^3 + 35a^3b^4 - 21a^2b^5 + 7ab^6 - b^7$$

$$16. \begin{array}{r} 1x^3y^0z^0 \\ 3x^2y^1z^0 \\ 3x^1y^2z^0 \end{array} = x^3 + 9x^2y + 27xy^2 + 27y^3$$

$$17. \quad \begin{array}{r} 1x^4 4^0 = x^4 - 16x^3 + 96x^2 - 256x + 256 \\ - 4x^3 4^1 \\ 6x^2 4^2 \\ - 4x 4^3 \\ 1x^0 4^4 \end{array}$$

$$18. \quad \begin{array}{r} x \quad 10 \quad A = l.w \\ x^2 \begin{array}{|c|c|} \hline x^3 & 10x^2 \\ \hline \end{array} \\ -3 \begin{array}{|c|c|} \hline -3x & -30 \\ \hline \end{array} \end{array} = x^3 + 7x^2 - 30$$

$$19. \quad \begin{array}{r} -1 \quad 4 \quad -2 \quad -1 \quad 6 \\ \downarrow \quad -4 \quad 6 \quad -9 \\ \hline 4 \quad -6 \quad 5 \quad 1 \end{array}$$

$$20. \quad \begin{array}{r} 6x - 4 + \frac{x-5}{x^2-2} \\ x^2-2 \overline{) 6x^3 - 4x^2 - 11x + 3} \\ \underline{-6x^2 + 0x^2 + 12x} \\ -4x^2 + x + 3 \\ \underline{+4x - 8} \\ x - 5 \end{array}$$

$$21. \quad \begin{array}{r} 3x^2 - 4x + 4 \quad + \quad \frac{5x-6}{x^2+x+2} \\ x^2+x+2 \overline{) 3x^4 - x^3 + 2x^2 + x + 2} \\ \underline{3x^4 + 3x^3 + 2x^2} \\ -4x^3 + 0x^2 + x \\ \underline{+4x^3 + 4x^2 + 8x} \end{array}$$

$$\begin{array}{r}
 22. \quad \begin{array}{l} x^3 + 2x^2 - 1 \quad | \quad 2x^3 + 3x^2 - 2x + 9 \\ \underline{-2x^3 + 4x^2 + 0x + 2} \\ -x^2 - 2x + 11 \end{array}
 \end{array}$$

$$\begin{aligned}
 27. \quad f(g(x)) &= 2\left(\frac{1}{2}x - 6\right) + 6 \\
 &= x - 12 + 6 \\
 &= x - 6 \quad \text{NOT Inverses}
 \end{aligned}$$

$$\begin{aligned}
 g(f(x)) &= \frac{1}{2}(2x + 6) - 6 \\
 &= x + 3 - 6 \\
 &= x - 3
 \end{aligned}$$

$$\begin{aligned}
 28. \quad f(g(x)) &= \sqrt[3]{(x^3 + 1) - 1} \\
 &= \sqrt[3]{x^3} \\
 &= x \quad \text{yes Inverses}
 \end{aligned}$$

$$\begin{aligned}
 g(f(x)) &= (\sqrt[3]{x - 1})^3 + 1 \\
 &= x - 1 + 1 \\
 &= x
 \end{aligned}$$