Review

Find each sum or difference.

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

- $\frac{4x - 12}{x^2 - 9} =$ _____
- $\frac{x^2 + 4x - 5}{x - 1} =$ _____
- $\frac{x^2 + 4x + 4}{2x^2 + 6x + 4} =$ _____

Choose the best answer.

10. Which of the following is equivalent to $\frac{x^3 + 4x^2 - 8}{x + 2}$?
    - 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. $y = \frac{5}{x}$ $\frac{x}{1} = \frac{5}{y} \Rightarrow \frac{1}{x} = \frac{y}{5}$

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

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 $g(x) = \frac{1}{2}x - 6$

$f(g(x)) =$ _____

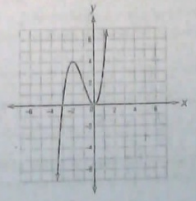
$g(f(x)) =$ _____

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

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

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

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

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

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

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

4.

	$6a^4$	a	1
a	$6a^5$	a^2	a
-3	$-18a^4$	$-3a$	-3

5.

	x^2	-1
$4x^2$	$4x^4$	$-4x^2$
x	x^3	$-x$

6.

	$2y$	6
$2y$	$4y^2$	$12y$
6	$12y$	36

10.

$$\begin{array}{r|cccc} -2 & 1 & 4 & 0 & -8 \\ & \downarrow & -2 & -4 & 8 \\ \hline & 1 & 2 & -4 & 0 \end{array}$$

12. $1\,x^3y^0 = x^3+3x^2y+3xy^2+y^3$
$3\,x^2y^1$
$3\,x^1y^2$
$1\,x^0y^3$

13. $1\,x^3y^0 - x^3-3x^2y+3xy^2-y^3$
$-3\,x^2y^1$
$3\,x^1y^2$
$-1\,x^0y^3$

14. $1\;\;x^6z^0 = x^6+12x^5+60x^4+160x^3+240x^2+192x+64$
$6\;\;x^5z^1$
$15\;x^4z^2$
$20\;x^3z^3$
$15\;x^2z^4$
$6\;x^1z^5$
$1\;x^0z^6$

15. $1\;\;a^7\,1^0 = a^7-7a^6+21a^5-35a^4+35a^3-21a^2+7a-1$
$-7\;\;a^6\,1^1$
$21\;a^5\,1^2$
$-35\;a^4\,1^3$
$35\;a^3\,1^4$
$-21\;a^2\,1^5$
$7\;\;a^1\,1^6$
$-1\;a^0\,1^7$

16. $1\;x^3\,3^0y^0 = x^3+9x^2y+27xy^2+27y^3$
$3\;x^2\,3^1y^1$
$3\;x^1\,3^2y^2$

17. $1x^4 4^0 - 4x^3 4^1 + 6x^2 4^2 - 4x^1 4^3 + 1x^0 4^4 = x^4 - 16x^3 + 96x^2 - 256x + 256$

18.

	x	10
x^2	x^3	$10x^2$
-3	$-3x$	-30

$A = l \cdot w$

$= x^3 + 7x^2 - 30$

19.

-1	4	-2	-1	6
	$\downarrow$	-4	6	-5
	4	-6	5	1

20. $x^2 - 2 \overline{)\, 6x^3 - 4x^2 - 11x + 3}$

$6x - 4 + \frac{x - 5}{x^2 - 2}$

$-6x^3 + 0x^2 + 12x$

$-4x^2 + x + 3$

$+4x \quad 5 \quad 0x \quad 8$

$x - 5$

21. $x^2 + x + 2 \overline{)\, 3x^4 - x^3 + 2x^2 + x + 2}$

$3x^2 - 4x + 4 + \frac{5x - 6}{x^2 + x + 2}$

$-3x^4 + 3x^3 + 2x^2$

$-4x^3 + 0x^2 + x$

$+4x^3 + 4x^2 + 8x$

22.

$$x^3+2x^2-1 \;\big|\; 2x^3+3x^2-2x+9$$

$$-2x^3-4x^2+0x+2$$

$$-x^2-2x+11$$

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

$= x-12+6$

$= x-6$ NOT Inverses

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

$x+3-6$

$= x-3$

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

$= \sqrt[3]{x^3}$

$= x$ yes Inverses

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

$= x-1+1$

$= x$