UNIT 3

Greek Discoveries

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3.1

The Distributive Property and Division

Just as the distributive property is used for multiplication, it can also be used for division.

In algebra, division is usually written in fractional form and the divisor (denominator) distributed to each term in the numerator. Each term in the numerator must be divided by the denominator.

Example 1 **Divide: $(3x + 6) \div 3$.**

$\frac{3x + 6}{3}$ Original problem set up as a fraction.

$\frac{3x}{3} + \frac{6}{3}$ Division distributed to each term in the numerator.

$\frac{\overset{1}{\cancel{3}x}}{\underset{1}{\cancel{3}}} + \frac{\overset{2}{\cancel{6}}}{\underset{1}{\cancel{3}}}$ Factors canceled.

$x + 2$ Simplified.

Example 2 **Divide: $(8x^2 - 6x + 36) \div (-2)$.**

$\frac{8x^2 - 6x + 36}{-2}$ Original problem set up as a fraction.

$\frac{8x^2}{-2} - \frac{6x}{-2} + \frac{36}{-2}$ Division distributed to each term in the numerator.

$\frac{\overset{4}{\cancel{8}x^2}}{\underset{1}{\cancel{-2}}} - \frac{\overset{3}{\cancel{6}x}}{\underset{1}{\cancel{-2}}} + \frac{\overset{18}{\cancel{36}}}{\underset{1}{\cancel{-2}}}$ Factors canceled.

$-4x^2 + 3x - 18$ Simplified.

Remember that the negative sign still remains, so denominators after canceling are –1.

Example 3 **Divide: $(15xy^2 - y^4 + 12) \div 3xy^2$.**

$\frac{15xy^2 - y^4 + 12}{3xy^2}$ Original problem set up as a fraction.

$\frac{15xy^2}{3xy^2} - \frac{y^4}{3xy^2} + \frac{12}{3xy^2}$ Division distributed to each term in the numerator.

$\frac{\overset{5}{\cancel{15}}\cancel{xy^2}}{\underset{1}{\cancel{3}}\cancel{xy^2}} - \frac{\overset{y^2}{\cancel{y^4}}}{\underset{1}{\cancel{3}}\cancel{xy^2}} + \frac{\overset{4}{\cancel{12}}}{\underset{1}{\cancel{3}}\cancel{xy^2}}$ Factors canceled.

$5 - \frac{y^2}{3x} + \frac{4}{xy^2}$ Simplified.

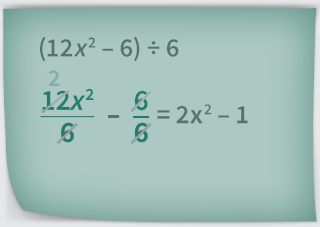
Math in History

Thales was a Greek mathematician, philosopher, and astronomer who lived around 600 years before Christ. He is said to have predicted the total solar eclipse that occurred on May 28, 585 B.C. This is the first record of someone predicting an eclipse.

When a term is negative and is divided by a negative term, the quotient is positive.

$\frac{\overset{4}{\cancel{8}x^2}}{\underset{1}{\cancel{-2}}} - \frac{\overset{3}{\cancel{6}x}}{\underset{1}{\cancel{-2}}} = -4x^2 + 3x$

Problems do not need to be rewritten in fractional form. However, it is easier to verify that each term in the dividend is divided by the divisor when rewritten as a fraction.



Today's Lesson

Simplify.

1. $(5x - 10) \div 5$

2. $(12x + 8) \div -4$

3. $(24x - 18y + 27) \div 3$

4. $(4z^2 - 2z) \div 2z$

5. $(4k^2 + 6k) \div 2k$

6. $(16x^3 + 4x^2 - 20x) \div -4x$

7. $(4x - 8) \div 2x$

8. $(6p^3 + 2p) \div 3p$

9. $(3x^2y + 6y^2) \div 2xy$

10. $(-7x^6y^3 - 21x^4y^2) \div -7x^3y^2$

REVIEW

Solve. 2.14

11. $4x - 17 = -1$

12. $-3x - 10 = 35$

13. $12x - 6 = 54$

14. $7 + 4y = 31$

Lesson 3.1

Simplify. 2.12

15. $\sqrt[3]{x^3}$ _____ **16.** $\sqrt{\frac{9}{16}}$ _____ **17.** $\sqrt{36}$ _____ **18.** $\sqrt[5]{-1}$ _____

Combine like terms in the expressions. 2.7

19. $8xyz + 6xy - xyz$ **20.** $-2x^2y + 5x^2y - x^2$ **21.** $9n - 4n - n + n^2$

Multiply the terms. 2.8

22. $xz \bullet xyz^2 \bullet 5x$ **23.** $-12y^4 \bullet 12z^5$ **24.** $-xyz \bullet -z \bullet 4xy$

Simplify. 2.7, 2.11

25. $2yz(7yz + 3z^2)$ **26.** $5(y^2 - y + 2) - 3y - 8$

Divide the terms. 2.9

27. $63x^{14}y^2 \div -54yz^3$ **28.** $x^3yz^4 \div x^2y^3z$ **29.** $-97xyz \div 97xyz$

Solve. 1.7

30. $9.5 \bullet 0.04$ **31.** $12 - 0.08$ **32.** $4.8 \div 0.06$ **33.** $35 + 8.07$

Assign variable(s) to the unknown(s), then translate the expression. 2.13

34. one-third the product of the base and height _____

35. double the sum of the length and width _____

Translate into symbols. Do not simplify or solve. 2.2, 2.6

36. a number equals seven more than six divided by another number _____

37. the quotient of forty-eight and eight, diminished by the square of a number _____

38. the square of two, times the difference of ten and five, equals a number plus two _____

Write the name of the property each equation illustrates. 1.3

39. $b \cdot 1 = b$ _____

40. $(9 + 11) + 7 = 9 + (11 + 7)$ _____

41. $n + (-n) = 0$ _____

Write the word(s) for each definition.

42. the number above the radical sign that indicates the root called for 2.12 _____

43. the number under the radical sign for which the root is found 2.12 _____

Today's Lesson

Simplify.

44. $(8x^2 - 2x) \div 2x$

45. $(3d - 1) \div 4d^2$

46. $(16x^2y + 18xy^2 + 20) \div 4xy$

Extra Practice

Simplify.

47. $(2n^2 - n^4) \div n^2$

48. $(3y^3 - 2y) \div 2y$

49. $(12x^2 - 4x + 28) \div 4$

50. $(32a^2b + 5ab - 8a^3) \div -4ab$

51. $(21a^2b - 9b + 3a) \div 3a$

52. $(22x^2y + 16xy - 8y) \div 2y$