Basic Operations with Real Numbers: Exercise Supplement*

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Abstract

This module is from Elementary Algebra by Denny Burzynski and Wade Ellis, Jr. The basic operations with real numbers are presented in this chapter. The concept of absolute value is discussed both geometrically and symbolically. The geometric presentation offers a visual understanding of the meaning of |x|. The symbolic presentation includes a literal explanation of how to use the definition. Negative exponents are developed, using reciprocals and the rules of exponents the student has already learned. Scientific notation is also included, using unique and real-life examples. This module contains the exercise supplement for the chapter "Basic Operations with Real Numbers".

1 Exercise Supplement

1.1 Signed Numbers (here[1])

For the following problems, find $-a$ if a is

Exercise 1 *(Solution on p. 7.)*

27

Exercise 2

-15

Exercise 3 *(Solution on p. 7.)*

$-\frac{8}{9}$

Exercise 4

$-(-3)$

Exercise 5 *(Solution on p. 7.)*

k

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[1]"Basic Operations with Real Numbers: Signed Numbers" <http://cnx.org/content/m18874/latest/>

1.2 Absolute Value (here[2])

Simplify the following problems.

Exercise 6
$|8|$

Exercise 7 *(Solution on p. 7.)*
$|-3|$

Exercise 8
$-|16|$

Exercise 9 *(Solution on p. 7.)*
$-(-|12|)$

Exercise 10
$-|0|$

1.3 AddItion of Signed Numbers (here[3]) - Multiplication and Division of Signed Numbers (here[4])

Simplify the following problems.

Exercise 11 *(Solution on p. 7.)*
$4+(-6)$

Exercise 12
$-16+(-18)$

Exercise 13 *(Solution on p. 7.)*
$3-(-14)$

Exercise 14
$(-5)(2)$

Exercise 15 *(Solution on p. 7.)*
$(-6)(-3)$

Exercise 16
$(-1)(-4)$

Exercise 17 *(Solution on p. 7.)*
$(4)(-3)$

Exercise 18
$\frac{-25}{5}$

Exercise 19 *(Solution on p. 7.)*
$\frac{-100}{-10}$

Exercise 20
$16-18+5$

Exercise 21 *(Solution on p. 7.)*
$\frac{(-2)(-4)+10}{-5}$

Exercise 22
$\frac{-3(-8+4)-12}{4(3+6)-2(-8)}$

[2] "Basic Operations with Real Numbers: Absolute Value" <http://cnx.org/content/m21876/latest/>
[3] "Basic Operations with Real Numbers: AddItion of Signed Numbers" <http://cnx.org/content/m21991/latest/>
[4] "Basic Operations with Real Numbers: Multiplication and Division of Signed Numbers" <http://cnx.org/content/m21872/latest/>

Exercise 23 *(Solution on p. 7.)*

$\frac{-1(-3-2)-4(-4)}{-13+10}$

Exercise 24

$-(2-10)$

Exercise 25 *(Solution on p. 7.)*

$0-6(-4)(-2)$

1.4 Multiplication and Division of Signed Numbers (here[5])

Find the value of each expression for the following problems.

Exercise 26

$P=R-C$. Find P if $R=3000$ and $C=3800$.

Exercise 27 *(Solution on p. 7.)*

$z=\frac{x-u}{s}$. Find z if $x=22, u=30$, and $s=8$.

Exercise 28

$P=n(n-1)(n-2)$. Find P if $n=-3$.

1.5 Negative Exponents (here[6])

Write the expressions for the following problems using only positive exponents.

Exercise 29 *(Solution on p. 7.)*

a^{-1}

Exercise 30

c^{-6}

Exercise 31 *(Solution on p. 7.)*

$a^3b^{-2}c^{-5}$

Exercise 32

$(x+5)^{-2}$

Exercise 33 *(Solution on p. 7.)*

$x^3y^2(x-3)^{-7}$

Exercise 34

$4^{-2}a^{-3}b^{-4}c^5$

Exercise 35 *(Solution on p. 7.)*

$2^{-1}x^{-1}$

Exercise 36

$(2x+9)^{-3}7x^4y^{-5}z^{-2}(3x-1)^2(2x+5)^{-1}$

Exercise 37 *(Solution on p. 7.)*

$(-2)^{-1}$

Exercise 38

$\frac{1}{x^{-4}}$

Exercise 39 *(Solution on p. 7.)*

$\frac{7x}{y^{-3}z^{-2}}$

[5] "Basic Operations with Real Numbers: Multiplication and Division of Signed Numbers" <http://cnx.org/content/m21872/latest/>

[6] "Basic Operations with Real Numbers: Negative Exponents" <http://cnx.org/content/m21882/latest/>

Exercise 40
$\frac{4c^{-2}}{b^{-6}}$

Exercise 41 *(Solution on p. 7.)*
$\frac{3^{-2}a^{-5}b^{-9}c^{2}}{x^{2}y^{-4}z^{-1}}$

Exercise 42
$\frac{(z-6)^{-2}}{(z+6)^{-4}}$

Exercise 43 *(Solution on p. 7.)*
$\frac{16a^{5}b^{-2}}{-2a^{3}b^{-5}}$

Exercise 44
$\frac{-44x^{3}y^{-6}z^{-8}}{-11x^{-2}y^{-7}z^{-8}}$

Exercise 45 *(Solution on p. 7.)*
8^{-2}

Exercise 46
9^{-1}

Exercise 47 *(Solution on p. 7.)*
2^{-5}

Exercise 48
$\left(x^{3}\right)^{-2}$

Exercise 49 *(Solution on p. 7.)*
$\left(a^{2}b\right)^{-3}$

Exercise 50
$\left(x^{-2}\right)^{-4}$

Exercise 51 *(Solution on p. 8.)*
$\left(c^{-1}\right)^{-4}$

Exercise 52
$\left(y^{-1}\right)^{-1}$

Exercise 53 *(Solution on p. 8.)*
$\left(x^{3}y^{-4}z^{-2}\right)^{-6}$

Exercise 54
$\left(\frac{x^{-6}}{y^{-2}}\right)^{-5}$

Exercise 55 *(Solution on p. 8.)*
$\left(\frac{2b^{-7}c^{-8}d^{4}}{x^{-2}y^{3}z}\right)^{-4}$

1.6 Scientific Notation (here[7])

Write the following problems using scientific notation.

Exercise 56
8739

Exercise 57 *(Solution on p. 8.)*
73567

Exercise 58
21,000

[7] "Basic Operations with Real Numbers: Scientific Notation" <http://cnx.org/content/m21879/latest/>

Exercise 59 *(Solution on p. 8.)*
746,000

Exercise 60
8866846

Exercise 61 *(Solution on p. 8.)*
0.0387

Exercise 62
0.0097

Exercise 63 *(Solution on p. 8.)*
0.376

Exercise 64
0.0000024

Exercise 65 *(Solution on p. 8.)*
0.000000000000537

Exercise 66
46,000,000,000,000,000

Convert the following problems from scientific form to standard form.

Exercise 67 *(Solution on p. 8.)*
3.87×10^5

Exercise 68
4.145×10^4

Exercise 69 *(Solution on p. 8.)*
6.009×10^7

Exercise 70
1.80067×10^6

Exercise 71 *(Solution on p. 8.)*
3.88×10^{-5}

Exercise 72
4.116×10^{-2}

Exercise 73 *(Solution on p. 8.)*
8.002×10^{-12}

Exercise 74
7.36490×10^{-14}

Exercise 75 *(Solution on p. 8.)*
2.101×10^{15}

Exercise 76
6.7202×10^{26}

Exercise 77 *(Solution on p. 8.)*
1×10^6

Exercise 78
1×10^7

Exercise 79 *(Solution on p. 8.)*
1×10^9

Find the product for the following problems. Write the result in scientific notation.

Exercise 80
$\left(1 \times 10^{5}\right)\left(2 \times 10^{3}\right)$

Exercise 81 *(Solution on p. 8.)*
$\left(3 \times 10^{6}\right)\left(7 \times 10^{7}\right)$

Exercise 82
$\left(2 \times 10^{14}\right)\left(8 \times 10^{19}\right)$

Exercise 83 *(Solution on p. 8.)*
$\left(9 \times 10^{2}\right)\left(3 \times 10^{75}\right)$

Exercise 84
$\left(1 \times 10^{4}\right)\left(1 \times 10^{5}\right)$

Exercise 85 *(Solution on p. 8.)*
$\left(8 \times 10^{-3}\right)\left(3 \times 10^{-6}\right)$

Exercise 86
$\left(9 \times 10^{-5}\right)\left(2 \times 10^{-1}\right)$

Exercise 87 *(Solution on p. 8.)*
$\left(3 \times 10^{-2}\right)\left(7 \times 10^{2}\right)$

Exercise 88
$\left(7.3 \times 10^{4}\right)\left(2.1 \times 10^{-8}\right)$

Exercise 89 *(Solution on p. 8.)*
$\left(1.06 \times 10^{-16}\right)\left(2.815 \times 10^{-12}\right)$

Exercise 90
$\left(9.3806 \times 10^{52}\right)\left(1.009 \times 10^{-31}\right)$

Solutions to Exercises in this Module

Solution to Exercise (p. 1)
-27
Solution to Exercise (p. 1)
$\frac{8}{9}$
Solution to Exercise (p. 1)
$-k$
Solution to Exercise (p. 2)
3
Solution to Exercise (p. 2)
12
Solution to Exercise (p. 2)
-2
Solution to Exercise (p. 2)
17
Solution to Exercise (p. 2)
18
Solution to Exercise (p. 2)
-12
Solution to Exercise (p. 2)
10
Solution to Exercise (p. 2)
$-\frac{18}{5}$
Solution to Exercise (p. 3)
-7
Solution to Exercise (p. 3)
-48
Solution to Exercise (p. 3)
-1
Solution to Exercise (p. 3)
$\frac{1}{a}$
Solution to Exercise (p. 3)
$\frac{a^3}{b^2c^5}$
Solution to Exercise (p. 3)
$\frac{x^3y^2}{(x-3)^7}$
Solution to Exercise (p. 3)
$\frac{1}{2x}$
Solution to Exercise (p. 3)
$\frac{1}{-2}$
Solution to Exercise (p. 3)
$7xy^3z^2$
Solution to Exercise (p. 4)
$\frac{c^2y^4z}{9a^5b^9x^2}$
Solution to Exercise (p. 4)
$-8a^2b^3$
Solution to Exercise (p. 4)
$\frac{1}{64}$
Solution to Exercise (p. 4)
$\frac{1}{32}$

Solution to Exercise (p. 4)
$\frac{1}{a^6b^3}$
Solution to Exercise (p. 4)
c^4
Solution to Exercise (p. 4)
$\frac{y^{24}z^{12}}{x^{18}}$
Solution to Exercise (p. 4)
$\frac{b^{28}c^{32}y^{12}z^4}{16d^{16}x^8}$
Solution to Exercise (p. 4)
7.3567×10^4
Solution to Exercise (p. 5)
7.46×10^5
Solution to Exercise (p. 5)
3.87×10^{-2}
Solution to Exercise (p. 5)
3.76×10^{-1}
Solution to Exercise (p. 5)
5.37×10^{-13}
Solution to Exercise (p. 5)
$387,000$
Solution to Exercise (p. 5)
$60,090,000$
Solution to Exercise (p. 5)
0.0000388
Solution to Exercise (p. 5)
0.000000000008002
Solution to Exercise (p. 5)
$2,101,000,000,000,000$
Solution to Exercise (p. 5)
$1,000,000$
Solution to Exercise (p. 5)
$1,000,000,000$
Solution to Exercise (p. 6)
2.1×10^{14}
Solution to Exercise (p. 6)
2.7×10^{78}
Solution to Exercise (p. 6)
2.4×10^{-8}
Solution to Exercise (p. 6)
2.1×10^1
Solution to Exercise (p. 6)
2.9839×10^{-28}