Exponent Rules and Scientific Notation

Product and quotient rules, zero and negative exponents, and powers of ten.

Name _____ Date _____

32 main · 2-up grid · 11 pages · visible side quests

Completion Reward

Shown here as a small pack artifact, not a preview destination.

1. Which expression is equivalent to x^3 * x^5?

A. x^15
B. x^8
C. 2x^8
D. x^2

1.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

1.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

1.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

1.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

1.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

2. Which expression is equivalent to 5y^7 / y^2?

A. 5y^9
B. 5y^3
C. y^5
D. 5y^5

2.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

2.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

2.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

2.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

2.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

3. What is 7r^0 equal to?

A. 0
B. 7
C. r
D. 7r

3.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

3.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

3.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

3.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

3.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

4. What does 10^3 mean?

A. 300
B. 30
C. 1000
D. 10^3 means 10 times 3

4.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

4.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

4.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

4.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

4.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

5. What is n^0 when n is nonzero?

A. 0
B. 1
C. n
D. -1

5.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

5.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

5.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

5.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

5.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

6. Write 6.3 x 10^4 as a standard number. Answer with a number.

6.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

6.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

6.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

6.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

6.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

7. Write 4,500,000 in scientific notation. What coefficient should appear before x 10^n? Answer with a number.

7.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

7.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

7.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

7.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

7.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

8. A student says x^2 + x^3 = x^5. What is the mistake?

A. The exponents should be multiplied to get x^6.
B. You should subtract the exponents to get x.
C. Exponents add when powers are multiplied, not when separate terms are added.
D. The expression should simplify to 2x^5.

8.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

8.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

8.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

8.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

8.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

9. Which expression is equivalent to n^-3?

A. -n^3
B. n^3
C. 1 / n^3
D. 1 / 3n

9.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

9.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

9.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

9.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

9.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

10. Which number is written in correct scientific notation?

A. 41 x 10^5
B. 0.41 x 10^7
C. 4.1 x 10^6
D. 4.1 x 6^10

10.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

10.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

10.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

10.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

10.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

11. Write 7.2 x 10^-3 as a decimal. Answer with a number.

11.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

11.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

11.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

11.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

11.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

12. Which expression is equivalent to 0.00052?

A. 5.2 x 10^-4
B. 5.2 x 10^4
C. 52 x 10^-5
D. 0.52 x 10^-3

12.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

12.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

12.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

12.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

12.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

13. Which expression is equivalent to 1 / k^4?

A. -k^4
B. k^4
C. k^-4
D. 1 / 4k

13.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

13.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

13.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

13.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

13.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

14. What is the best next step to simplify (12y^5) / (3y^2)?

A. Divide the coefficients and subtract the exponents on y
B. Add the coefficients and subtract the exponents on y
C. Multiply everything by y^2 first
D. Change y^5 / y^2 into y^7

14.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

14.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

14.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

14.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

14.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

15. What is the best next step to simplify (2a^3)(3a^2)?

A. Add the coefficients and multiply the exponents.
B. Subtract the exponents because the bases match.
C. Multiply the coefficients and add the exponents on a.
D. Distribute 2a^3 across 3 and a^2.

15.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

15.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

15.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

15.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

15.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

16. A student says z^6 / z^2 = z^3. What is the mistake?

A. They should add the exponents to get z^8.
B. They should multiply the exponents to get z^12.
C. They should subtract exponents: 6 - 2 = 4, not divide the exponents.
D. They forgot to change z into 1/z.

16.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

16.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

16.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

16.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

16.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

17. A student says x^-2 = -x^2. What is the mistake?

A. A negative exponent means reciprocal, not a negative sign in front.
B. They should add 2 to the exponent instead.
C. They should square first and then negate.
D. Negative exponents always equal 0.

17.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

17.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

17.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

17.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

17.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

18. A student says (x^2)^3 = x^5. What is the mistake?

A. They should subtract the exponents to get x^-1.
B. They should distribute the 3 only to the coefficient.
C. They should multiply the exponents, not add them.
D. The expression should stay as x^2^3.

18.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

18.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

18.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

18.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

18.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

19. Simplify (m^4)(m^2). Answer with your final expression.

19.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

19.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

19.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

19.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

19.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

20. Simplify (p^3)^4. Answer with your final expression.

20.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

20.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

20.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

20.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

20.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

21. Simplify a^9 / a^4. Answer with your final expression.

21.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

21.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

21.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

21.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

21.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

22. Simplify (4x^2)(5x^3). Answer with your final expression.

22.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

22.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

22.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

22.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

22.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

23. Simplify (2m^2)^3. Answer with your final expression.

23.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

23.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

23.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

23.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

23.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

24. Simplify (12y^5) / (3y^2). Answer with your final expression.

24.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

24.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

24.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

24.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

24.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

25. Rewrite 1 / p^3 using a negative exponent. Answer as an expression.

25.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

25.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

25.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

25.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

25.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

26. Write 0.00081 in scientific notation. Answer in scientific notation.

26.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

26.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

26.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

26.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

26.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

27. Which expression is equivalent to (2 x 10^3)(3 x 10^2)?

A. 5 x 10^6
B. 6 x 10^6
C. 6 x 10^1
D. 6 x 10^5

27.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

27.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

27.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

27.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

27.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

28. Which expression is equivalent to (8 x 10^6) / (2 x 10^2)?

A. 4 x 10^8
B. 4 x 10^4
C. 6 x 10^4
D. 4 x 10^3

28.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

28.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

28.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

28.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

28.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

29. Which student rewrote 52 x 10^4 correctly in normalized scientific notation?

A. Student B: 5.2 x 10^4
B. Student C: 52 x 10^5
C. Student D: 0.52 x 10^6
D. Student A: 5.2 x 10^5

29.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

29.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

29.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

29.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

29.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

30. Simplify (r^6 * r^2) / r^3. Answer with your final expression.

30.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

30.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

30.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

30.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

30.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

31. Simplify 3x^2 * x^4. Answer with your final expression.

31.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

31.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

31.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

31.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

31.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4

32. Which student work is valid?

A. Student B: a^4 + a^2 = a^6 because the bases match and the exponents add.
B. Student C: (a^4)^2 = a^6 because 4 + 2 = 6.
C. Student A: a^4 * a^2 = a^6 because the bases match and the exponents add.
D. Student D: a^4 / a^2 = a^2 / a^4 because quotient means flip both powers.

32.1. What is x^3 x x^4?

A. x^7
B. x^12
C. x^1
D. 2x^7

32.2. What is y^7 / y^2?

A. y^9
B. y^5
C. y^14
D. y^3

32.3. What is (a^3)^2?

A. a^5
B. a^6
C. 2a^3
D. a^9

32.4. What is x^-2?

A. -x^2
B. 1 / x^2
C. x / 2
D. 2 / x

32.5. Which is scientific notation for 4,500,000?

A. 4.5 x 10^6
B. 45 x 10^5
C. 0.45 x 10^7
D. 450 x 10^4