



Workout Section

1. Perform the following operation.

$$(-1)^{113} = \underline{-1}$$

2. Perform the following operation.

$$(-7)^0 = \underline{1}$$

3. Perform the following operation.

$$(-13)^2 = \underline{169}$$

4. Perform the following operation.

$$(-5)^3 = \underline{-125}$$

5. Write the following exponential expression as an expanded multiplication.

$$b^4 \underline{b \cdot b \cdot b \cdot b}$$

6. Determine the value of the following exponential expression.

$$4^4 = \underline{256}$$

7. Indicate the base and the exponent in the equation below.

$$a^b = c$$

base a

exponent b

8. Write the following exponential expression as an expanded multiplication.

$$6^4 \underline{6 \cdot 6 \cdot 6 \cdot 6}$$

9. Write the following multiplication with an exponent.

$$(9)(9)(9)(9)(9)(9)(9) = \underline{9^7}$$

10. Perform the following multiplication by writing the result with a single base and exponent.

$$(x^2)(x^7) = \underline{x^{2+7} = x^9}$$

11. Calculate the following multiplication.

$$(5)(5^2)(3^2)(3) = \underline{5^{1+2} \cdot 3^{2+1} = (5^3)(3^3)}$$

12. Calculate the following multiplication and write your answer in exponential form.

$$(5^9)(5^4) = \underline{5^{9+4} = 5^{13}}$$

13. Calculate the following multiplication and write your answer in exponential form.

$$(60^3)(60) = \underline{60^{3+1} = 60^4}$$

14. Perform the following multiplication by writing the result with a single base and exponent.

$$(t^{30})(t^{200}) = \underline{t^{30+200} = t^{230}}$$

15. Write the following number with a positive exponent.

$$7^{-5} = \underline{\frac{1}{7^5}}$$

16. Perform the following division. Write your answer with a positive exponent.

$$\frac{y^{20}}{y^{34}} = \underline{y^{-14} = \frac{1}{y^{14}}}$$

17. Write the following number with a positive exponent.

$$y^{-100} = \underline{\frac{1}{y^{100}}}$$

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18. Perform the following division. Write your answer with a positive exponent.

$$\frac{x^8}{x^3} = \frac{x^{8-3}}{x} = x^5$$

19. Write the following number with a positive exponent.

$$\frac{1}{4^{-50}} = 4^{50}$$

20. Using only positive exponents, simplify the expression $(27c^8z^{-2})^{-1}$.

$$\frac{z^2}{27c^8}$$

21. Using only positive exponents, simplify the expression $\left(\frac{d^9x^{12}}{11}\right)^2$.

$$\frac{d^{18}x^{24}}{11^2}$$

22. Using only positive exponents, simplify the expression $(r^{13})^4$.

$$r^{52}$$

23. Using only positive exponents, simplify the expression $\left(\frac{a^8b^{24}}{x^{18}}\right)^0$.

$$= 1$$

24. Using only positive exponents, simplify the expression $(p^3s^7)^5$.

$$p^{15}s^{35}$$

25. What is the product of $(4xy)(2y)$?

$$8xy^2$$

26. What is the product of $(12x^{-5}y)(3xy^2)$?

$$36x^{-4}y^3$$

27. What is the product of $(a^{20})(a^{-30})$?

$$a^{-10}$$

28. What is the product of $(5b^5c)(2bc)$?

$$10b^6c^2$$

29. What is the product of $(5^9)(5^{-3})$?

$$5^6$$

30. Perform the indicated operation and simplify if necessary $\left(\frac{3}{7}\right)\left(\frac{4}{9}\right)$.

$$\frac{12}{63} = \frac{4}{21}$$

31. Perform the indicated operation and simplify if necessary $\frac{z^6}{3} \cdot \frac{z^5}{3}$.

$$\frac{z^{11}}{9}$$

32. Perform the indicated operation and simplify if necessary $\left(a^{\frac{4}{5}}\right)^{\frac{7}{8}}$.

$$a^{\frac{28}{40}} = a^{\frac{7}{10}}$$



33. Perform the indicated operation and

$$\text{simplify if necessary } \frac{w^{\frac{3}{4}}}{w^{\frac{1}{2} \cdot 2}} = \frac{w^{\frac{3}{4}}}{w^{\frac{1}{2} \cdot 2}}$$

$$= w^{\frac{3}{4} - \frac{2}{4}} = w^{\frac{1}{4}}$$

34. Perform the indicated operation and

$$\text{simplify if necessary } \left(b^{\frac{4}{9}}\right)\left(b^{\frac{2}{3}}\right)$$

$$b^{\frac{4}{9} + \frac{2}{3}} = b^{\frac{4}{9} + \frac{4}{3}} = b^{\frac{16}{3}}$$

35. Simplify the following expression using the necessary exponent laws.

$$\left(\frac{xy^3z}{xy^2z^2}\right)^{-1} = \left(x^{-1} y^{3-2} z^{-2}\right)^{-1} = yz^{-1} = \frac{y}{z}$$

36. Simplify the following expression using the necessary exponent laws.

$$(x^3y^5)^0 = 1$$

37. Simplify the following expression using the necessary exponent laws.

$$(2x)^2 \times (3x^2)^{-3} = \frac{2^2 x^2}{3^3 x^6} = \frac{4x^2}{27x^6} = \frac{4}{27x^4}$$

38. Simplify the following expression using the necessary exponent laws.

$$(2x^3)^{2y} = 2^{2y} x^{6y}$$

39. Simplify the following expression using the necessary exponent laws.

$$\frac{(8x^2y^3)}{2z^{-1}} = \left(\frac{8}{4} \frac{x^2z}{y^3}\right) = \frac{2x^2z}{y^3}$$

40. Using the necessary exponent laws,

$$\text{simplify the expression } ((5a)^2)((7a)^2)$$

$$(5^2 a^2)(7^2 a^2) = (25a^2)(49a^2) = 1225a^4$$

41. Using the necessary exponent laws,

$$\text{simplify the expression } \left(\frac{9b^8}{11w^3}\right)\left(\frac{2w^2}{3b^5}\right)$$

$$\frac{18b^8w^2}{33b^5w^3} = \frac{6b^3w^{-1}}{11} = \frac{6b^3}{11w}$$

42. Using the necessary exponent laws,

$$\text{simplify the expression } \left(\frac{w^6x^8}{y^4}\right)^{\frac{1}{2}}$$

$$\frac{w^{6 \cdot \frac{1}{2}} x^{8 \cdot \frac{1}{2}}}{y^{4 \cdot \frac{1}{2}}} = \frac{w^3 x^4}{y^2}$$

43. Using the necessary exponent laws,

$$\text{simplify the expression } \left(\frac{7c^3}{9y^5}\right)\left(\frac{3y^7}{4c^6}\right)$$

$$\frac{21c^3y^7}{36c^6y^5} = \frac{7c^{-3}y^2}{12c^3} = \frac{7y^2}{12c^3}$$

44. Using the necessary exponent laws,

$$\text{simplify the expression } ((3z)^4)((2z)^3)$$

$$(3^4 z^4)(2^3 z^3) = 648z^7$$

45. Please identify the radical form of the following power $xy^{\frac{b}{c}}$.

$$x \cdot (\sqrt[\frac{c}{b}]{y})^b$$

46. Please identify the radical form of the following power $x^{\frac{3}{5}}$.

$$\left(\sqrt[5]{x}\right)^3$$

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47. Please identify the radical form of the following power $c^{\frac{2}{3}}$.

$$\left(\sqrt[3]{c}\right)^2$$

48. Please identify the radical form of the following power $x^{\frac{1}{8}}$.

$$\sqrt[8]{x}$$

49. Please identify the radical form of the following power $5x^{\frac{b}{3}}$.

$$\left(\sqrt[3]{5x}\right)^b$$

50. Rewrite the following expression so that it contains only positive exponents:

$$2x^{-7} \quad \frac{2}{x^7}$$

51. Rewrite the following expression so that it contains only positive exponents:

$$18a^{-2}b^5c^{-9} \quad \frac{18b^5}{a^2c^9}$$

52. Rewrite the following expression so that it contains only positive exponents:

$$27y^{-8}z^9 \quad \frac{27z^9}{y^8}$$

53. Rewrite the following expression so that it contains only positive exponents:

$$z^{-5} \quad \frac{1}{z^5}$$

54. Rewrite the following expression so that it contains only positive exponents:

$$\frac{x^{-3}}{7az^{-12}} \quad \frac{z^{12}}{7ax^3}$$

55. Give the quotient of $\frac{a^9}{a^{23}}$

$$= a^{-14} = \frac{1}{a^{14}}$$

56. What is the quotient of $\frac{x^3y^4z^9}{x^{22}y^4z^{10}}$? $x^{-18}y^0z^{-1}$

$$= \frac{1}{x^{18}z}$$

57. What is the quotient of $(a^{15}b^{13}c^2) \div (a^3b^8)$?

$$\frac{a^{15}b^{13}c^2}{a^3b^8} = a^{12}b^5c^2$$

58. Give the quotient of $\frac{x^7}{x^3}$ = x^4

59. What is the quotient of $\frac{a^8b^3}{a^4b^7}$? = $a^4b^{-4} = \frac{a^4}{b^4}$