Name _____ Date _____

Simplify.

1. $\dfrac{(ab^3c^2)(abc^3)}{(a^6b^2c)}$

2. $\dfrac{p^5w}{(-pw^2)(p^3w^3)}$

3. $\dfrac{r^9p^3}{(rp^6)(-r^3p^4)}$

4. $\dfrac{(y^3z^2)(-y^5z^3)}{(y^4z^5)}$

5. $\dfrac{(a^2x^5)(-ax^4)}{(a^3x^7)}$

6. $\dfrac{(4a^3b^2)^3}{2a^2b)^5}$

7. $\dfrac{(9p^2w)^2}{(6p^2w^3)^2}$

8. $\dfrac{-r^3p(-rp)^5}{(r^4p^2)^2}$

9. $\dfrac{(-km^2)^4}{(km)^3(km^5)}$

10. $\dfrac{ab^4(-a^3b)^2}{(-ab^2)^3}$

11. $\dfrac{(w^2z^4)^3}{(-wz^5)^2(w^4z^2)}$

12. $(3n^{-1})(-5n^{-3})$

13. $-6a^{-5}b^6 \cdot 5a^4b^{-2}$

14. $9x^{-1}y^{-4} \cdot 4x^4y^4$

15. $(-4c^{-7}d^4)(-2c^2d^{-5})$

16. $(-3u^{-5}w^0)(5u^5w^{-6})$

17. $14x^{-4}y^{-3} \cdot 3x^5y^{-3}$

18. $(nr^{-6})(-2n^0r^{-2})$

19. $-7ay^3 \cdot 5a^{-1}y^{-2}$

20. $(13k^5m^{-3})(2k^{-3}m^{-1})$

21. $(x^{-3}z^4)^4(2x^{-6}z^8)^{-2}$

22. $(3a^3c^{-2})^{-2}(a^{-4}c^0)^{-3}$

23. $\dfrac{-15r^0}{30p^{-2}}$

24. $\dfrac{w^{-1}z^{-3}}{w^{-2}z^2}$

25. $\dfrac{w^{-5}x^{-1}y^3}{w^{-5}xy^{-2}}$

26. $\dfrac{10ab^{-7}c^{-2}}{15a^{-2}b^0c^{-3}}$

27. $\dfrac{m^{-3}n^{-2}p^2}{m^{-4}n^{-2}p^{-1}}$

28. $\dfrac{21x^2y^0z^{-1}}{3x^{-3}y^6z^{-2}}$

29. $\dfrac{2^{-4}a^3b^{-3}}{8^{-2}ab^{-4}}$

30. $\dfrac{3^{-1}s^{-2}t}{3^{-4}s^3t^5}$

31. $\dfrac{5^{-3}x^2y^{-4}}{10^{-2}xy^{-3}}$

32. $\dfrac{7c^{-2}d^{-3}}{2^{-3}c^{-5}d^2}$

33. $\dfrac{(2^3)^{-1}x^2y^{-3}}{-4^{-2}x^0y^{-2}}$

34. $\dfrac{3^{-4}b^{-5}c^{-1}}{(9bc^2)^{-2}}$

35. $\dfrac{(-4m^3)^2(n^{-2})^2}{(2^{-1})^2m^4n^{-8}}$

36. $\dfrac{(5^{-2})^{-1}p^3r^{-5}}{(10^{-1}pr^3)^{-2}}$

37. $\dfrac{(3a^{-3})^{-2}b^2c^{-4}}{(-6)^{-1}(a^2b^{-3})^2c^{-6}}$

38. $\dfrac{(5^{-1})^2x^{-5}(y^{-2}z)^{-3}}{15^{-2}(x^0y^3z^{-1})^2}$

39. $\dfrac{-3^{-2}c^{-4}(d^0e^{-2})^2}{(6^{-1})^2(cd)^{-2}e^{-4}}$

40. $\dfrac{2^{-5}(k^{-3}m^2)^{-1}n^{-7}}{(2^{-2})^3k^4(mn^{-1})^{-2}}$

41. $\left[\dfrac{2^{-2}r^2s^{-1}}{2rs^{-3}}\right]^{-2}$

42. $\left[\dfrac{3^{-1}a^{-3}b^2}{6^{-2}a^{-3}b^{-2}}\right]^{-1}$

43. $\left[\dfrac{5^{-3}c^{-4}d^{-2}}{5^{-1}cd^{-4}}\right]^{-2}$

44. $\left[\dfrac{12^{-1}x^3y^{-3}}{2^{-3}x^{-1}y^{-6}}\right]^{-3}$

45. $\dfrac{(-2c^3d)^3(-3cd^5)}{-6c^2d^2(4cd)^2}$

46. $\dfrac{(4x^4y)(-5xy^5)^2}{10x^6y^3(-2xy)^3}$

47. $\dfrac{m^2rx^2(mrx)^5}{(mr^3x)^3(mx^4)}$

48. $\dfrac{k^4g^2p(k^2gp^2)^3}{(k^2g^3p^3)^2(k^4gp^3)}$

49. $\dfrac{(-kn^5)(3k^2n)^2}{(-6k^3n^2)^2(-2kn^3)}$

50. $\dfrac{(2xy)^3(-5x^2y)^2}{(35xy^5)(10x^2y^8)}$

51. $\dfrac{(8c^2d)^2(2cd^3)}{(3d^3)(4cd^2)^3}$

52. $\dfrac{(9a^4b^3)(12ab^7)}{(-3ab)^3(2a^2b)^2}$

53. $\dfrac{(5xy^3)^2(4x^2)^2}{(30x^5y^2)^2}$

54. $\dfrac{(-6bc^4)(2b^2c^2)^5}{(-12b^2c^7)^2}$

55. $\dfrac{(2pr)^4(9p^3r^6)}{(-6pr^5)^2}$

56. $\dfrac{(-10h^4k^3)^3}{(5hk^4)^2(-12h^2k)}$

57. Determine the exact value of $25^{-1.5}$.

a) $-125$ b) $-\frac{1}{125}$ c) $\frac{1}{125}$ d) $\sqrt{5}$ e) $125$

58. Determine the exact value of $243^{-0.6}$.

a) $-27$ b) $-\frac{1}{27}$ c) $-\frac{1}{3}$ d) $\frac{1}{27}$ e) $\frac{1}{3}$

59. Determine the exact value of $(12.25)^{0.5}$.

a) $\frac{2}{7}$ b) $\sqrt{\frac{7}{2}}$ c) $\frac{7}{2}$ d) 3.96 e) $\frac{49}{8}$

60. Determine the exact value of $(3.375)^{-0.\overline{6}}$.

a) $-\frac{4}{9}$ b) $\frac{8}{27}$ c) $\frac{4}{9}$ d) $\frac{2}{3}$ e) $\frac{9}{4}$

61. Write $d^{\frac{5}{2}} \div d^{\frac{1}{2}}$ as a power.

a) $d^2$ b) $\frac{1}{d^2}$ c) $d^3$ d) $d^5$ e) 1

62. Write $c^{\frac{4}{3}} \div c^{\frac{1}{3}}$ as a power.

a) $\frac{1}{c}$ b) $c$ c) $c^{\frac{5}{3}}$ d) $c^4$ e) 1

63. Write $\left(\sqrt[5]{y^4}\right)\left(\sqrt{y^3}\right)$ as a power.

a) $y^{-\frac{7}{10}}$ b) $y$ c) $y^{\frac{6}{5}}$ d) $y^{\frac{7}{5}}$ e) $y^{\frac{23}{10}}$

64. Write $\left(\sqrt[4]{y^5}\right)\left(\sqrt[3]{y^2}\right)$ as a power.

a) $y^{\frac{8}{15}}$ b) $y$ c) $y^{\frac{22}{15}}$ d) $y^{\frac{23}{12}}$ e) $y^{\frac{23}{10}}$

65. Simplify $\left(\sqrt[4]{a^5b^3}\right)^2$

a) $a^{\frac{5}{4}}b^{\frac{3}{4}}$ b) $a^{\frac{5}{2}}b^{\frac{3}{2}}$ c) $a^{\frac{25}{16}}b^{\frac{9}{16}}$ d) $a^{10}b^6$ e) $b^{\frac{10}{4}}a^{\frac{6}{4}}$

66. Simplify $\left(\sqrt[2]{x^3y^5}\right)^4$

a) $x^{\frac{3}{2}}y^{\frac{5}{2}}$ b) $x^{\frac{81}{16}}y^{\frac{625}{16}}$ c) $x^6y^{10}$ d) $x^{12}y^{20}$ e) $y^6x^{10}$

67. Express $\sqrt[3]{72}$ as a mixed radical in simplest form.

a) $2\sqrt[3]{3}$ b) $2\sqrt[3]{6}$ c) $2\sqrt[3]{9}$ d) $3\sqrt[3]{2}$ e) $18\sqrt[3]{2}$

68. Express $\sqrt[3]{320}$ as a mixed radical in simplest form.

a) $\frac{8}{3}\sqrt[3]{5}$ b) $4\sqrt[3]{5}$ c) $5\sqrt[3]{4}$ d) $\sqrt{106\frac{2}{3}}$ e) $24\sqrt[3]{5}$

69. Express $\sqrt[3]{2560}$ as a mixed radical in simplest form.

a) $2\sqrt[3]{320}$ b) $8\sqrt[3]{5}$ c) $16\sqrt[3]{10}$ d) 40 e) $48\sqrt[3]{10}$

70. Express $\sqrt[3]{3000}$ as a mixed radical in simplest form.

a) $3\sqrt[3]{10}$ b) 10 c) $10\sqrt[3]{3}$ d) $10\sqrt[3]{15}$ e) $10\sqrt[3]{30}$

71. Simplify and rewrite using only positive exponents: $\left(\frac{4x^2}{(2y)^3}\right)^{-2}$

a) $\frac{-4y^6}{x^2}$ b) $\frac{x^4}{4y^6}$ c) $\frac{4y^6}{x^4}$ d) $\frac{1}{y^6}$ e) $y^6$

72. Simplify and rewrite using only positive exponents: $\left(\frac{9x^2}{(3y)^3}\right)^{-3}$

a) $-\frac{1}{9x^6}$ b) $\frac{x^6}{27y^9}$ c) $\frac{27y^3}{x^2}$ d) $\frac{27y^9}{x^6}$ e) $y^9$

73. Simplify and rewrite using only positive exponents: $\left(\frac{(2x)^{-2}}{2y^3}\right)^{-2}$

a) $-4x^4y^6$ b) $\frac{1}{y^6}$ c) $\frac{y^6}{16x^4}$ d) $\frac{x^4}{y^6}$ e) $64x^4y^6$

74. Simplify and rewrite using only positive exponents: $\left(\frac{(3x)^{-3}}{3y^3}\right)^{-1}$

a) $-x^3y^3$ b) $81x^3y^3$ c) $\frac{x^3}{81y^3}$ d) $\frac{y^9}{x^6}$ e) $y^9$

75. Simplify: $\left(\frac{5x}{y^2}\right)^{-1} \cdot \frac{1}{y}$

a) $\frac{y}{5x}$ b) $\frac{5x}{y}$ c) $5xy$ d) $\frac{1}{5}xy$ e) $\frac{5y}{x}$

76. Simplify: $\left(\frac{8x^2}{y}\right)^{-1} \cdot \frac{x}{y}$

a) $\frac{8}{x}$ b) $8x$ c) $-\frac{8x^3}{y^2}$ d) $\frac{1}{8x}$ e) $\frac{x}{8}$

77. Simplify the expression $\frac{7^{-1}}{2^{-5}}$.

a) $-\frac{7}{32}$ b) $-\frac{32}{7}$ c) $\frac{7}{32}$ d) $\frac{10}{7}$ e) $\frac{32}{7}$

78. Rewrite the expression $\frac{4^3 \cdot 4^{-5}}{4^7}$ without negative exponents.

a) $-4^6$ b) $\frac{1}{4^9}$ c) $\frac{1}{4^6}$ d) $4^6$ e) $4^9$

79. Rewrite the expression $\frac{5^4}{5^{-3} \cdot 5^{-2}}$ without negative exponents.

a) $\frac{1}{5^{12}}$ b) $\frac{1}{5^3}$ c) $5^3$ d) $5^9$ e) $5^{12}$

80. Simplify the expression $\dfrac{4k^{-3}m^5}{4^{-1}k^{-7}m^{-3}}$.

a) $-16k^2m^8$ b) $-\dfrac{16k^4}{m^6}$ c) $4k^2m^4$ d) $8k^4m^6$ e) $16k^4m^8$

81. Simplify: $\dfrac{6^{-1}y^{-2}z^5}{6^2y^{-1}z^{-2}}$

a) $\dfrac{z^7}{216y}$ b) $\dfrac{yz^7}{18}$ c) $\dfrac{y}{216z^7}$ d) $\dfrac{18y}{z^7}$ e) $\dfrac{216y}{z^7}$

82. Simplify the expression $\dfrac{(4a^2b^3)^{-2}(2ab^{-1})^3}{(a^3b)^{-4}}$ by using positive exponents.

a) $\dfrac{4b^6}{a^{11}}$ b) $\dfrac{b^4}{8a^9}$ c) $\dfrac{2b^4}{a^{11}}$ d) $\dfrac{a^9}{8b^7}$ e) $\dfrac{a^{11}}{2b^5}$

83. Simplify the expression $\dfrac{(m^6n)^{-2}(m^2n^{-2})^3}{m^{-1}n^{-2}}$ by using positive exponents.

a) $\dfrac{m^7}{n^6}$ b) $\dfrac{n^{10}}{m^5}$ c) $\dfrac{1}{m^7n^6}$ d) $\dfrac{m^5}{n^{10}}$ e) $\dfrac{1}{m^5n^6}$

84. Simplify the expression $\dfrac{(2y^{-1}z^2)^2(3y^{-2}z^{-3})^3}{(y^3z^2)^{-1}}$ by using positive exponents.

a) $\dfrac{27y^4}{4z^3}$ b) $\dfrac{108}{y^5z^3}$ c) $\dfrac{y^7z^2}{108}$ d) $\dfrac{108y^5}{z^3}$ e) $\dfrac{4z^3}{27y^5}$

2/1/2012

**Answer List**

1. $\frac{b^2c^4}{a^4}$
2. $-\frac{p}{w^4}$
3. $-\frac{r^5}{p^7}$
4. $-y^4$
5. $-x^2$
6. $\frac{2b}{a}$
7. $\frac{9}{4w^4}$
8. $p^2$
9. 1
10. $-a^4$
11. 1
12. $-\frac{15}{n^4}$
13. $-\frac{30b^4}{a}$
14. $36x^3$
15. $\frac{8}{c^5d}$
16. $-\frac{15}{w^6}$
17. $\frac{42x}{y^6}$
18. $-\frac{2n}{r^8}$
19. $-35y$
20. $\frac{26k^2}{m^4}$
21. $\frac{1}{4}$
22. $\frac{c^4a^6}{9}$
23. $-\frac{p^2}{2}$
24. $\frac{w}{y^5}$
25. $\frac{y^5}{x^2}$
26. $\frac{2a^3c}{3b^7}$
27. $mp^3$
28. $\frac{7x^5z}{y^6}$
29. $4a^2b$
30. $\frac{27}{s^5t^4}$
31. $\frac{4x}{5y}$
32. $\frac{56c^3}{d^5}$
33. $-\frac{2x^2}{y}$
34. $\frac{c^3}{b^3}$
35. $64m^2n^4$
36. $\frac{p^5r}{4}$
37. $-\frac{2a^2b^8c^2}{3}$
38. $\frac{9}{x^5z}$
39. $\frac{4d^2}{c^2}$
40. $\frac{2}{kn^9}$
41. $\frac{64}{r^2s^4}$
42. $\frac{1}{12b^4}$
43. $\frac{625c^{10}}{d^4}$
44. $\frac{27}{8x^{12}y^9}$
45. $-\frac{c^6d^4}{4}$
46. $-\frac{5y^5}{4x^3}$
47. $\frac{m^3}{r^3}$
48. $\frac{k^2}{g^2p^2}$
49. $\frac{1}{8k^2}$
50. $\frac{4x^4}{7y^8}$
51. $\frac{2c^2}{3d^4}$
52. $-\frac{b^5}{a^2}$
53. $\frac{4y^2}{9x^4}$
54. $-\frac{4b^7}{3}$
55. $4p^5$
56. $\frac{10h^8}{3}$
57. c
58. d
59. c
60. c
61. a
62. b
63. e
64. d
65. b
66. c
67. c
68. b
69. b
70. c
71. c
72. d
73. e
74. b
75. a
76. d
77. e
78. b
79. d
80. e
81. a
82. e
83. e
84. b