

## 13.3 MULTIPLICATION WITH EXPONENTS

A. Write each first in factored form and then in exponential form.

1.  $8^4 \times 8^2 = 8^6$
2.  $7^3 \times 7^5 = 7^8$
3.  $15^2 \times 15^3 = 15^5$
4.  $9^3 \times 9^3 = 9^6$
5.  $18^5 \times 18^0 = 18^5$
6.  $(\frac{3}{4})^2 \times (\frac{3}{4})^3 = (\frac{3}{4})^5$
7.  $(-9)^2 \times (-9)^4 = (-9)^6$
8.  $(-3)^1 \times (-3)^4 = (-3)^5$
9.  $(+3)^1 \times (-3)^3 = (3)^1 \times (-3)^3$
10.  $(7)^{-5} \times (7)^{-1} = 7^{-6}$
11.  $(8^0) \times (8)^0 = 8^0$
12.  $3^{-3} \times 3^{-5} = 3^{-8}$
13.  $5^2 \cdot 5^5 \cdot 5^3 = 5^{10}$
14.  $8^1 \cdot 8^1 \cdot 8^2 = 8^4$
15.  $6^3 \cdot 6^4 \cdot 6^0 = 6^7$
16.  $2^1 \cdot 2^2 \cdot 2^3 = 2^6$
17.  $8^6 \cdot 6^8 = 8^6 \cdot 6^8$
18.  $6^{-6} \cdot 6^{+6} = 6^0$

B. Calculate each of the following and leave your answers in exponential form.

1.  $2^3 \times 2^4 = 2^7$
2.  $5^2 \times 5^7 = 5^9$
3.  $5^4 \times 5^4 = 5^8$
4.  $8^3 \times 8^7 = 8^{10}$
5.  $9^3 \times 9^9 = 9^{12}$
6.  $8^4 \times 8^6 = 8^{10}$
7.  $8^3 \times 8^5 = 8^8$
8.  $(-3)^5 \times (-3)^6 = (-3)^{11}$
9.  $(-5)^7 \times (-5)^8 = (-5)^{15}$
10.  $(\frac{1}{2})^2 \cdot (\frac{1}{2})^8 = (\frac{1}{2})^{10}$
11.  $19^{-3} \times 19^{-6} = 19^{-9}$
12.  $20^5 \times 20^{-5} = 20^0$
13.  $2^4 \times 2^3 \times 2^5 = 2^{12}$
14.  $5^3 \times 5^3 \times 5^7 = 5^{13}$
15.  $8^2 \times 8^3 \times 8^7 = 8^{12}$
16.  $3^4 \times 5^7 = 3^4 \cdot 5^7$
17.  $15^0 \cdot 15^6 \cdot 15^4 = 15^{10}$
18.  $(-5)^7 \cdot (-5)^6 \cdot (-5)^3 = (-5)^{16}$
19.  $7^{-2} \cdot 7^{-3} \cdot 7^{-4} = 7^{-9}$
20.  $(\frac{1}{4})^5 \cdot (\frac{1}{4})^6 \cdot (\frac{1}{4})^7 = (\frac{1}{4})^{18}$
21.  $8^5 \cdot 7^5 \cdot 6^5 = 8^5 \cdot 7^5 \cdot 6^5$
22.  $3^2 \times 3^4 \times 3^{-8} = 3^{-2}$
23.  $5^{-7} \cdot 5^{-9} = 5^{-16}$
24.  $(8^3)(8^5)(8^{-9}) = 8^{-1}$

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C. Calculate each of the following and leave your answer in exponential form.

1.  $2^{10} \times 2^4$   $2^{14}$
2.  $6^3 \times 6^3$   $6^6$
3.  $7^5 \times 7^{-2}$   $7^3$
4.  $(-2)^4 \times (-2)^6$   $(-2)^{10}$
5.  $5^{-3} \times 5^5$   $5^{-2}$
6.  $(-2)^4 \times (-2)^{-7}$   $(-2)^{-3}$
7.  $(\frac{2}{3})^5 \times (\frac{2}{3})^2$   $(\frac{2}{3})^7$
8.  $(-8)^5 \cdot (-8)^{-8}$   $(-8)^{-3}$
9.  $3^8 \times 3^{-2}$   $3^6$
10.  $7^5 \times 7^{-5}$   $7^0$
11.  $5^2 \cdot 5^{-3} \cdot 5^{-4}$   $5^{-5}$
12.  $x^2 x^7 x^8$   $x^{17}$
13.  $7^6 7^4 7^3$   $7^{13}$
14.  $y^7 y^3 y^5 y^{-4}$   $y^{11}$
15.  $2^{-1} \times 2^{-2}$   $2^{-3}$
16.  $3^4 \cdot 3^{-3} \cdot 3^2 \cdot 3^5$   $3^8$
17.  $8^3 7^3 8^3 7^5$   $8^6 7^8$
18.  $y^{2x} y^{6x}$   $y^{8x}$
19.  $(3^4)^3$   $3^{12}$
20.  $x^3 y^3 x^4 y^1$   $x^7 y^4$
21.  $49^x \cdot 49^x$   $49^{2x}$
22.  $3^2 4^2 3^5 4^7$   $3^7 \cdot 4^9$
23.  $5^3 4^3 5^5 4^7$   $5^8 4^{10}$
24.  $y^{100} y^{-53} y^{-86}$   $y^{-39}$
25.  $42^5 42^{-7} 42^2$   $42^0$
26.  $(2x)^{12} (2x)^{14}$   $(2x)^{26}$
27.  $(3^4)^2 \cdot (3^4)^{-3}$   $(3^4)^{-1}$