Class/Homework

Section 2.4
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 Questions : 3,4, 5,6,7,8,9,10, 11,
13,15, 17,18, 19

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3. When can you not add or subtract exponents to multiply or divide powers?

4. Write each product as a single power.

a) $5^5 \times 5^4$

b) $10^2 \times 10^{11}$

c) $(-3)^3 \times (-3)^3$

d) $21^6 \times 21^4$

e) $(-4)^1 \times (-4)^3$

f) $6^{12} \times 6^3$

g) $2^0 \times 2^4$

h) $(-7)^3 \times (-7)^0$

5. Write each quotient as a power.

a) $4^5 \div 4^3$

b) $8^9 \div 8^6$

c) $15^{10} \div 15^0$

d) $(-6)^8 \div (-6)^3$

e) $\dfrac{2^{12}}{2^{10}}$

f) $\dfrac{(-10)^{12}}{(-10)^6}$

g) $\dfrac{6^5}{6^1}$

h) $\dfrac{(-1)^5}{(-1)^4}$

6. a) Evaluate.

i) $3^4 \div 3^4$ 　　　　　　ii) $(-4)^6 \div (-4)^6$

iii) $\dfrac{5^8}{5^8}$ 　　　　　　iv) $\dfrac{(-6)^3}{(-6)^3}$

b) Use the results of part a. Explain how the exponent law for the quotient of powers can be used to verify that a power with exponent 0 is 1.

8. Express as a single power.

a) $3^4 \times 3^9 \div 3^{11}$

b) $(-4)^3 \div (-4)^2 \times (-4)^{10}$

c) $6^0 \times 6^3 \div 6^2$

d) $\dfrac{4^3 \times 4^5}{4^2 \times 4^6}$

e) $\dfrac{(-3)^4 \times (-3)^4}{(-3)^4}$

9. a) Express as a single power, then evaluate.

  i) $(-6)^1 \times (-6)^7 \div (-6)^7$ ii) $(-6)^7 \div (-6)^7 \times (-6)^1$

  b) Explain why changing the order of the terms in the expressions in part a does not affect the answer.

10. Simplify, then evaluate.

a) $10^2 \times 10^2 + 10^4$

b) $10^3 \times 10^3 - 10^3$

c) $10^{11} - 10^3 \times 10^6$

d) $10^1 + 10^5 \times 10^2$

e) $10^6 \div 10^2 \times 10^2$

f) $10^9 \div 10^9$

g) $\dfrac{10^{12}}{10^6}$

h) $\dfrac{10^4 \times 10^3}{10^2}$

i) $\dfrac{10^{11}}{10^4 \times 10^2}$

j) $\dfrac{10^5}{10^3} + 10^2$

13. Evaluate.

a) $2^3 \times 2^2 - 2^5 \times 2$

b) $3^2 \times 3 + 2^2 \times 2^4$

c) $4^2 - 3^0 \times 3 + 2^3$

d) $(-3)^6 \div (-3)^5 - (-3)^5 \div (-3)^3$

e) $(-2)^4[(-2)^5 \div (-2)^3] + (-2)^4$

f) $-2^4(2^6 \div 2^2) - 2^4$

g) $(-5)^3 \div (-5)^2 \times (-5)^0 + (-5)^2 \div (-5)$

19. Simplify, then evaluate only the expressions with a positive value. Explain how you know the sign of each answer without evaluating.

a) $(-2)^2 \times (-2)^3$

b) $(-2)^0 \times (-2)^5$

c) $(-2)^5 \div (-2)^3$

d) $(-2)^6 \div (-2)^6$

e) $\dfrac{(-2)^3 \times (-2)^4}{(-2)^3 \times (-2)^2}$

f) $\dfrac{(-2)^6}{(-2)^3 \times (-2)^2}$

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4. Write each expression as a product of powers.

a) $(6 \times 4)^3$ b) $(2 \times 5)^4$ c) $[(-2) \times 3]^5$

d) $(25 \times 4)^2$ e) $(11 \times 3)^1$ f) $[(-3) \times (-2)]^3$

5. Write each expression as a quotient of powers.

a) $(8 \div 5)^3$ b) $(21 \div 5)^4$ c) $[(-12) \div (-7)]^5$

d) $\left(\dfrac{10}{3}\right)^3$ e) $\left(\dfrac{1}{3}\right)^2$ f) $\left(\dfrac{27}{100}\right)^4$

6. Write as a power.

a) $(3^2)^4$ b) $(6^3)^3$ c) $(5^3)^1$

d) $(7^0)^6$ e) $-(8^2)^2$ f) $[(-3)^4]^2$

7. Simplify $(2^4)^2$ and $(2^2)^4$. What do you notice? Explain the results.

8. Write each expression as a product or quotient of powers.

a) $[3 \times (-5)]^3$ b) $-(2 \times 4)^5$ c) $\left(\dfrac{2}{3}\right)^4$ d) $\left(\dfrac{-7}{-2}\right)^2$

e) $-[(-10) \times 3]^3$ f) $(16 \div 9)^2$

9. Why is the value of $(-5^2)^3$ negative?

10. Simplify each expression, then evaluate it.
For each expression, state the strategy
you used and why.

a) $(3 \times 2)^3$ b) $[(-2) \times 4]^2$ c) $\left(\frac{9}{-3}\right)^3$

d) $\left(\frac{8}{2}\right)^2$ e) $(12^8)^0$ f) $[(-4)^2]^2$

4. Simplify, then evaluate. Show your work.

a) $(3^2 \times 3^1)^2$

b) $(4^6 \div 4^4)^2$

c) $[(-2)^0 \times (-2)^3]^2$

d) $(10^6 \div 10^4)^3$

e) $(10^3)^2 \times (10^2)^3$

f) $(12^2)^4 \div (12^3)^2$

g) $(5^2)^6 \div (5^3)^4$

h) $[(-2)^2]^3 \times (-2)^3$

Copy the solution and correct the errors.

a) $(3^2 \times 2^2)^3 = (6^4)^3$

$= 6^{12}$

$= 2\ 176\ 782\ 336$

b) $[(-3)^2]^3 = (-3)^5$

$= -243$

c) $\left(\dfrac{6^2}{6^1}\right)^2 = 6^4$

$= 1296$

d) $(2^6 \times 2^2 \div 2^4)^3 = (2^3)^3$

$= 2^9$

$= 512$

e) $(10^2 + 10^3)^2 = (10^5)^2$

$= 10^{10}$

$= 10\ 000\ 000\ 000$

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16. Simplify, then evaluate each expression.

a) $(4^2 \times 4^3)^2 - (5^4 \div 5^2)^2$

b) $(3^3 \div 3^2)^3 + (8^4 \times 8^3)^0$

c) $(2^3)^4 + (2^4 \div 2^3)^2$

d) $(6^2 \times 6^0)^3 + (2^6 \div 2^4)^3$

e) $(5^3 \times 5^3)^0 - (4^2)^2$

f) $(10^5 \div 10^2)^2 + (3^3 \div 3^1)^4$

17. Simplify, then evaluate each expression.

a) $[(-2)^3 \times (-2)^2]^2 - [(-3)^3 \div (-3)^2]^2$

b) $[(-2)^3 \div (-2)^2]^2 - [(-3)^3 \times (-3)^2]^2$

c) $[(-2)^3 \times (-2)^2]^2 + [(-3)^3 \div (-3)^2]^2$

d) $[(-2)^3 \div (-2)^2]^2 + [(-3)^3 \times (-3)^2]^2$

e) $[(-2)^3 \div (-2)^2]^2 - [(-3)^3 \div (-3)^2]^2$

f) $[(-2)^3 \times (-2)^2]^2 + [(-3)^3 \times (-3)^2]^2$

19. Simplify, then evaluate each expression.

a) $(2^3 \times 2^6)^2 - (3^7 \div 3^5)^4$

b) $(6 \times 8)^5 + (5^3)^2$

c) $[(-4)^3 \times (-4)^2]^2 + (4^3 \times 4^2)^2$

d) $[(-2)^4]^3 + [(-4)^3]^2 - [(-3)^2]^4$

e) $[(-3)^4]^2 \times [(-4)^0]^2 - [(-3)^3]^0$

f) $[(-5) \times (-4)]^3 + [(-6)^3]^2 - [(-3)^9 \div (-3)^8]^5$