P25-29

September 10, 2018 1:00 PM

$b^0 = 1$ except 0^0

$\sqrt{n} \rightarrow \sqrt{x} \approx \frac{1}{2}\left(a + \frac{x}{a}\right)$

HW P.25 Q8–12 (Right)

Quiz on Monday (1.2–1.4)

8. Evaluate.

a) 5^3 _____ b) 3^5 _____

c) 6^2 _____ d) 2^6 _____

e) $(-3)^4$ _____ f) -3^4 _____

g) -2^5 _____ h) $-(-2)^5$ _____

i) -2^6 _____ j) $-(-2)^6$ _____

9. Evaluate. $a \neq 0,\ b \neq 0,\ a \neq b,\ a + b \neq 0$

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a) 6^0 _____ b) $(-6)^0$ _____

c) $-(6)^0$ _____ d) -6^0 _____

e) $2^0 + 3^0$ _____ f) $2^0 - 3^0$ _____

g) $-2^0 - 3^0$ _____ h) $(2^0 + 3^0)^0$ _____

i) $-(-2^0 - 3^0)$ _____ j) $3^0 \times 4^0$ _____

k) $(a + b)^0$ _____ l) $a^0 - b^0$ _____

m) $-a^0 - b^0$ _____ n) $-(a + b)^0$ _____

10. Write as a repeated factor.

a) 2^4 _____ b) $(-2)^4$ _____

c) -2^4 _____ d) a^5 _____

e) $(-a)^5$ _____ f) a^n _____

11. Use <, > or = to write a true sentence.

a) $2^3 < 3^2$ (8 < 9)

b) $2^4 \_\_\_ 4^2$

c) $(-2^4) = -2^4$ (−16 = −16)

d) $-(-2)^3 \_\_\_ 2^3$

e) $(-2)^6 > 6^2$ (+64 > 36) $2\times2\times2\times2\times2\times2 = 8 \quad 8 = 64$

f) $(-5)^3 \_\_\_ (-3)^5$

g) $(-5)^6 > (-4)^{99}$ (Even, odd; + > −)

h) $(-2)^5 \_\_\_ 5^2$

P.26 i) $\left(\frac{2}{3}\right)^2 > \left(\frac{2}{3}\right)^5$ base is less than 1; smaller

j) $\left(\frac{5}{2}\right)^3 \_\_\_ \left(\frac{5}{2}\right)^4$

k) $\left(\frac{3}{5}\right)^5 \_\_\_ \left(\frac{2}{5}\right)^5$

l) $\left(\frac{8}{7}\right)^{100} \_\_\_ \left(\frac{8}{7}\right)^{101}$

m) $\left(-\frac{2}{3}\right)^3 < \left(-\frac{2}{3}\right)^5$ $-\left(\frac{2}{3}\right)^3 < -\left(\frac{2}{3}\right)^5 \Rightarrow \left(\frac{2}{3}\right)^3 > \left(\frac{2}{3}\right)^5$ (smaller)

n) $\left(-\frac{3}{2}\right)^6 > \left(-\frac{3}{2}\right)^5$ (even, odd; + > −)

o) $\left(-\frac{2}{3}\right)^2 \_\_\_ \left(-\frac{2}{3}\right)^4$

p) $\left(\frac{3}{2}\right)^2 < \left(\frac{3}{2}\right)^4$ $\frac{3}{2} = 1.5$ bigger

12. Write in exponential form.

a) $2+2+2+2 = 8 = 2^3$ 2^3

b) $3+3+3+3+3+3+3+3+3 = 27$ 3^3

c) $5+5+5+5+5$ _____

d) $4+4+4+4 \Rightarrow 32 = 2^5$ 2^5

e) $6+6+6+6+6+6 = 36 \rightarrow 6^2$ 6^2

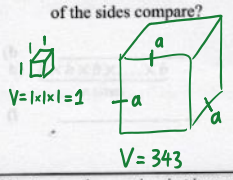
f) $2+2+2+2+2+2+2+2+2+2 = 16$ 2^4

g) $8+8$ _____

h) $9+9+9 = 27$ 3^3

13. Suppose the width of a square is four times the width of another square. How do the areas of the squares compare?

14. Suppose the volume of a cube is 343 times the volume of another cube. How do the lengths of the sides compare?



$V = a \times a \times a$

$343 = a^3$ $343 = 7\times7\times7$

$\therefore a = 7$ times bigger.

1.5 Orders of Operations

If we want to solve $4 + 2 \times 3$, do we add first, then multiply, or do we multiply first, then add? Does it make a difference? If we add first, the answer is 18; if we multiply first, the answer is 10. What if we write $2(3 + 4)$? What do the brackets mean? What about $6^2 \div 2$? To come to an answer that everyone can agree on, we must make rules to standardize the order in which we perform mathematical operations.

P.27 BEDMAS (± × + −)

Rules for Order of Operations ( ) [ ] { }

B 1. Do all calculations within brackets or parentheses first. When more than one kind of grouping of symbols occurs, do the innermost one first, then work from the inside out.

E 2. Evaluate all exponential expressions.

D/M 3. Do all multiplication and division in order from left to right.

A/S 4. Do all addition and subtraction in order from left to right.

To remember the order of operations, the acronym **BEDMAS** is used.

B Brackets
E Exponents
D Division
M Multiplication
A Addition
S Subtraction

Ex1) $3\cdot[(4+2)^2 - 10]$
$= 3\cdot[6^2 - 10]$
$= 3\cdot[36 - 10]$
$= 3\cdot[26]$
$= 78$

Ex2) $3 + 10\cdot(4+2)^2$ (1 Item)
$= 3 + 10\cdot 6^2$
$= 3 + 10\times 36$
$= 3 + 360$
$= 363$

Example 1 Simplify.

a) $5 + 3 \times 4$

Example 1 Simplify.

a) $5+3\times4$

b) $2^3+2\times3$

c) $6-(2+3)^2$

d) $(3-2\times4)^2-\left(3+\frac{6^2}{2}\right)$

▶ *Solution:*

a) $5+3\times4=5+12=17$

b) $2^3+2\times3=8+2\times3=8+6=14$

c) $6-(2+3)^2=6-5^2=6-25=-19$

d) $(3-2\times4)^2-\left(3+\frac{6^2}{2}\right)=(3-8)^2-\left(3+\frac{36}{2}\right)=(-5)^2-(3+18)=25-21=4$

= 3 + 10×36
= 3 + 360
= 363

Ex3) $(-3\times2)^2-\left(4+\frac{q^2}{3}\right)$ ← 4
$(-6)^2$ $4+27$
= 36 − 31
= 5

$\frac{q^2}{3}=\frac{3\times9}{3_1}=27$

$\left(\frac{q}{3}\right)^2=\left(\frac{q^3}{3}\right)\left(\frac{q^2}{3_1}\right)=9$

P. 28 HW P. 28 Q 1-4 (R;lt)

1.5 Exercise Set

1. Calculate.

a) $6+2\times3$ _____ b) $2\times3+2\times4$ _____

c) $4\times6-5\times3$ _____ d) $16-8\div4-2$ _____

P.28 1 e) $12\div3-16\div8$ 4 − 2 = 2 f) $25-18\div6-10$ _____

g) $7-3-10\div2$ _____ h) $-6\times2-4-2$ _____

i) $6-3\times4-5$ → $6-12-5$ → $-6-5$ = −11 j) $63\div7\div3\times2$ _____

2. Simplify.

a) $6-(2\times3)$ _____ b) $(6-2)+3$ _____

c) $-8-(5-3)$ _____ d) $(-8-5)-3$ _____

e) $-(8-3)+(3-7)$ _____ f) $100\div(10\div5)$ _____

g) $(100\div10)\div5$ _____ h) $128\div(32\div2)$ _____

i) $(128\div32)\div\frac{2}{1}$ → $\frac{64\,2}{128}\times\frac{1}{2_1}$ → $\times\frac{1}{2}$ = 2 j) $5\times10-(7+3)\div5-24$ _____

3. Simplify.

a) 3×2^3 _____ b) $(3\times2)^3$ _____

c) $-5-3^2$ _____ d) $(-5-3)^2$ _____

e) $2^4\div2^2\times2^5\div2^3$ _____ f) $(2^4\div2^2)(2^5\div2^3)$ _____

g) $\frac{6+3\times4}{6+3\times4}$ _____ h) $\frac{(6+3)(4)}{6+3\times4}$ _____

i) $\frac{15+2\times5}{15-2\times5}$ _____ j) $\frac{(15+2)(5)}{15-2\times5}$ = 3 _____

4. Simplify.

a) $12 + 2[(20 - 8) - (1 + 3^2)]$

b) $\frac{3^3 - (1^3 + 2^3)}{2}$

c) $4 + 3(2^2 - 1)^3$

d) $4^2[(8 + 4) \div 6]$

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4 e) $\frac{(-5)^2 - 3 \times 5}{3^2 + 3 \times 2(-1)^5} = \frac{25 - 15}{9 + -6} = \frac{10}{3}$

$3 \times 2 \cdot (-1)^5$

$3 \times 2 \times (-1)$

-6

f) $\frac{(-2)^3 + 4^2}{3 - 5^2 + 3 \times 6} = \frac{-8 + 16}{3 - 25 + 18} = \frac{8}{-4} = -2$

$+3 \; -25 \; +18 \; -7 \; +2$

Ext

4 g) $4^2 \times 3 \div 8 - \frac{(4)(6 - 10)}{2} - 24 \div 2^3$

$\frac{16 \times 3}{8} \quad \frac{4 \cdot (-4)}{2} \quad \frac{24}{8}$

$= 6 \quad - \cdot - 8 \quad - \quad 3$

$= 6 + 8 - 3 = 11$

h) $-5^2 + \frac{(3)(4 - 8)}{2} + 10 \div 5$

$=$

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

$= \frac{8}{4} \times 2 + 9 - 6$

$= 4 + 9 - 6$

$= 7$

j) $\frac{(6 - 5)^4 + 21}{27 - 4^2}$

k) $\frac{40 - 1^3 - 2^4}{3(2 + 5) + 2}$

l) $20 \div 4 + \{2 \times 3^2 - [3 + (6 - 2)]\}$

P.29 TRY

m) $3 + 2\{3[(4 - 2)^2 + 1]\}$

n) $-6 - 3^2\{-2(2 - 3)^3 + (4 - 2)^2\}$

$=$

$=$

$= -$ → -60