MATH 100: CLASS DISCUSSION
4 SEPTEMBER 2018

If time permits play 2048. Download app on your phone.

Write the powers of 2 through 2^{12}.   Can you estimate 2^{20} without using a calculator?

Order of Operations:
1. Parentheses
2. Exponents and roots
3. Multiplication and Division
4. Addition and Subtraction

Basic laws:

1. Associative rule
2. Distributive rule
3. Commutative rule

Verify each of the following examples:

1. $\sqrt{1+3} + 5 = \sqrt{4} + 5 = 2 + 5 = 7$
2. $\frac{1+2}{3+4} + 5 = \frac{3}{7} + 5$
3. $[(1+2) - 3] - (4-5)$
4. $10 \div (5 \div 2) = 4$
5. $(10 \div 5) \div 2 = 1$

Exercises: Simplify each of the following expressions:

1. $(5-4) - ((2-3) + 1)$
2. $(9-11) + 5(1 - 4 \div 2)$
3. $9 - 3 \div \frac{1}{3} + 1$
4. $1 + 2(3-4) + (6-7+8)\,(3+1)$
5. $3(1 + 2(3 + 4(5+6)))$
6. $5(x-3) - 7(6-x) + 3$
7. $24 - 3(8-x)$

8. $7(25 - x) - 2x$

9. $2(3x - 25)$

10. $5x - 17 + 3x - 5$

11. $6x - 7 - 8x + 115$

12. $x - [3 + \{x - 3(3 + x)\}]$

13. $14x - (5x - 9) - \{4 - 3x - (2x - 3)\}$

14. $10 \times 4 - 2 \times (4^2 \div 4) - 2 \div 1/2 + 9$

15. $-10 + (20 \div 2^2 \times 5 \div 5) \times 8 - 2$

## ➢ Algebra exercises from Hall & Knight I (continued from last class)

1. If $a = 7, b = 2, c = 0, x = 5, y = 3$, find the value of: (A) ab^3, (B) a^4b^y, (C) $a^5c^5y^x$,

 (D) 1^{x+3y}, (E) $abcxy$, (F) $2a + 5b + 9c$, (G) $3x^2 + 1$, (H) a^{b^c}, (I) $\left(a^b\right)^c$

2. If $a = 2, b = 3, c = 1, p = 0, q = 4, r = 6$, find the value of: (A) $\dfrac{3a^2r}{8b}$, (B) $3a^2b^c$, (C) $\dfrac{b^r}{r^b}$,

 (D) $\dfrac{64}{q^r}$, (E) $\dfrac{5a^rb^q}{64r^a}$

3. If $a = 2, b = 3, c = 1, d = 0$, find the numerical value of: (A) $3bcd + 5cda - 7dab + abc$,

 (B) $2a^2 + 3b^3 - 4c^4$, (C) $a^2 + b^2 + c^2 + d^2$, (D) $a^4 + b^4 - c^4$

4. If $a = 2, b = 1, c = 3, x = 4, y = 6, z = 0$, find the value of:

 (A) $c^2(y - x) - b^2(c - a)$, (B) $(2a - c)(x + 2y - z)$, (C) $\dfrac{a^2}{b^2} + \dfrac{b^2}{a^2} - \dfrac{2y}{x^2}$,

 (D) $\dfrac{a^2 - b^2}{a^2b^2} - \dfrac{(a + b + z)^2}{(b + c - z)^2}$, (E) $\dfrac{(a + b + c)^2}{c(y - z)} - \dfrac{4(c - a)^3}{3(a + y)}$

5. When x has the values 0, 3, 6, 8, 10, find the values of $x^2 - 9x + 20$.

6. Show that, if $a = 10$ and $b = 7$, then the following two expressions are equal:
 $$4(a - b) + 3(a + b), \quad 5(a + b) + 2(a - 3b)$$
 Are these expressions equal *for all values of a and b?*

7. When $x = 5$, show that $4x^2 + 4x - 3$ is equal to $9(x + 8)$.

8. Show that $6x^3 - 11x^2 + 3x$ is equal to 0 when x = 1/3, and when x = 3/2. Find its

value in the form of a decimal when x = 1/10.

(A) Which is the greater 245 or 2·4·5, and by how much?

(B) Write the product of *t* and *u* in three ways.

(C) If 5 first-graders have *p* marbles each, express algebraically how many

they have in all.   If p = 25, what is the number?

(D) If 6 cakes are to be shared equally among *x* boys, express algebraically

how many each will have. If x = 42, what is the number?

(E) If 54 books are divided equally among *c* students, express each student's

share algebraically. What is the arithmetical value if c = 6?

(F) What is the difference between "twice 3" and "3 squared"?

(G)   Give the expression for "thrice d," also that for the "cube of d."   Give the

arithmetical values if d = 2.

(H) Distinguish between "four times x" and "x to the fourth." Give the

respective values when x = 3.

(I) The quantity *c* is to be multiplied by the quantity *x*. How is this expressed?

Give the product if c = 7 and x = 3.

(J) If *x factors*, each equal to *c*, are to be multiplied together, express this

algebraically. What is the value if x = 2 and the factor c = 7?

(K) The quantities *a, b, c* are to be added together. Express this algebraically.

What is the answer if a = 5, b = 7, c = 11?

(L) The quantity *r* is to be taken from the quantity *s*. Give the algebraic

expression that denotes this. What is the answer if r = 27 and s = 41?

(M) Albertine starts playing with x marbles and wins y. Express the number

she then has. If x = 25 and y = 9, what number has she?

(N) Albertine plays with her increased number and loses *z*. Express the number she then has. If z = 17, how many has she left?

(O) A farmer takes *f* sheep to market and sells *g* of them. How many has she left? What is the *remainder* if f = 64 and g = 48?

(P) Another farmer takes *k* sheep to market and returns with *l* of them. How many has he sold?   If *k* = 75 and *l* = 32, what is the number he has sold?

(Q) Give the sum and product of the three quantities *a, b, c*; and if a = 5, b = 7, c = 6, give the arithmetical value of each.

(R)   If I walk *y* miles per hour for *y* hours, what is the algebraic expression for the length of my walk?   If y = 4, what is the answer?
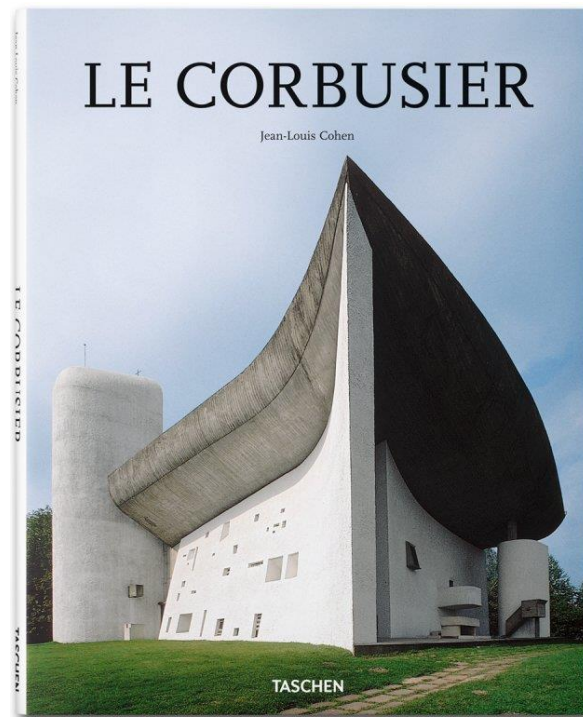
The mathematical phenomenon always develops out of simple arithmetic, so useful in everyday life, out of numbers, those weapons of the gods: the gods are there, behind the wall, at play with numbers.

- Le Corbusier (1887 – 1965)