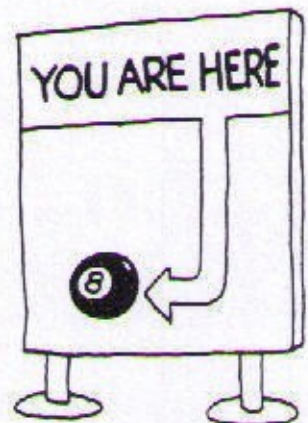# Friendship Junior High School
Sixth Grade Advanced Math Packet
(TDP Pull-Out Program)

Introduction To Algebra

YOU ARE HERE

<u>Algebra Units 1-5</u>

Working With Integers
Order of Operations
Evaluating Expressions
Solving Equations
Problem Solving

UNIT 1
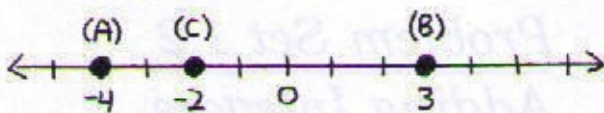# Working With Integers

1. UNDERSTANDING INTEGERS

Integers are all positive counting numbers, negative counting numbers, and zero.

Demonstration

Place each integer on a number line:

(A) -4   (B) 3   (C) -2

Demonstration

Which of the following values are integers?

(D) -5   (E) $3\frac{1}{2}$ (F) -2.25

(D) is an integer. (E) and (F) are not integers.

Demonstration

Place a comparison sign between each pair of integers.

(G) -3 ☐ 2   (G) <
(H) -3 ☐ 0   (H) <
(I) -4 ☐ -6   (I) >

Problem Set 1.1
Understanding Integers
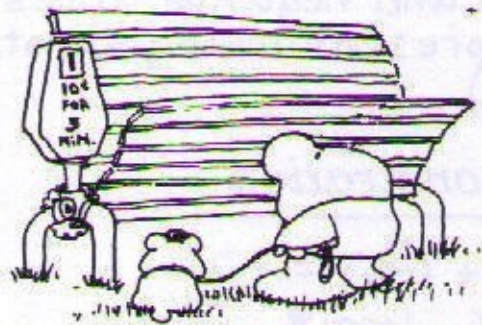
Place each value on a number line:

① -5, 0, 2, 4, -1

② -3, -7, -1, 6, 2

③ -4, -3, 5, 0, -7

④ -2, 3, 4, -4, -1

⑤ -8, -6, -3, 2, 0

⑥ -1, 0, 1, -2, 2

Identify the integers:

⑦ -2.4   ⑪ -2⅓   ⑮ .3

⑧ ½   ⑫ 0   ⑯ -100

⑨ 3   ⑬ 3.35   ⑰ 1776

⑩ -4   ⑭ -6   ⑱ -1½

Place a comparison sign between each pair of integers:

(19) −2 ☐ −5   (25) −3 ☐ 3

(20) 3 ☐ −2   (26) −5 ☐ −5

(21) 4 ☐ 7   (27) −7 ☐ −4

(22) 0 ☐ −1   (28) 3 ☐ 9

(23) −6 ☐ −4   (29) −4 ☐ −2

(24) −8 ☐ −9   (30) 0 ☐ −1

negatives. Line out the values as you combine them.

(C) $(-3) + (-4) + (5) + (7) + (-2)$

$(-3) + (-4) + (5) + (7) + (-2)$

$(-9) + (12) = 3$

(D) $(-3) + (2) + (-7) + (4) + (4)$

$(-3) + (2) + (-7) + (4) + (4)$

$(-10) + (10) = 0$

2. ADDING INTEGERS

Imagine positive values to represent money earned (won) and negative values to represent money spent (lost).

Demonstration

(A) $(+6) + (-8) = -2$

win 6, lose 8

(B) $(-4) + (-7) = -11$

lose 4, lose 7

Demonstration

when adding several integers, combine positives and combine

Problem Set 1.2
Adding Integers

Copy each problem and show all steps:

① $(-6) + (-2)$ ⑪ $(8) + (9)$

② $(-3) + (7)$ ⑫ $(-5) + (11)$

③ $(-8) + (5)$ ⑬ $(7) + (-10)$

④ $(4) + (9)$ ⑭ $(-3) + (-8)$

⑤ $(-7) + (7)$ ⑮ $(-5) + (9)$

⑥ $(6) + (-10)$ ⑯ $(8) + (-11)$

⑦ $(-3) + (-9)$ ⑰ $(-6) + (-4)$

⑧ $(6) + (-4)$ ⑱ $(-2) + (7)$

⑨ $(0) + (-3)$ ⑲ $(6) + (8)$

⑩ $(-7) + (-5)$ ⑳ $(-3) + (-2)$

Working With Integers

21. $(-7) + (6) + (-3) + (-6) + (2)$

22. $(7) + (-4) + (8) + (9) + (-3)$

23. $(-8) + (-6) + (-2) + (7) + (9)$

24. $(-3) + (7) + (-8) + (4) + (0)$

25. $(-6) + (-2) + (3) + (4) + (-1)$

26. $(7) + (-3) + (-2) + (5) + (-8)$

27. $(-3) + (5) + (-5) + (7) + (-2)$

28. $(-10) + (-11) + (9) + (8) + (4)$

JUST REMEMBER, WITHOUT ME, YOU'RE NOTHING!
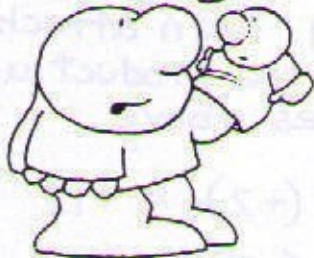
3. SUBTRACTING INTEGERS

When subtracting integers, change the subtraction sign to "addition of the opposite." Then add.

When subtracting several integers, change signs, combine, and show all steps.

Demonstration

(A) $(6) - (8)$
$(6) + (-8) = -2$

(B) $(-7) - (-9)$
$(-7) + (9) = 2$

(C) $(-5) - (6)$
$(-5) + (-6) = -11$

(D) $(-6) + (-5) - (4) - (-3) - (-2)$
$(-6) + (-5) + (-4) + (3) + (2)$
$(-15) + (5) = -10$

Problem Set 1.3
Subtracting Integers

Perform the indicated operation. Show all steps.

1. $(6) - (-4)$ 9. $(10) - (-4)$

2. $(-3) - (7)$ 10. $(7) - (6)$

3. $(-8) + (-9)$ 11. $(-7) + (-8)$

4. $(-6) + (-5)$ 12. $(-9) - (-6)$

5. $(-8) + (4)$ 13. $(6) + (-6)$

6. $(-7) - (-9)$ 14. $(-8) - (9)$

7. $(6) + (-4)$ 15. $(-7) - (-12)$

8. $(9) + (7)$ 16. $(8) + (-14)$

UNIT 1
Working With Integers

⑰ $(-4) - (-12)$ ⑲ $(-6) + (-5)$

⑱ $(3) + (-9)$ ⑳ $(-10) - (-8)$

Challenge Problems

㉑ $(-3) + (-6) - (-8) - (-5) + (4)$

㉒ $(5) - (-4) - (2) + (-6) - (3)$

㉓ $(-7) - (-3) + (-2) - (5) - (-1)$

㉔ $(-3) + (-2) - (-5) - (-6) - (4)$

㉕ $(-7) - (5) - (-6) + (4)$

㉖ $(6) - (6) + (-6) - (-6)$

㉗ $(-10) + (-8) - (-7) - (12) + (-5)$

㉘ $(-6) - (-4) - (14) + (20) - (-12)$

㉙ $(-7) + (-2) - (-9) - (6) + (3)$

㉚ $(-8) - (-8) + (-8) - (8) + (-8)$

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4. MULTIPLYING & DIVIDING

Multiplication and division of integers operate under the same rules :

- The answer is $(+)$ if both signs are the same

- The answer is $(-)$ if the signs are different

Demonstration

Ignore the signs and multiply. Then attach a sign to the product using the rules above.

(A) $(+6) \times (+2) = +12$

(B) $(+6) \times (-2) = -12$

(C) $(-6) \times (+2) = -12$

(D) $(-6) \times (-2) = +12$

Divide – using the same rules and procedures.

(E) $(+6) \div (+2) = +3$

(F) $(+6) \div (-2) = -3$

(G) $(-6) \div (+2) = -3$

(H) $(-6) \div (-2) = +3$

-4-

Working With Integers

Demonstration

When multiplying more than two integers, use the rules indicated below:

- If you multiply an odd number of (−) signs, the product will be (−)

- If you multiply an even number of (−) signs, the product will be (+)

(I) $(-3) \times (2) \times (-1) = 6$
even number of (−) signs

(J) $(-2) \times (-2) \times (-3) = -12$
odd number of (−) signs

Problem Set 1.4
Multiplying & Dividing

Perform the indicated operation:

① $(6) \times (-5)$
② $(-3) \times (-8)$
③ $(7) \div (-1)$
④ $(9) \div (3)$
⑤ $(-2) \times (8)$
⑥ $(-6) \times (-6)$

⑦ $(-20) \div (5)$
⑧ $(8) \div (-8)$
⑨ $(-3) \times (-7)$
⑩ $(-12) \div (4)$
⑪ $(-15) \div (3)$
⑫ $(12) \times (-5)$

⑬ $(-7) \times (-7)$
⑭ $(8) \div (1)$
⑮ $(-6) \div (-3)$
⑯ $(-4) \times (12)$

⑰ $(-10) \times (-8)$
⑱ $(25) \div (-5)$
⑲ $(55) \div (11)$
⑳ $(14) \times (-3)$

Perform the indicated operations. Be careful not to confuse the rules for adding and subtracting with the rules for multiplying and dividing:

㉑ $(-3) + (-8)$
㉒ $(-8) - (-4)$
㉓ $(-7) \times (-2)$
㉔ $(-3) - (4)$
㉕ $(12) + (-6)$

㉖ $(-8) \div (2)$
㉗ $(-2) - (-8)$
㉘ $(-10) \times (3)$
㉙ $(-10) + (13)$
㉚ $(8) - (-6)$

Challenge Problems

㉛ $(-2) \times (-1) \times (3) \times (2)$

㉜ $(-4) \times (2) \times (-1) \times (-1)$

㉝ $(-5) \times (1) \times (3) \times (2)$

㉞ $(-4) \times (-3) \times (-2) \times (-1)$

㉟ $(6) + (-2) - (-3) + (4) - (-1)$

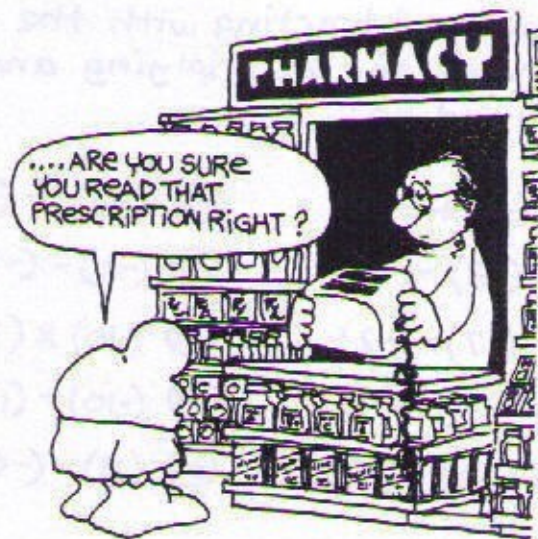continued

UNIT 1
Working With Integers

36) $(10) - (-3) - (4) + (-7) - (-2)$

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

38) $(6) - (-1) + (3) + (-5) - (-2)$

39) $(-12) + (-8) - (-15) + (6) - (-10)$

40) $(-1) \times (-1) \times (-1) \times (-1) \times (-1)$

....ARE YOU SURE YOU READ THAT PRESCRIPTION RIGHT?

PHARMACY

REVIEW & PRACTICE

Draw a number line and identify each integer:

1) $-4, -3, 6, 2$

2) $0, -1, 5, -3, -4$

3) $2, -2, 5, -5$

4) $-3, 0, 3, -1$

Identify the integers:

5) -4 7) $-1\frac{2}{3}$ 9) 0

6) -4.5 8) 6 10) $-2\frac{1}{2}$

Place a comparison sign between each pair of integers:

11) $-2 \square 0$ 14) $-8 \square -6$

12) $-4 \square -7$ 15) $-2 \square -10$

13) $7 \square -7$ 16) $-3 \square -3$

Perform the indicated operations. Show all steps for subtraction problems:

17) $(-3) + (-7)$ 25) $(-2) + (-6)$

18) $(-8) \times (-4)$ 26) $(-8) - (-4)$

19) $(9) \div (-3)$ 27) $(5) + (-7)$

20) $(-12) - (-6)$ 28) $(-10) \div (-1)$

21) $(-8) \div (-8)$ 29) $(8) - (-6)$

22) $(6) - (7)$ 30) $(-12) \times (-3)$

23) $(-4) - (-8)$ 31) $(-2) - (-9)$

24) $(-3) \times (4)$ 32) $(-5) + (13)$

Working With Integers

(33) $(-8) \times (5)$

(34) $(6) - (-14)$

(35) $(-12) + (-3)$

(36) $(-4) \times (-2)$

(37) $(-8) - (-10)$

(38) $(-4) - (-3)$

(39) $(-20) \div (4)$

(40) $(13) + (-10)$

(41) $(-5) - (-8)$

(42) $(-16) \div (-8)$

(43) $(-3) - (-1)$

Challenge Problems

(44) $(-3) + (-2) - (-5) - (-7) - (8)$

(45) $(-4) - (-2) + (-6) - (7) - (-2)$

(46) $(-6) + (-2) + (4) - (-2) - (6)$

(47) $(8) - (-2) + (-5) - (-6) + (-4)$

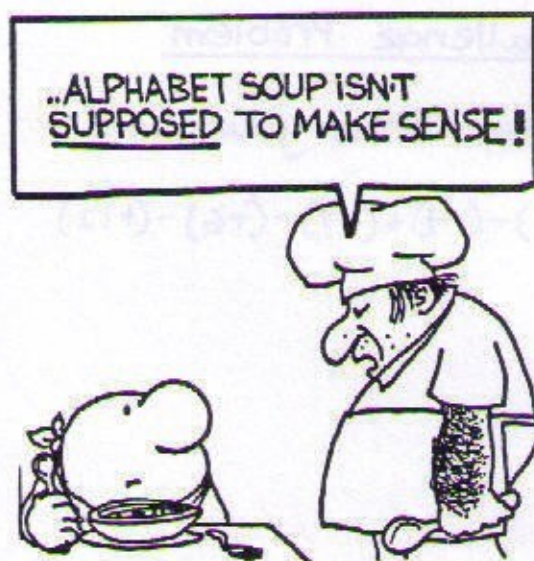(48) $(-2) \times (2) \times (-3) \times (1)$

(49) $(-3) \times (-1) \times (2) \times (-4) \times (2)$

(50) $(8) \times (-1) \times (2) \times (-1) \times (-1)$

(51) $(-3) \times (2) \times (-1) \times (4) \times (2)$

(52) $(-3) - (-5) + (-7) - (-2) - (6) + (4)$

(53) $(-2) - (8) + (-3) - (-5) + (-12)$

..ALPHABET SOUP ISN'T SUPPOSED TO MAKE SENSE!
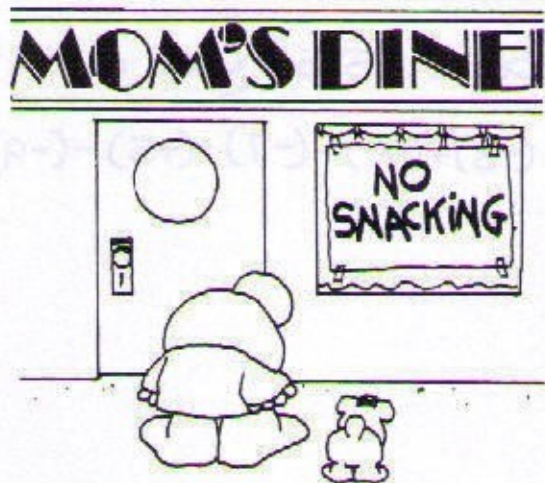
UNIT 1
Working With Integers

Place a comparison sign between the integers:

① $-11 \ \square \ -13$

Perform the indicated operations. Show your work on subtraction problems:

② $(-8) \div (+4)$

③ $(-3) + (-7)$

④ $(-9) - (-2)$

⑤ $(-5) \times (-9)$

Challenge Problem

Solve. Show your work:

⑥ $(-3) - (-4) + (-7) - (+6) - (+12)$

Place a comparison sign between the integers:

① $-9 \ \square \ -1$

Perform the indicated operations. Show your work on subtraction problems:

② $(-20) \div (-4)$

③ $(-2) + (+7)$

④ $(-5) - (+11)$

⑤ $(+4) \times (-12)$

Challenge Problem

Solve. Show your work:

⑥ $(-8) + (-4) - (-7) - (+5) - (-9)$

Order Of Operations

1. USING EXPONENTS

An exponent shows how many times the base number is multiplied by itself.

Demonstration

(A) $3^4 = 3 \times 3 \times 3 \times 3 \times 1 = 81$

$3^3 = 3 \times 3 \times 3 \times 1 = 27$

$3^2 = 3 \times 3 \times 1 = 9$

$3^1 = 3 \times 1 = 3$

$3^0 = 1$

Note: Anything raised to the "0" power = 1

(B) $2^4 = 2 \times 2 \times 2 \times 2 \times 1 = 16$

$2^3 = 2 \times 2 \times 2 \times 1 = 8$

$2^2 = 2 \times 2 \times 1 = 4$

$2^1 = 2 \times 1 = 2$

$2^0 = 1$

Demonstration

When a base number is inside of parenthesis, an exponent indicates the number of times the base is multiplied by itself.

(C) $(-2)^4 = (-2) \times (-2) \times (-2) \times (-2) \times 1 = 16$

$(-2)^3 = (-2) \times (-2) \times (-2) \times 1 = -8$

$(-2)^2 = (-2) \times (-2) \times 1 = 4$

$(-2)^1 = (-2) \times 1 = -2$

$(-2)^0 = 1$

Note: In the above example, an "even" exponent results in an even amount of (−) signs and a (+) result.

Note: Anything to the "0" power = 1 (even a negative base value).

(D) $(-2)^5 = -32$

(E) $(-1)^6 = 1$

(F) $(-5)^3 = -125$

(G) $(-7)^0 = 1$

YOU'RE RIGHT... THAT'S A VERY FUNNY NOISE!

NYUK NYUK NYUK
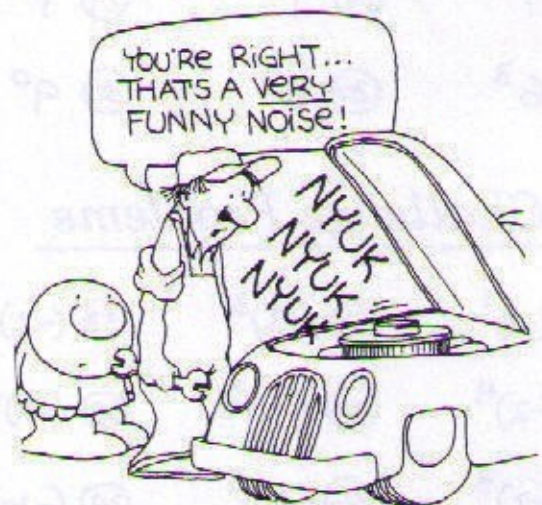
UNIT 2
Order Of Operations

Problem Set 2.1
Using Exponents

Indicate the value of each exponential expression:

① 7^2　　⑪ 3^5　　㉑ 4^4

② 4^3　　⑫ 9^2　　㉒ 6^4

③ 5^2　　⑬ 4^0　　㉓ 5^0

④ 8^0　　⑭ 10^3　　㉔ 12^2

⑤ 5^3　　⑮ 2^6　　㉕ 3^3

⑥ 3^4　　⑯ 10^2　　㉖ 13^1

⑦ 2^5　　⑰ 10^4　　㉗ 2^4

⑧ 1^5　　⑱ 2^3　　㉘ 6^2

⑨ 7^0　　⑲ 1^7　　㉙ 1^4

⑩ 6^3　　⑳ 8^2　　㉚ 9^0

Challenge Problems

㉛ $(-2)^1$　　㉞ $(-3)^3$　　㊲ $(-2)^5$

㉜ $(-2)^4$　　㉟ $(-4)^3$　　㊳ $(-1)^6$

㉝ $(-2)^3$　　㊱ $(-5)^0$　　㊴ $(-10)^3$

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2. LEARNING THE ORDER

Use the following order when calculations are to be performed in an expression:

- Parenthesis
- Exponents
- Multiply / Divide
- Add / Subtract

Demonstration

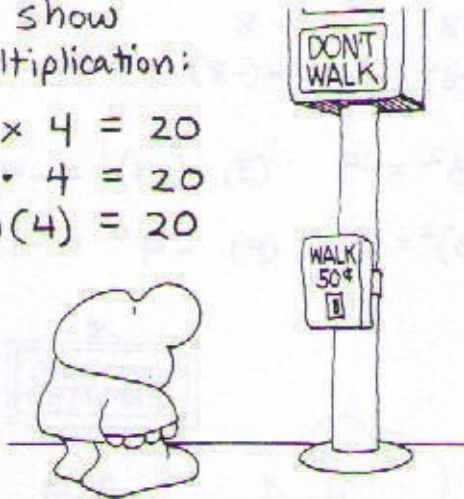Show your work when determining each value:

(A) $6 + 3 \times 4$
$6 + 12 = 18$

(B) $7 - (8-3) \times 4 - 2$
$7 - (5) \times 4 - 2$
$7 - 20 - 2$
$7 + (-20) + (-2) = -15$

OOPS! SORRY...
@#*!!

$-10-$

UNIT 2
Order Of Operations

Note: There are three ways to show multiplication:

- $5 \times 4 = 20$
- $5 \cdot 4 = 20$
- $(5)(4) = 20$

Demonstration

(c) $(-3)(2) - (-4)(-2)$
$(-6) - (8)$
$(-6) + (-8) = -14$

(D) $(-2)^3 - (-3) \cdot (-1)$
$(-8) - (-3) \cdot (-1)$
$(-8) - (3)$
$(-8) + (-3) = -11$

Problem Set 2.2
Learning The Order

Determine each value. Show all steps.

① $6 - 3 \times 5$

② $8 + 2 \cdot (-3)$

③ $6 + (-8) \div 2$

④ $-2 - (-3)(-2)$

⑤ $-8 - (7-3)$

⑥ $12 - (9-1)$

⑦ $8 - (6+5)(-1)$

⑧ $-9 + (4+2)(-2)$

⑨ $4 - (3)(-2) - 5$

⑩ $-6 + (-2)(4) - (-1)$

⑪ $10 - 5 \cdot 3 - 4$

⑫ $-1 + (3)(-4) - (-2)$

⑬ $-6 + (-3)(5-2)$

⑭ $-8 - (-6) \cdot (3+7)$

⑮ $(6-3) - (8+5)$

⑯ $(3-8) + (6-10)$

⑰ $(-2)^2 - (3-5)$

⑱ $(-1)^3 + (2-7)$

⑲ $(-4)^0 - (-2)(5)$

⑳ $(-3)(-3) + (-1)^4$

Challenge Problems

㉑ $(-2)(-2)(-2) - (-2)^3$

㉒ $(2-5)^2 + (3-4)^3$

㉓ $(-2)^2 - (-1)^3 + (-3)^2$

㉔ $(-2)(-3) - (-4)(-1)^2 - (-3)$

㉕ $(-2)(5-7) - (-3)^0$

㉖ $(-5)^2 - (-6) \div (-1)^3 - (-3)$

㉗ $(-2)^0 - (3-7)(-3)$

㉘ $(-6)(-1) \div (-2) - (-2)^3$

㉙ $(-1)(-1)(-1) + (-1)^0$

㉚ $(-2)^4 - (-2)^3 - (-2)^2$

Order Of Operations

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3. MORE PRACTICE

As you continue to work with order of operations, it is important that you continue to show each step.

Demonstration

(A) $(-1)^2 - (-2)^2 (-3)^0$
$(1) - (4)(1)$
$(1) - (4)$
$(1) + (-4) = -3$

Note: There is a difference in calculating with exponents when you do not have parenthesis around a negative base value.

With Parenthesis	No Parenthesis
$(-2)^4 = 16$	$-2^4 = -16$
$(-2)^3 = -8$	$-2^3 = -8$
$(-2)^2 = 4$	$-2^2 = -4$
$(-2)^1 = -2$	$-2^1 = -2$
$(-2)^0 = 1$	$-2^0 = -1$

In these expressions, the order indicates you should apply the exponent before the negative sign. That is why they are all negative.

(B) $(-2)^3 - 2^2 - 2^3$
$(-8) - 4 - 8$
$(-8) + (-4) + (-8) = -20$

(C) $-3^2 = -9$ (E) $(-4)^1 = -4$

(D) $(-3)^2 = 9$ (F) $-4^0 = -1$

OVERTIPPING PERMITTED

Problem Set 2.3
More Practice

Determine each value. Show all steps.

① $(-3)(-2)(-1) - (-2)^2$

② $(-1)^2 - (5-9) \div 2$

③ $(-1)^2 - 1^2$

④ $(-4)^0 - (-3)^2 - (-1)^3$

⑤ $(-2)(-5) + (-2)^2 - (-2)^3$

⑥ $-2(5-8) - (-3)^2$

UNIT 2
Order Of Operations

⑦ $(-3)^2 - 3^2 + (-3)^2$

⑧ $-3(-2)^2 - (-1)^4$

⑨ $(-3)(-5)^0 - 2^2$

⑩ $-2^4(3-7)^0 - (-2)$

⑪ $(-1)^2 - (-1)^3 - (-1)^4$

⑫ $(-2)^3 - (-3)(-1)(-2)^2$

⑬ $-4^2 - 4 - (-4)^2$

⑭ $(-3)^2 - (5-7)$

⑮ $-3^2 - 5(-7)$

⑯ $-5^0 - (-5)^0 - (-5)$

① 3^3

② 2^5

③ 4^2

④ $(-10)^2$

⑤ $(-3)^3$

⑥ $(-2)^4$

⑦ -3^2

⑧ -2^2

⑨ -4^0

⑩ $(-4)^0$

⑪ $-4 - (-3)(-2)$

⑫ $(6-9) - (-2)$

⑬ $(-3) - 8 \div (-2)$

⑭ $(-2)(-4) - (-1)(3)$

⑮ $8 - 2(-4) - (-6)$

⑯ $(-1)^3 - (4-9)$

⑰ $(-2)^2 - (-3)(-2)$

⑱ $(-1)^2(-2)^3 - (-2)$

⑲ $(-3) - (-2)^3 \div 2$

⑳ $(-3)(-2)(-1)$

㉑ $(6-8)^2 - (-2)^0$

㉒ $(-1)^0 - (-1)^2 - (-1)$

㉓ $(-2)(-2)^2 - (-2)$

㉔ $(-6) - (-2)^3 \cdot (-1)$

㉕ $(-3)(-4)(-5)$

Exponent Review

⑰ -4^2

⑱ $(-4)^2$

⑲ -3^3

⑳ -3^2

㉑ $(-3)^3$

㉒ $(-3)^2$

㉓ -2^0

㉔ $(-2)^0$

㉕ $(-2)^5$

㉖ -5^3

㉗ $(-5)^3$

㉘ $(-5)^2$

㉙ -5^0

㉚ -1^3

Challenge Problems

㉖ $(-2)^2 - (-2)^0(-3)^2 + (5-11)$

㉗ $(4-6)^2 - (-2)^3(-5)^0$

㉘ $(-3) - (-2)(-2)(-2)^2$

㉙ $(-2) - 2^3 - 2^2$

㉚ $-3^2 - (-3)^2 - (-3)$

㉛ $(-1)^2 - (-1)^3 - 1^4$

㉜ $(9-12)^2 - (5-8)^3(-3)^0$

㉝ $(-2)^3(-2)^2 - (-2) \div (-2)$

㉞ $(-2)^2 - 2^4 \div (-2)^3 - 2^2$

UNIT 2
Order Of Operations

PRACTICE TEST #1

Determine the value of each expression:

① 2^5

② $(-3)^3$

③ $-3 + (-6) \cdot (+2)$

④ $(-8) + (-9) \div (-3) - (-4)$

⑤ $(-6)^0 + (-3) - (-2)$

Challenge Problem

Solve. Show your work:

⑥ $(-3)^3 - 4^0 + (-3)(-4)$

PRACTICE TEST #2

Determine the value of each expression:

① 3^4

② $(-4)^2$

③ $-8 - (-2)(-1)^2 - (-5)$

④ $(-2) - (5-9)(-2) + (-8)$

⑤ $(-4)(+3) - (-4)$

Challenge Problem

Solve. Show your work:

⑥ $-3^2 - (-2) \div (+2) - (4-6)$

TODAY'S SPECIAL
U.F.O. PLATE

WHAT'S THE U.F.O. PLATE?

--UNIDENTIFIED FRIED OBJECT !!

...I'M NOT SURE WHAT KIND OF PIE THAT IS...IT WAS HERE WHEN I BOUGHT THE PLACE!

ED'S DINE

UNIT 3
Evaluating Expressions

1. SUBSTITUTING VALUES

Evaluating expressions involves substituting values for variables and using the order of operations.

Demonstration

Always use parenthesis when substituting values.

Evaluate for:
a = 2   b = 3   c = -2

(A) $a + b$
$(2) + (3) = 5$

(B) $b + ca$
$(3) + (-2)(2)$
$(3) + (-4) = -1$

(C) $b - c + a \div c$
$(3) - (-2) + (2) \div (-2)$
$(3) - (-2) + (-1)$
$(3) + (2) + (-1)$
$(5) + (-1) = 4$

(D) $a(b-c)$
$(2)((3)-(-2))$
$(2)((3)+(2))$
$(2)(5) = 10$

Problem Set 3.1
Substituting Values

Evaluate each expression:
a = 3   b = -2   c = -4

① $a + b + c$
② $b - a$
③ $b - c$
④ $a + b - c$
⑤ $c - ab$
⑥ $ac + ab$
⑦ $a - c \div b$
⑧ $b + ac \div b$
⑨ $ac - ab$
⑩ $cb + ac$
⑪ $a - b - c$
⑫ $ab - bc$
⑬ $a + b \div b + c$
⑭ abc
⑮ $c - bc + ac$
⑯ $ab - abc$
⑰ $b + bc \div b$

continued

PROCRASTINATION
RESEARCH CEN
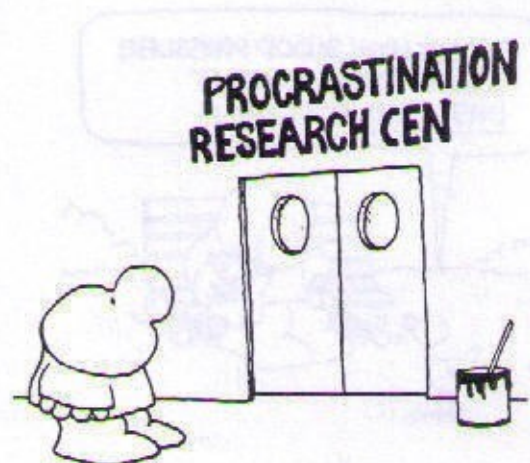
⑱ $b - ab + c - bc$

⑲ $a + b - c \cdot a - b$

⑳ $b - ac \div b - ab$

Challenge Problems

㉑ $b(a-b)$

㉒ $(b-c) + (a-c)$

㉓ $a(b+c) - a$

㉔ $(a+c) - b \div (a+c)$

㉕ $ab - (b-a)$

㉖ $(a+b) - (c-b)$

㉗ $a(b+c) - b(a-c)$

㉘ $(a-b)(b+c)$

I'VE GOT HiGH BLOOD PRESSURE ... NEXT TiME, MAKE iT UNSALTED POPCORN!

---

2. COEFFICIENTS

A coefficient is a value multiplied by a variable.

Example : $3n$

- The variable : n
- The coefficient : 3

Demonstration

Evaluate each expression:
$$x = -2 \quad y = -1 \quad z = 2$$

(A) $2x - 3y$

$2(-2) - 3(-1)$

$(-4) - (-3)$

$(-4) + (3) = -1$

(B) $3yz - x$

$3(-1)(2) - (-2)$

$(-6) - (-2)$

$(-6) + (2) = -4$

(C) $2y - 3(2x + z)$

$2(-1) - 3(2(-2) + (2))$

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

$2(-1) - 3(-2)$

$(-2) - (-6)$

$(-2) + (6) = 4$

UNIT 3
Evaluating Expressions

Problem Set 3.2
Coefficients

Evaluate each expression:
$x = -1$ $y = 3$ $z = -2$

① $3x + y$

② $x - 2z$

③ $3xy$

④ $4xz$

⑤ $y + 2x$

⑥ $z - 5y$

⑦ $4y - x \cdot 2z$

⑧ $x + 3z \div y$

⑨ $4xyz + x$

⑩ $2y - 3z$

⑪ $3xy - x + y$

⑫ $z - 2y \cdot x$

⑬ $3y \cdot x + 2y$

⑭ $x - 2y + 2z$

⑮ $3x - 3y - 3z$

⑯ $x - y - 4xy$
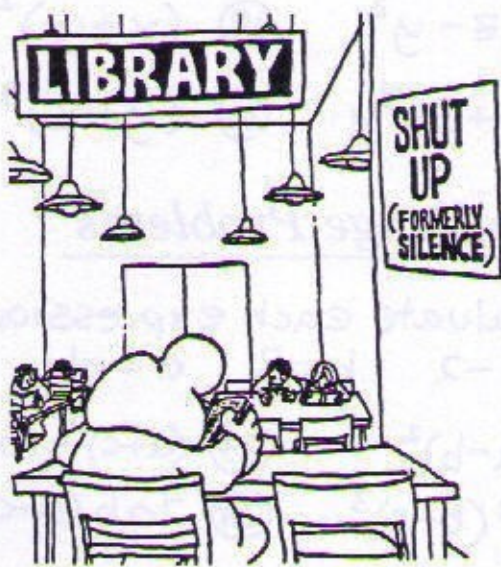
Challenge Problems

Evaluate each expression:
$a = -2$ $b = -1$ $c = 4$

⑰ $3(a - b)$

⑱ $2(b + c)$

⑲ $2a(2b - c)$

⑳ $3b(c - 2a)$

㉑ $(a + b) - 3ab$

㉒ $(c - b) + 4bc$

㉓ $3ab(2a + b)$

㉔ $4b(3a - 2c)$

3. EXPONENTS

When evaluating expressions that include exponents, it is very important to use parenthesis.

Demonstration

Evaluate each expression:
$x = -2$ $y = -3$ $z = -4$

(A) x^2
$(-2)^2 = 4$

(B) $2y^2$
$2(-3)^2$
$2(9) = 18$

Failing to use parenthesis results in an incorrect answer:
$-2^2 \rightarrow -4$

UNIT 3
Evaluating Expressions

Demonstration

Evaluate each expression:
$a = -3 \quad b = -1 \quad c = 2$

(C) $3ab^2$
$3(-3)(-1)^2$
$3(-3)(1) = -9$

(D) $(a+b)^3$
$((-3)+(-1))^3$
$(-4)^3 = -64$

(E) $2c - 3ab^2c^2$
$2(2) - 3(-3)(-1)^2(2)^2$
$2(2) - 3(-3)(1)(4)$
$(4) - (-36)$
$(4) + (36) = 40$

Remember: Continue to use parenthesis when evaluating expressions.

WHEN i SAID i WAS DREAMING OF A WHITE CHRISTMAS, i DIDN'T MEAN ALL AT ONCE!

Problem Set 3.3
Exponents

Evaluate each expression:
$x = -1 \quad y = -2 \quad z = -3$

① x^4
② y^2
③ y^3
④ z^0
⑤ $3xy^2$
⑥ $4x^3z$
⑦ $3x^2 + y^3$
⑧ $2xz - x^4$
⑨ $3yz - y^2$
⑩ $xy + 3x^4y$

⑪ $x^2y^2z^2$
⑫ $2xy^3z$
⑬ $x^2 - 2y^2 - z$
⑭ $3x - y + z^2$
⑮ $2xyz - x^2$
⑯ $xy^0 + xy^2$
⑰ $3x^2 - x^3 \div z^0$
⑱ $2y^3 - z^2 \div 3x$
⑲ $(x+y)^2$
⑳ $(y+z)^3$

Challenge Problems

Evaluate each expression:
$a = -2 \quad b = 3 \quad c = -1$

㉑ $2(a-b)^2$
㉒ $3c^2(b-c)^3$
㉓ $(a+c)^2 - (b-a)^2$
㉔ $2ab(a-c)^3$

-18-

UNIT 3

Evaluating Expressions

Evaluate each expression:
$a = -1$ $b = -3$ $c = 2$

① $a - b$
② $b - c$
③ $a + b \cdot c$
④ $b - c \div a$
⑤ $b - ab$
⑥ $c + ac$
⑦ abc
⑧ $ac - ab$
⑨ $bc \div a$
⑩ $bc - abc$
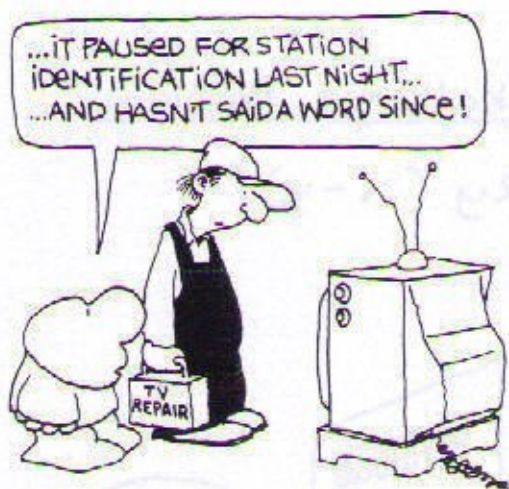
Evaluate each expression:
$x = -2$ $y = -3$ $z = -1$

⑪ $3xy - z$
⑫ $2y - 3z$
⑬ $4x - 2y \div 3z$
⑭ $4y - 6z \div x$
⑮ $5xz - 3y$
⑯ $2yz + 3x$
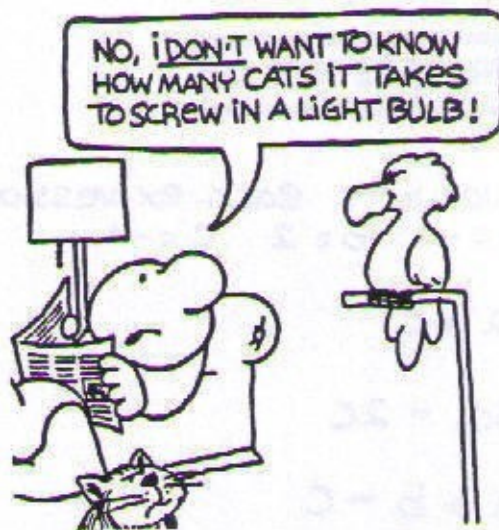
Evaluate each expression:
$a = 2$ $b = -2$ $c = -1$

⑰ b^2
⑱ b^3
⑲ ab^4
⑳ $b^3 c^4$
㉑ $2b^2 - 3a$
㉒ $6c^3 - ab$
㉓ $2ab^2c^2$
㉔ $3a^2b^3$
㉕ $a^0 bc^5$
㉖ $(a-b)^2$
㉗ $(b+c)^2$
㉘ $3(b-c)^3$
㉙ $4(c-a)^2$
㉚ $3ab^2(a+c)$
㉛ $2bc^3(a-b)$
㉜ $(b-c)^3 - 3b^2$

Evaluating Expressions

Evaluate each expression:
$a = -2$ $b = 2$ $c = -1$

① $a + c$

② $3a - 2c$

③ $a + b - c$

④ $4a - 3c^3$

⑤ $2ab^2c^4$

Challenge Problem

⑥ $4c(a-c)^2$

Evaluate each expression:
$x = -1$ $y = -3$ $z = 2$

① $x + y + z$

② $4x - 5y$

③ $2x + 2y$

④ $3x^3 - 2y$

⑤ $5x^2yz$

Challenge Problem

⑥ $2y(x-y)^2$

AS MUCH AS I HATE GETTING
NOTHING BUT BILLS
...AT LEAST IT'S CONSOLING
TO KNOW SOMEBODY CARES !!

FUTURE

...IT FEELS
WARM !!

Cumulative Review

REVIEW & PRACTICE

Place a comparison sign between each pair of integers:

① $-3 \square 0$

③ $-6 \square -8$

② $-5 \square -1$

④ $-5 \square -5$

Perform the indicated operations. Show all steps:

⑤ $(-4)+(-7)$

⑨ $(+12) \div (-2)$

⑥ $(-3) \times (-5)$

⑩ $(-6) \times (+5)$

⑦ $(-8)-(+4)$

⑪ $(-3)-(-8)$

⑧ $(-6)-(-10)$

⑫ $(-4)+(+9)$

⑬ $(-6)+(-4)-(+2)-(-6)-(-8)+(-3)$

⑭ $(-4) \times (-1) \times (+2) \times (-1) \times (-1)$

⑮ $(+11)-(-12)+(-4)-(-2)+(+5)$

CASHEW!!

GESUNDHEIT!

MIXED NUTS

Exponents and order of operations:

⑯ 3^3

⑳ -2^2

㉔ $(-4)^2$

⑰ 2^4

㉑ -5^2

㉕ -4^2

⑱ $(-2)^3$

㉒ $(-3)^0$

㉖ -5^3

⑲ $(-2)^2$

㉓ -3^3

㉗ $(-7)^2$

㉘ $(-2)+(-3) \times (+4)-(-5)$

㉙ $(-6)-(-8)+(+3) \cdot (-2)$

㉚ $(-8) \div (-2)-(-6) \div (-6)$

㉛ $(-1)(-2)-(-3)(-2)-(-4)$

㉜ $(-3)^2-(-2)^3+(-3)^0$

㉝ $(-4)-(-2)^2-3^2$

㉞ $(+3)(-2)-(-2)^2(-1)^3$

㉟ $(-2)+(-1)^2 \times (-2)^0-(-3)^2$

㊱ $-3^2-(-2)(-1)(+3)-2^2$

㊲ $(-5) \div (-1)^3 \times (-4)-(-2)^3$

㊳ $(-1)(-2)-(-3) \div (-1)-(-2)^2$

㊴ $-1^2-(-1)^3-(-1)^4-(-1)^5$

-21-

Cumulative Review

Evaluating expressions:
$a = -1$ $b = -2$ $c = 2$

$x = -1$ $y = -2$ $z = -3$

40. $a + b + c$
41. $2a - 3b$
42. $a + 2b - c$
43. $a - b + 2c$

44. $a^2 - bc$
45. $a - b^2 c$
46. $a + 2bc$
47. $b^2 - a^2 c^2$

54. $x - y + 2z$
55. $3x - y^2$
56. $2(x + y) - y^2$
57. $x^3 - y^3$
58. $4(x + z) - 2(x + y)$
59. $x^2 + y^2 + z^2$
60. $2xy - yz$
61. $2x^3 y^2 + 3y$
62. $3xy^2 + 2z^2$

$x = 2$ $y = -3$ $z = -2$

48. $3xy$
49. $2x - 3z$
50. $x^2 - xy$

51. $(x + y)^2$
52. $(y + z)^2$
53. $x(y + x)$

SOMETIMES I GET SO FRUSTRATED WITH MY COMPUTER... I FEEL MORE LIKE BOOTING IT OUT INSTEAD OF BOOTING IT UP!

...IT'S A COMMON PROBLEM WITH THESE OLDER MACHINES ...THE PILOT LIGHT WENT OUT!

COMPUTER REPAIR
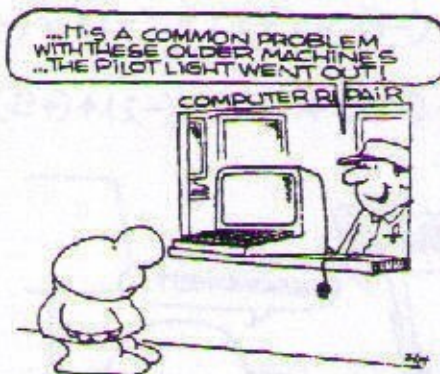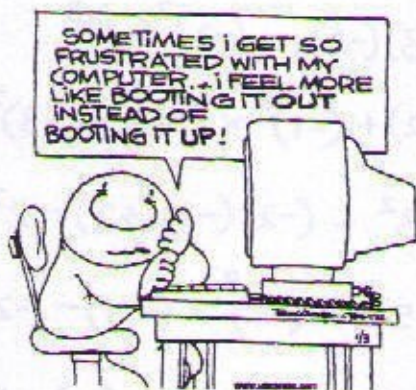
Cumulative Review

PRACTICE TEST

Place a comparison sign:

① $-7 \ \square \ -9$

Solve or simplify:

② $(-3) + (-5)$

③ $(-2) - (+7)$

④ $(-4) \times (+3)$

⑤ $(-12) \div (-2)$

⑥ $(-2)^3$

⑦ -3^2

⑧ $(-2) - (-4) \times (-3)$

⑨ $-1^2 + (-3)^2$

⑩ $(-2)(-3) - (-1)^0$

⑪ $(-2) + (+4) - (-3) - (+7)$

Evaluating expressions:
$a = -2 \quad b = -3 \quad c = 2$

⑫ $a + b - c$

⑬ $2a + b^2$

⑭ $2(a+b)$

⑮ $a^2 - 2bc$

⑯ $abc - 2ab$

⑰ $3a - 2b + c^2$

⑱ $a^2 - b^2 - c^2$

Simplify:

⑲ $(-3)(-1)^2 - (-2)^3(-4)^0$

⑳ $(-6) + (-1)^4(-2)^2 - 1^3$

UNIT 4
Solving Equations

1. SIMPLE EQUATIONS

An equation is a mathematical statement that is in balance. To solve an equation, it is necessary to isolate the variable.

Keep the balance by performing operations on both sides of the equation.

Demonstration

Solve each equation and show all steps:

(A) $n + 7 = 15$

$$n + 7^{-7} = 15^{-7}$$
$$n = 8$$

(B) $-10 = x - 6$
$$-10^{+6} = x - 6^{+6}$$
$$-4 = x$$
$$x = -4$$

(C) $12 - a = 21$

$$12^{-12} - a = 21^{-12}$$
$$-a = 9$$
$$a = -9$$
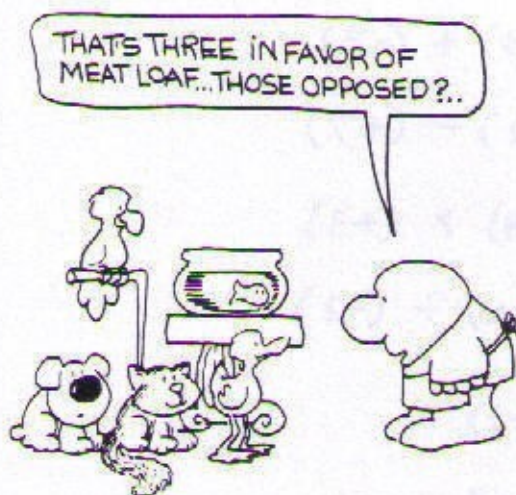
Note: In problem (c), to reach the last step you must multiply both sides by (-1)
$$-a = 9$$
$$(-1)(-a) = (-1)(9)$$
$$a = -9$$

THAT'S THREE IN FAVOR OF MEAT LOAF...THOSE OPPOSED?..

Problem Set 4.1
Simple Equations

Solve each equation and show all steps:

① $x + 15 = 2$ ⑤ $5 = a - 15$

② $a + 8 = -4$ ⑥ $14 = n + 12$

③ $n - 5 = -2$ ⑦ $9 = x + 7$

④ $c - 12 = 8$ ⑧ $-10 = c - 4$

Solving Equations

⑨ $11 + n = 16$ ⑮ $n + 1 = 1$

⑩ $12 + a = -2$ ⑯ $x + 6 = -6$

⑪ $9 - x = 4$ ⑰ $3 - a = 4$

⑫ $8 - n = -3$ ⑱ $12 - n = -1$

⑬ $7 = 5 - a$ ⑲ $3 = 8 - x$

⑭ $-6 = 3 - n$ ⑳ $-2 = -5 - n$

HELP
FIGHT
STATIC
CLING

2. TWO-STEP EQUATIONS

Some equations require more than one operation to isolate the variable.

To solve a two-step equation, you must know some important vocabulary terms involving equations:

$$5n - 3 = 12$$

↑↑ ↑ ↑ constant
| | variable
coefficient

Demonstration

Solve the equation. Show all steps.

(A) $5n - 3 = 12$

$5n - 3^{+3} = 12^{+3}$

$5n = 15$

$\left(\frac{1}{5}\right)(5n) = \left(\frac{1}{5}\right)(15)$

$n = \frac{15}{5}$

$n = 3$

Step 1   Add 3 to both sides

Step 2   To isolate the variable, multiply both sides by the reciprocal of the coefficient

Note: Always add or subtract before multiplying by the reciprocal of the coefficient.

UNIT 4
Solving Equations

(B) $8 + 6x = 24$

$8^{-8} + 6x = 24^{-8}$

$6x = 16$

$(\frac{1}{6})(6x) = (\frac{1}{6})(16)$ ← Always use parenthesis in this step

$x = \frac{16}{6}$

$x = \frac{8}{3}$ ← Leave improper fractions in reduced form

(C) $16 = 6 - 4x$

$16^{-6} = 6^{-6} - 4x$

$10 = -4x$

$(\frac{-1}{4})(10) = (\frac{-1}{4})(-4x)$

$\frac{-10}{4} = x$

$x = \frac{-5}{2}$

To check an equation, plug in your answer in the original equation.

AND AWAY

UP

UP

UP
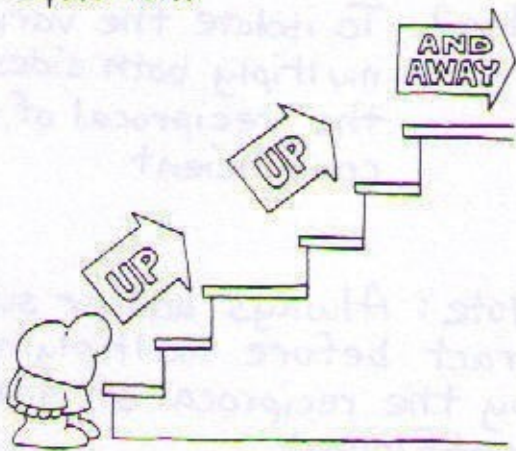
Two Step Equations

Solve each equation and show all steps.

① $4n + 2 = 26$ ⑨ $-6 = 5x - 6$

② $2n - 4 = 6$ ⑩ $9 = -4n - 3$

③ $-2x - 1 = 9$ ⑪ $6 - 3x = 8$

④ $-3a + 5 = 20$ ⑫ $5n + 8 = -3$

⑤ $3x + 2 = 11$ ⑬ $14 - 6a = -2$

⑥ $4a - 3 = -15$ ⑭ $8 - 2n = 8$

⑦ $8 = 2n + 4$ ⑮ $4 - 4x = -10$

⑧ $-12 = 3a + 3$ ⑯ $2 + 8a = 20$

3. COMBINING TERMS

Before isolating the variable, combine all the like terms.

Demonstration

(A) $5n - 3 + 4 - 4n = 8$

$n + 1^{-1} = 8^{-1}$

$n = 7$

-26-

Solving Equations

(B) $2n - 6 = 6n - 2 - 2n$

$\overset{-4n}{2n} - 6 = \overset{-4n}{4n} - 2$

$-2n - 6^{+6} = -2^{+6}$

$-2n = 4$

$\left(\frac{-1}{2}\right)(-2n) = \left(\frac{-1}{2}\right)(4)$

$n = \frac{-4}{2}$

$n = -2$

Problem Set 4.3
Combining Terms

Solve each equation and show all the steps:

① $2n - 5 = 4n - 8 - n$

② $5x + 6 = 2x + 14 + x$

③ $10 - 3a = a - 14 + 4a$

④ $6 + 4n = n - 12 + 5n$

⑤ $n - 5 + 3n = 6 + 7n - 8$

⑥ $2a + 5 - 4a = 3a + 2 - 6a$

⑦ $4a - 6 = 2a - 5 + 4a$

⑧ $3x - 4 + 7x = 18 - x$

⑨ $5n = 3n - 4n + 8$

⑩ $2x - 3 + 7 = x + 6 + (-2)$

⑪ $3n - n + 4 = -2 - 5n$

⑫ $8 - a + 4 = 3a - 2 - a$

⑬ $3x - 5x + 2 = x + 3$

⑭ $8 - 2n - 5 = 3n + 7 - n$

⑮ $9 - 3n + 6 = 8 + n - 1$

⑯ $x - 6 = 8x - 5 - x$

⑰ $3a - 5 + a = a - 7 + 3$

⑱ $2n - 6 - 5n = 7 - n + 3$

⑲ $12 - 5x + 3 = x - 9 + 2x$

⑳ $n - 8 - 5n = 4 - 2n + 2$

PALM READER

LOOK, IF YOU'RE THAT TICKLISH, LET'S USE TEA LEAVES!
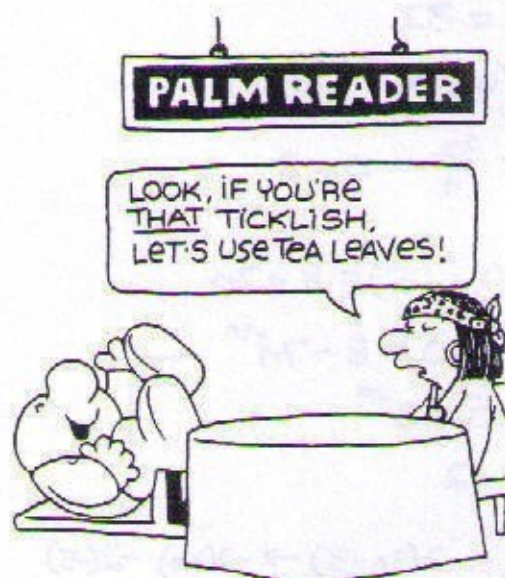
Solving Equations

4. DISTRIBUTIVE PROPERTY

To understand how the distributive property works, consider this example:

$4(8) = 32$

$4(8)$ can be expressed as:

$4(3+5)$

$4(3) \quad 4(+5)$

$12 + 20 = 32$

Demonstration

(A) $\quad 4(n-3) = 20$

$(4)(n) \quad (4)(-3)$

$4n - 12^{+12} = 20^{+12}$

$4n = 32$

$\left(\tfrac{1}{4}\right)(4n) = \left(\tfrac{1}{4}\right)(32)$

$n = \tfrac{32}{4} \quad n = 8$

(B) $\quad -2(3n-5) = 8 - 7n$

$-6n^{+7n} + 10 = 8 - 7n^{+7n}$

$n + 10^{-10} = 8^{-10}$

$n = -2$

Note: $-2(3n-5) \rightarrow -2(3n) \; -2(-5)$
$\qquad\qquad\qquad -6n + 10$

Demonstration

In the following example, be sure to attach the negative sign to the four when using the distributive property:

(c) $\quad 8 - 4(2n-3) = n + 2$

$8\boxed{-4(2n-3)} = n+2$

$8 - 8n + 12 = n + 2$

$20 - 8n^{-n} = n^{-n} + 2$

$20^{-20} - 9n = 2^{-20}$

$-9n = -18$

$\left(-\tfrac{1}{9}\right)(-9n) = \left(-\tfrac{1}{9}\right)(-18)$

$n = \tfrac{18}{9} \quad\quad n = 2$
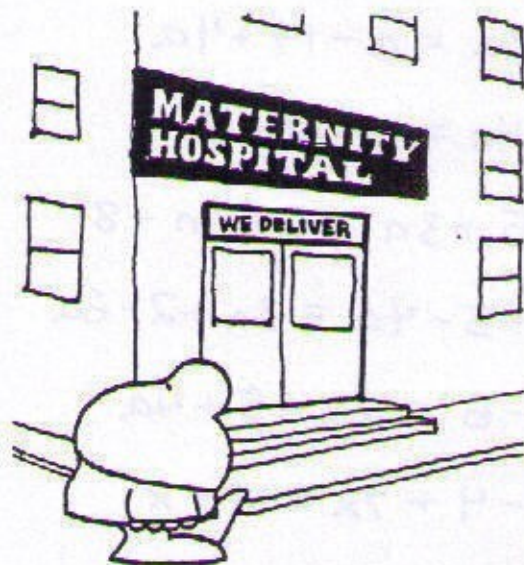
Solving Equations

Problem Set 4.4
Distributive Property

1. $2(x+1) = -4$

2. $3(n-4) = -21$

3. $-5(a+7) = 10$

4. $-4(x-3) = -8$

5. $6(2x-3) = 6$

6. $4(3n-2) = 16$

7. $3(2n-4) = 18 - 4n$

8. $-2(5x-3) = -8 - 3x$

9. $5n - 1 = 2(3n-2)$

10. $3x + 2 = 4(3x+5)$

11. $a - 6 = -2(a-5)$

12. $2n + 5 = 3(2n+2)$

Challenge Problems

13. $8x - 2(3x+2) = 0$

14. $3x - 3 = 5 - 2(x+4)$

15. $2n = 3(2n-4) - 6$

16. $3(n+4) = 2(n-1) - 2$

17. $4(2a-1) = 3 - 2(3-2a)$

18. $6(a+2) - 3(3a+1) = 0$

... MAYBE I SHOULD TURN THE WATER SOFTENER DOWN A TAD!
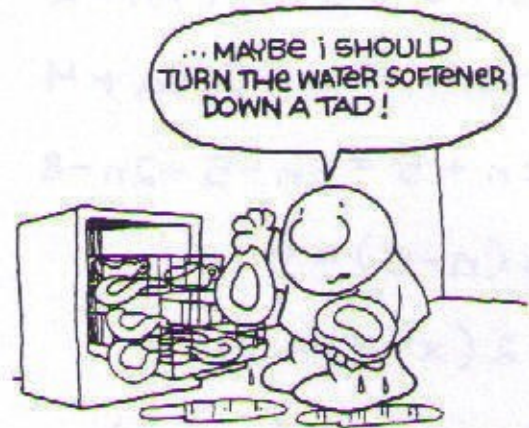
REVIEW & PRACTICE

Solve each equation and show all steps :

1. $n + 7 = 4$

2. $x - 9 = -2$

3. $8 = 10 - n$

4. $-6 = a - 7$

5. $4 - x = 12$

6. $9 - n = -1$

7. $3n - 5 = 7$

8. $5x + 6 = -9$

9. $-4 = 3a + 2$

10. $8 - 2n = 0$

11. $13 - 4x = 9$

12. $4n - 3 = 7$

UNIT 4
Solving Equations

⑬ $3n + 4 - n = 7n + 12 - n$

⑭ $12x - 5 - 3x = 9 + 4x + 1$

⑮ $4a + 5 + a = -8 + 3a + 1$

⑯ $3n - 6 - 5n = -9 + n - 2$

⑰ $14a - 1 = a + 7 - 3a + 4$

⑱ $2n + 5 = 6n - 5 + 2n - 8$

⑲ $3(n - 5) = 9$

⑳ $-2(x - 4) = 10$

㉑ $3n - 3 = 4(2n + 3)$

㉒ $2a + 6 = -4(3a + 1)$

㉓ $4x + 6 = x - 3(2x + 1)$

㉔ $2n + 5 = 3n - 2(4n + 2)$

Challenge Problems

㉕ $6(2x + 1) = 3(4 - x)$

㉖ $2(n - 1) - 3(2n + 2) = 3$

㉗ $4(2x + 3) - 2(x - 5) = 0$

㉘ $3a - 2(4a - 1) - a = 3(a + 1)$

㉙ $x - 2(x - 5) + 3x = 4(2x - 2)$

㉚ $3n - 2(n - 1) = n - 3(2n + 4)$

..WE INTERRUPT THIS COMMERCIAL TO BRING YOU ANOTHER COMMERCIAL BY A MUCH LARGER COMPANY...

UNIT 4
Solving Equations

Solve each equation and show all steps :

① $x - 5 = 12$

② $2n - 7 = -11$

③ $3a - 5 = -17$

④ $3n - 4 = 2n - 3 + 4n - 10$

⑤ $4(a - 3) = -20$

Challenge Problem

⑥ $3(4n - 1) - 2(n + 5) = -6$

Solve each equation and show all steps :

① $a + 7 = -4$

② $3x - 4 = -22$

③ $4n - 7 = 17$

④ $2a - 3 = 3a - 5 - 7a - 10$

⑤ $3(2n - 1) = 18$

Challenge Problem

⑥ $2(4x - 3) - 3(x - 5) = 7$

1. INTEGER PROBLEMS

Many word problems can be solved by setting up an equation.

Demonstration

(A) A number increased by seven is twelve. Find the number.

Define a variable:
n = the number

$$n + 7 = 12$$

$$n + 7^{-7} = 12^{-7}$$
$$n = 5 \qquad \boxed{5}$$

(B) Eight decreased by a number is fourteen. Find the number.

$$8 - n = 14$$
$$8 - n^{-8} = 14^{-8}$$
$$-n = 6$$
$$n = -6 \qquad \boxed{-6}$$

Note: Increased by (+)
Decreased by (−)

(C) Nineteen is eleven more than twice a number. Find the number.

$$19 = 2n + 11$$
$$19^{-11} = 2n + 11^{-11}$$
$$8 = 2n$$
$$\left(\tfrac{1}{2}\right)(8) = \left(\tfrac{1}{2}\right)(2n)$$
$$\tfrac{8}{2} = n$$
$$n = 4 \qquad \boxed{4}$$

Note: Even though these problems can sometimes be solved without an equation, it is important to learn this process on simple problems before attempting more complicated problems in the next lesson.

Always use an equation.

...HE SAYS YOUR BIRD FEEDER IS EMPTY!!

UNIT 5
Problem Solving

Problem Set 5.1
Integer Problems

Write an equation to help solve each problem. Show your work.

① A number decreased by eleven is negative five. Find the number.

② A number decreased by nine is zero. Find the number.

③ A number increased by seven is four. Find the number.

④ A number increased by negative two is fourteen. Find the number.

⑤ Twelve is six less than a number. Find the number.

⑥ Negative three is nine more than a number. Find the number.

⑦ Two is six less than four times a number. Find the number.

⑧ Negative five is four more than three times a number. Find the number.

⑨ Twice a number decreased by seven is eleven. Find the number.

⑩ Four times a number increased by negative ten is eighteen. Find the number.

I THINK ITS HIS EYESIGHT... HE JUST GOES SWISH-SWISH-BONK, SWISH-SWISH-BONK ALL DAY LONG!
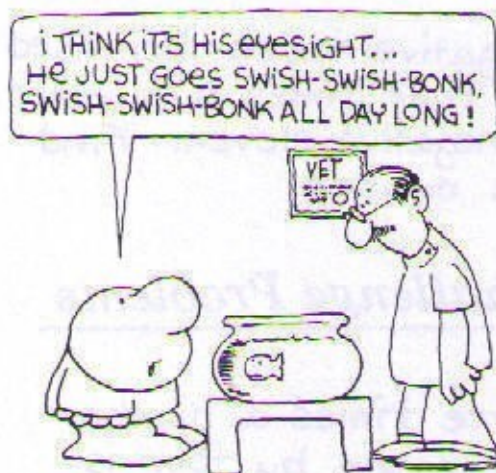
⑪ Nine decreased by three times a number is negative six. Find the number.

⑫ Negative four increased by twice a number is negative sixteen. Find the number.

⑬ Fourteen is six less than

Problem Solving

five times a number. Find the number.

⑭ Eighteen decreased by four times a number is six. Find the number.

⑮ Negative eight decreased by six times a number is negative twenty. Find the number.

⑯ Negative three increased by four times a number is negative eleven. Find the number.

Challenge Problems

⑰ Three times a number decreased by four is equal to one more than twice the number. Find the number.

⑱ Two less than three times a number is equal to six more than seven times the number. What is the number?

⑲ Eight decreased by three times a number is equal

to one less than six times the number. Find the number.

⑳ Seven more than a number is equal to nineteen more than three times the number. Find the number.

YOUR WEIGHT
AND
PIG MASK
50¢

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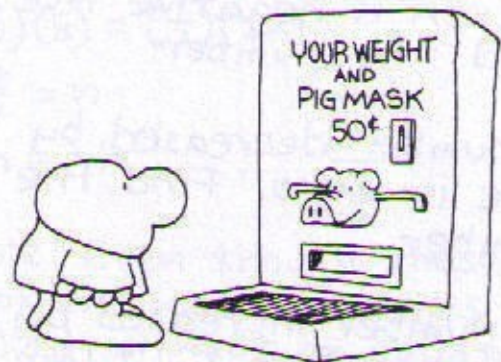
2. USING PARENTHESIS

When you have to subtract a "quantity," it is important to:

• use parenthesis

• learn to distribute the subtraction sign into the quantity

Recognizing a "quantity" is a key when writing equations.

Demonstration

(A) Twice a number decreased by three more than the number is five. Find the number.

$$2n - (n+3) = 5$$

twice a number	decreased by	three more than a number	is	five

You must use parenthesis when you decrease by a quantity $(n+3)$.

$$2n - (n+3) = 5$$
$$2n - n - 3 = 5$$
$$n - 3^{+3} = 5^{+3}$$
$$n = 8 \quad \boxed{8}$$

Notice how the subtraction sign is distributed:

$$-(n+3)$$
$$-n - 3$$

Now:

To check your answer, plug into the words:

twice a number	three more than a num.	is five

$$2(8) - (8+3) = 5$$
$$16 - 11 = 5$$
$$5 = 5 \checkmark$$

(B) Seven more than a number decreased by five less than twice the number is five. Find the number.

$$(n+7) - (2n-5) = 5$$

seven more than a number	decreased by	five less than	is	five
		twice the number		

$$(n+7) - (2n-5) = 5$$
$$n + 7 - 2n + 5 = 5$$
$$-n + 12^{+-12} = 5^{-12}$$
$$-n = -7$$
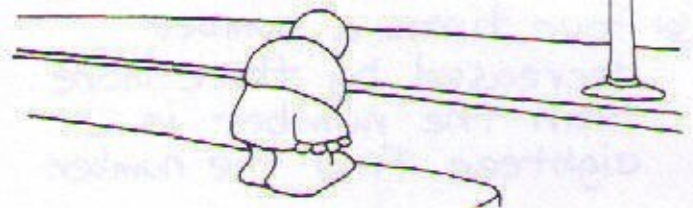$$n = 7 \quad \boxed{7}$$

Now: Use the words to check the solution.

seven more than num.	five less than twice the num.

$$(7+7) - (2(7)-5) = 5$$
$$(14) - (14-5) = 5$$
$$14 - 9 = 5$$
$$5 = 5 \checkmark$$

WALK
DONT WALK
FIDGET IMPATIENTLY

Problem Solving

Problem Set 5.2
Using Parenthesis

Set up an equation and solve. Use the words to check your solution.

① Three times a number increased by four is thirty-one. Find the number.

② Twice a number increased by six is negative two. Find the number.

③ Twice a number decreased by two is negative ten. Find the number.

④ A number decreased by eleven is negative five. Find the number.

⑤ Five times a number decreased by three less than the number is twenty-seven. Find the number.

⑥ Four times a number decreased by three more than the number is eighteen. Find the number.

⑦ Three times a number decreased by two less than twice the number is fourteen. Find the number.

⑧ Four times a number decreased by five more than twice the number is negative eleven. Find the number.

EDDIE'S
FAST FOOD

YOUR TIME'S UP, BUSTER .....OUT !!!

⑨ Two less than a number decreased by three more than twice the number is seven. Find the number.

⑩ Four less than three times a number decreased by three more than the number is negative five. Find the number.

Problem Solving

⑪ Two more than three times a number is equal to eight more than twice the number. Find the number.

⑫ Six less than four times a number is equal to four more than twice the number. Find the number.

Challenge Problems

⑬ Two more than three times a number decreased by four less than twice the number is equal to four times the number. Find the number.

⑭ Two less than three times a number decreased by six more than the number is equal to four times the number. Find the number.

⑮ Two more than three times a number is equal to three more than the number decreased by seven less than twice the number. Find it.

REVIEW & PRACTICE

Set up an equation and solve. Show all work. Check your solutions.

① A number decreased by five is three. Find the number.

② A number increased by three is negative seven. Find the number.

③ Nine is seven less than a number. Find the number.

④ Negative six is eight more than a number. Find the number.

⑤ Four times a number increased by seven is twenty-three. Find the number.

⑥ Twice a number decreased by nine is negative eleven. Find the number.

i FeeL LiKe AN UNLiSTeD NUMBeR IN THE GReAT PHONe BOOK OF life...

⑦ Eight decreased by three times a number is twenty-three. Find the number.

⑧ Negative six increased by twice a number is twelve. Find the number.

⑨ Five times a number decreased by four more than the number is negative eight. Find the number.

⑩ Twice a number decreased by five less than the number is negative four. Find the number.

⑪ Three more than a number decreased by two less than three times the number is seven. Find the number.

⑫ Five less than twice a number decreased by two more than four times the number is eleven. Find the number.

⑬ Three times a number decreased by eleven is one more than twice the

number. Find the number.

⑭ Five more than four times a number is equal to three more than twice the number. Find the number.

Challenge Problems

⑮ Two more than twice a number decreased by five less than three times the number is seven less than the number. Find the number

⑯ Ten more than six times a number decreased by two more than the number is four less than the number. Find it.

FOR REALLY BUSY PEOPLE AEROSOL INSTANT BREAKFAST

⑰ Four more than twice a number decreased by five more than the number is two less than twice the number. Find the number.

UNIT 5
Problem Solving

Set up an equation to solve. Show your work, check the solution:

① A number decreased by eight is negative five. Find the number.

② Twice a number increased by three is negative eleven. Find the number.

③ Twelve decreased by three times a number is negative three. Find the number.

④ Four times a number increased by five more than twice the number is thirty-five. Find the number.

⑤ Four more than a number decreased by two less than three times the number is twelve. Find the number.

⑥ Five times a number decreased by four more than twice the number equals twelve less than seven times the number. Find the number.
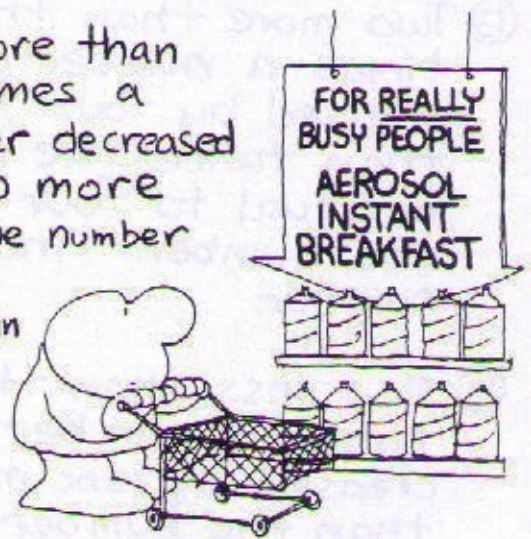
Set up an equation to solve. Show your work, check the solution:

① A number increased by six is two. Find the number.

② Three times a number decreased by eight is seven. Find the number.

③ Negative four increased by twice a number is ten. Find the number.

④ Twice a number decreased by five less than three times the number is nine. Find the number.

⑤ Two less than three times a number decreased by four more than the number is negative ten. Find the number.

⑥ Twice a number decreased by three less than three times the number equals thirteen more than the number. Find it.

Cumulative Review

Integer operations:

① $(-6) \div (-3)$ ⑤ $(-8) - (-9)$

② $(+8) + (-4)$ ⑥ $(-4) \times (-3)$

③ $(-7) - (-5)$ ⑦ $(-7) + (+6)$

④ $(+12) \times (-4)$ ⑧ $(+8) - (-4)$

⑨ $(-3) + (-7) - (-6) - (+8) + (-4)$

⑩ $(-2)(-1)(-1)(+2)(+3)$

Exponents and order of operations:

⑪ $(-1)^5$ ⑭ $(-3)^3$ ⑰ -5^2

⑫ -4^0 ⑮ $(-1)^4$ ⑱ $(-2)^4$

⑬ -2^2 ⑯ -5^3 ⑲ -6^2

⑳ $(-2) + (-3)(-4) - (-2)$

㉑ $(-5) - (-4) + (-12) \div (+3)$

㉒ $(-2)^3 - (-1)^0$

㉓ $(-3)^2 - (-2)(-1)^4$

Evaluating expressions:
$a = -3 \quad b = -1 \quad c = 2$

㉔ $a - b + c$ ㉘ $3(a+b)$

㉕ $2a - 3b$ ㉙ $2ab^2 - c$

㉖ $a^2 + ab$ ㉚ $c(a+b)^2$

㉗ $3c - 2bc$ ㉛ $3b^3 - 2a^2$

Solve each equation and show all steps:

㉜ $n - 8 = 15$

㉝ $2x - 3 = 13$

㉞ $12 - 3a = -3$

㉟ $4 - 2n = 10$

㊱ $4x - 3 = 2 - 3x + 6x$

㊲ $-4 - 2n + 7 = -5n - 9$

㊳ $2(3n - 1) = 22$

㊴ $3(a + 4) - 3 = 2(3a - 3)$

㊵ $12 - 2(n - 3) = -4n$

㊶ $3n - 2(5n + 2) = -2n - 1$

Cumulative Review

Set up an equation and solve. Show your work and check solutions:

42. A number decreased by seven is negative two.

43. Three times a number increased by four is negative eleven.

44. Six times a number decreased by two more than the number is thirteen. Find the number.

45. Four more than a number decreased by two less than twice the number is ten. Find the number.

46. Three more than a number decreased by four more than three times the number is five more than the number. Find the number.

47. Two more than four times a number decreased by three less than twice the number is equal to three times the number. Find the number.

...i THINK I'VE GOT IT FIXED NOW. BUT BE CAREFUL—IT CAN SENSE FEAR!

PRACTICE TEST

Integer operations:

① $(-3) - (-8)$

② $(-3) \times (-2) \times (-1)$

③ $(-5) + (-2) - (-7) - (+4) - (-2)$

④ $(-4) - (-8) + (-3) - (+7) - (-4)$

Exponents and order of operations:

⑤ $(-3)^2$

⑥ -2^4

⑦ $(-3) - (-4) \times (+3)$

⑧ $(-1)^3 - (-2)^2 - 3^2$

⑨ $(-2)(-3) - (-4) \div (-2)^2$

Cumulative Review

Evaluating expressions:

$x = 2$ $y = -2$ $z = -3$

⑩ $3x - 2yz$

⑪ $2xy^2 - 3z$

⑫ $3(y + z) + 2x$

⑬ $xyz - y^3$

Solve each equation and show all steps:

⑭ $14 - 3n = n + 2$

⑮ $2(x - 3) = -10$

⑯ $a - 3(a - 4) = -5a + 3$

⑰ $3(2n - 1) - (n + 4) = n + 1$

Set up an equation and solve. Show your work and check solutions:

⑱ Four less than twice a number is eight. Find the number.

⑲ Three less than a number decreased by two more four times the number

is one. Find the number.

⑳ Four more than twice a number decreased by three less than five times the number is equal to eight less than twice the number. Find the number.

...YOU KNOW, THIS WOULD BE A LOT EASIER IF WE COULD GET SOMEONE TO SIT IN FOR YOU ON KEYBOARD!!
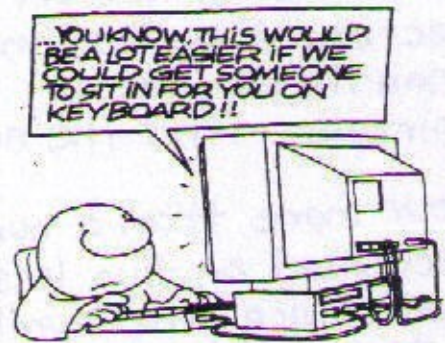
ALGEBRA SKILLS
Cumulative Review

REVIEW & PRACTICE

Integer operations:

① $(-8) \div (-4)$ ⑤ $(-9) - (-6)$

② $(+9) + (-5)$ ⑥ $(-6) \times (-5)$

③ $(-3) - (-12)$ ⑦ $(-8) + (+5)$

④ $(+7) \times (-5)$ ⑧ $(+7) - (-9)$

⑨ $(-2) + (-5) - (-4) - (+7) + (-2)$

⑩ $(-3)(-2)(-2)(+1)(+4)$

Exponents and order of operations:

⑪ $(-2)^3$ ⑭ $(-2)^4$ ⑰ -7^2

⑫ -5^2 ⑮ $(-1)^6$ ⑱ $(-4)^3$

⑬ -3^0 ⑯ -3^4 ⑲ -8^2

⑳ $(-4) + (-6)(-2) - (-4)$

㉑ $(-8) - (-3) + (-10) \div (+2)$

㉒ $(-1)^5 - (-3)^2$

㉓ $(-2)^0 - (-4)(-2)^3$

Evaluating expressions:
$x = -1 \quad y = -2 \quad z = -3$

㉔ $x - y + z$ ㉘ $3(x + y)$

㉕ $2x - 3y$ ㉙ $2xy^2 - z$

㉖ $x^2 + xy$ ㉚ $z(x + y)^2$

㉗ $3z - 2yz$ ㉛ $3y^3 - 2x^2$

"A SURGE PROTECTOR IS DEFENSE ENOUGH ...YOU'VE GOT NOTHING TO FEAR FROM 'STATIC CLING'!"

Solve each equation and show all steps:

㉜ $x - 5 = -7$

㉝ $3n - 4 = 11$

㉞ $21 - 2a = 13$

㉟ $6 - 3x = 15$

㊱ $2n - 4 = 3 - 4n + 5$

37. $-8 - 3x + 9 = -7x - 11$

38. $3(2n - 2) = 30$

39. $4(a + 1) - 2 = 3(4a - 2)$

40. $18 + 3(5x + 4) = 0$

41. $5n - 3(2n - 4) = -4n + 21$

Set up an equation and solve. Show your work. Check your solutions:

42. A number increased by twelve is negative two. Find the number.

43. Four times a number decreased by six more than the number is negative fifteen. Find the number.

44. Eight times a number decreased by three less than the number is seventeen. Find the number.

45. Two more than three times a number decreased by five less than five times the number is eleven. Find the number.

46. Two more than a number decreased by five more than twice the number is five more than the number. Find the number.

47. Three less than twice a number decreased by one more than five times the number is twelve more than the number. Find the number.

ECONO-AIRLINE
...YOU'LL ARRIVE IN L.A. A LITTLE LATE, BECAUSE YOU'LL HAVE TO DUST SOME CROPS ALONG THE WAY!!

PRACTICE TEST

Integer operations:

1. $(-5) - (-12)$

2. $(-2) \times (-4) \times (-1)$

3. $(-3) + (-5) - (-4) - (+7) - (-8)$

4. $(-6) - (-8) + (-5) - (+9) - (-2)$

ALGEBRA SKILLS
Cumulative Review

Exponents and order of operations:

⑤ $(-2)^6$

⑥ -2^4

⑦ $(-5)-(-7) \times (-4)$

⑧ $(-2)^2 - (-1)^5 - 4^2$

⑨ $(-1)(-4) - (-6) \div (-1)^3$

Evaluating expressions:
$a = -2 \quad b = -3 \quad c = 4$

⑩ $3a - 2bc$

⑪ $2ab^2 - 3c$

⑫ $3(b+c) + 2a$

⑬ $abc + c^2$

Solve each equation and show all steps:

⑭ $15 - 4x = x - 5$

⑮ $3(n-2) = -12$

⑯ $2x - 5(x-3) = 4x + 1$

⑰ $2(n+2) - (3n-5) = 1 - 3n$

Set up an equation and solve. Show your work and check solutions:

⑱ Three more than five times a number is thirty-three. Find the number.

⑲ Two less than three times a number decreased by one more than five times the number is five. Find the number.

⑳ Four less than three times a number decreased by six more than twice the number is four less than four times the number. Find the number.

...THEY JUST CLOSED A TAX LOOPHOLE...
...WHILE i WAS STILL IN iT!