2. Subtract the lower number from the upper.

(a) $\begin{array}{r} 5 \\ 8 \\ \hline -3 \end{array}$ (b) $\begin{array}{r} -6 \\ -10 \\ \hline 4 \end{array}$ (c) $\begin{array}{r} 4 \\ -11 \\ \hline 15 \end{array}$ (d) $\begin{array}{r} -9 \\ 14 \\ \hline -23 \end{array}$ (e) $\begin{array}{r} 0 \\ 7 \\ \hline -7 \end{array}$

(f) $\begin{array}{r} 12 \\ 7 \\ \hline 5 \end{array}$ (g) $\begin{array}{r} -14 \\ 8 \\ \hline -22 \end{array}$ (h) $\begin{array}{r} -18 \\ 0 \\ \hline -18 \end{array}$ (i) $\begin{array}{r} 14 \\ -5 \\ \hline 19 \end{array}$ (j) $\begin{array}{r} -15 \\ -6 \\ \hline -9 \end{array}$

III. Perform the indicated operations.

1. (a) $(5)(3)$ 15 (b) $(-2)(3)(5)$ −30 (c) $(-4)(3)$ −12 (d) $(2)(-4)(-3)$ 24
(e) $(-8)(-5)$ 40 (f) $(-3)(-5)(-4)$ −60 (g) $(6)(-7)$ −42 (h) $(-2)(5)(-3)(3)$ 90

2. (a) $24 \div 6$ 4 (b) $(-27) \div (-3)$ 9 (c) $36 \div (-9)$ −4 (d) $(-48) \div 12$ −4

3. (a) $3 \times (-5)(-4) \div 6 \times (-2)$ −20
(b) $8 \div (-2) \times (-6) \times (-3) \div (-9)$ 8
(c) -5^2 −25 (d) $(-7)^2$ 49 (e) -2^3 −8 (f) $(-3)^3$ −27

Test B—Improvement Test

I. 1. If an office building has floors above street level marked with positive numbers, where is −2 located? two floors below ground

2. A teacher sent in the following report on Monday: "Number of pupils in room, 39. Number of vacant seats, 3." On Tuesday she reported: "Number of pupils in room, 44. Number of vacant seats, −2." What did the −2 mean? Two seats were needed.

3. A man walks 8 blocks north, 5 blocks south, 6 blocks farther south, 6 blocks north, and 7 blocks south. If the distances north are + and those south are −, express this in signed numbers. Express the position of the man at the end of his walk, in relation to the starting point, by a signed number, and explain your answer.
−4, The man is 4 blocks south of his starting point.

II. 1. Combine each of the following into a single number.
(a) $18 + 3 - 15 + 7 - 4 - 9$ 0 (b) $-11 - 2 + 6 - 1 + 10 - 2$ 0
(c) $-7 - 6 - 2 + 3 + 5 + 9 - 14$ −12

2. Subtract the lower number from the upper.

(a) $\begin{array}{r} 7 \\ 12 \\ \hline -5 \end{array}$ (b) $\begin{array}{r} -8 \\ -15 \\ \hline 7 \end{array}$ (c) $\begin{array}{r} 5 \\ -13 \\ \hline 18 \end{array}$ (d) $\begin{array}{r} -11 \\ 16 \\ \hline -27 \end{array}$ (e) $\begin{array}{r} 15 \\ 0 \\ \hline 15 \end{array}$

(f) $\begin{array}{r} 18 \\ 6 \\ \hline 12 \end{array}$ (g) $\begin{array}{r} -11 \\ 0 \\ \hline -11 \end{array}$ (h) $\begin{array}{r} -17 \\ 12 \\ \hline -29 \end{array}$ (i) $\begin{array}{r} 0 \\ -8 \\ \hline 8 \end{array}$ (j) $\begin{array}{r} -19 \\ -13 \\ \hline -6 \end{array}$

III. Perform the indicated operations

1. (a) $(-8)(3)$ -24 (b) $(-8)(-2)(-4)$ -64 (c) $(-12)(-4)$ 48 (d) $(-5)(-4)(6)$ 120
(e) $(2)(-4)(3)$ -24 (f) $(-7)(2)(3)(-2)$ 84

2. (a) $(-35) \div (-7)$ 5 (b) $48 \div (-6)$ -8 (c) $30 \div (-5)$ -6 (d) $(-24) \div 3$ -8

3. (a) $(2) \times (-4) \div 2 \times 7$ -28 (b) $9 \div (-3) \times (-4) \times 5 \div (-10)$ -6
(c) $(-4)^2$ 16 (d) -4^2 -16 (e) -3^3 -27 (f) $(-2)^3$ -8

Test C—Test for High Rank

I. Find the value of each of the following by substituting for the letters the numbers which they represent. Remember to decide upon the sign of each term before you attempt to find its absolute value.
$a = 1,\ b = -2,\ c = 3,\ d = -4,\ e = \frac{1}{2},\ f = 0$

1. $(ab)^3$ -8 **2.** a^3b -2 **3.** ab^3 -8 **4.** $5bde$ 20 **5.** $-8bf$ 0

6. $\frac{-9bd}{8c}$ -3 **7.** $5b^2 - 2bc - 3c^2$ 5 **8.** $\frac{2c^2 + 3cd + d^2}{b^3 + c^2}$ -2

9. $bc + 3cd - 2bd + 4bc + 3bd - 7cd - 5bc + 6cd - bd$ -24

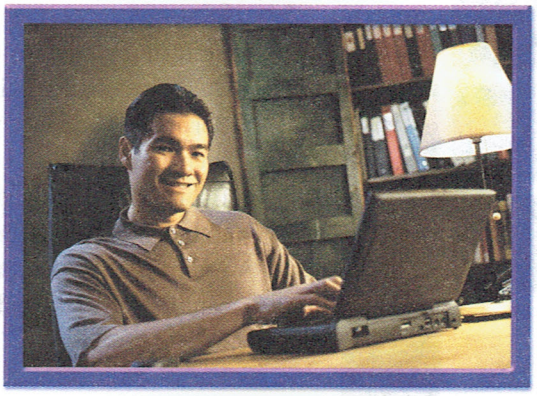
10. $cd^2e - abcf + 8e^2 + b^5$ -6

II. Solve the following problems.

1. Jason earns \$35.00 more in a week than Bradley and \$12.50 less than Sigmund. Together the three boys earned \$120.00. How much does each earn? Bradley—\$12.50; Jason—\$47.50; Sigmund—\$60

2. The length of a rectangle is 1 inch less than twice the width, and the perimeter is 40 inches. Find the width and the length. 7 in. by 13 in.

3. The second side of a triangle is 2 inches longer than the first side and the third side is 3 inches shorter than the first side. The perimeter is 20 inches. Find the lengths of the sides. 1st—7 in.; 2nd—9 in.; 3rd—4 in.

4. Find two numbers whose sum is 64 if one of the numbers is $\frac{1}{7}$ the other. 8; 56

5. If the cost of a particular computer program is $\frac{1}{9}$ of the cost of a personal computer without the program and if the computer plus the program costs \$810, how much does the program alone cost? \$81