

### DEFINITION

A relation is any set of ordered-pair numbers.

Suppose that the weights of any number of students are recorded by the school nurse.

Student	1	2	3	4
Weight	150	130	100	160

The pairing of the student number and his corresponding weight is a relation and is written:

$$A = \{(1, 150), (2, 130), (3, 100), (4, 160)\}$$

These data are written as a set of ordered-pair numbers. Each element of the set is an ordered-pair.

The first element of each pair is the student number, and the set of all first elements is called the *domain* of the relation or data set.

$$\text{The domain of } A = \{1, 2, 3, 4\}$$

The second element of each pair is the weight, and the set of second elements is called the *range* of the relation or data set.

$$\text{The range of } A = \{150, 130, 100, 160\}$$

WRITE THE DOMAIN AND RANGE OF THE FOLLOWING RELATIONS IN LIST FORM.

1.1  $\{(5, 0), (6, 1), (7, 2)\}$

a. Domain \_\_\_\_\_

b. Range \_\_\_\_\_

1.2  $F = \{(6, \sqrt{2}), (7, \sqrt{3}), (8, \sqrt{4}), (9, \sqrt{5})\}$

a. Domain of  $F$  \_\_\_\_\_

b. Range of  $F$  \_\_\_\_\_

1.3  $G = \{(\frac{1}{2}, \frac{\pi}{6}), (\frac{1}{2}, \frac{\pi}{4}), (\frac{1}{2}, \frac{\pi}{3}), (\frac{1}{2}, \frac{\pi}{2})\}$

a. Domain of  $G$  \_\_\_\_\_

b. Range of  $G$  \_\_\_\_\_

1.4  $J = \{(6.2, 0.3), (7.3, 0.3), (8.4, 0.3), (9.5, 0.3)\}$

a. Domain of  $J$  \_\_\_\_\_

b. Range of  $J$  \_\_\_\_\_

WRITE THE REQUIRED RELATIONS.

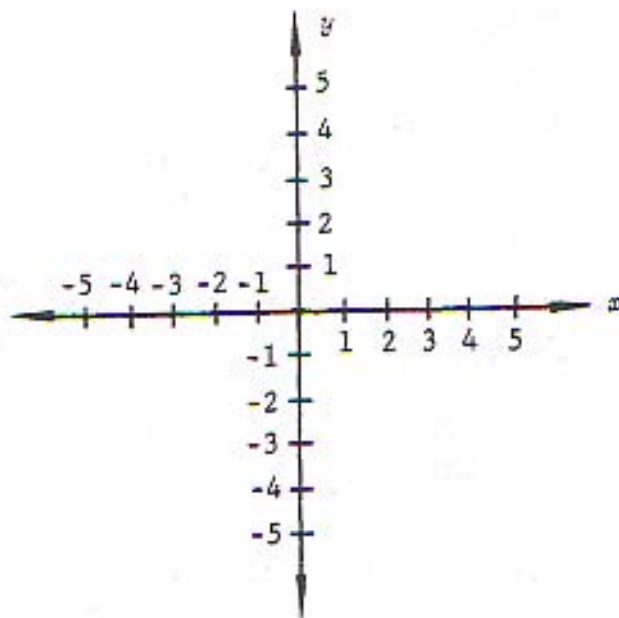
- 1.5 Write a relation in ordered-pair form for six different packages of fruit whose weights are the domain of the relation and are 10, 15, 20, 30, 60, and 90; and whose costs are the range of the relation and are \$2, \$3, \$4, \$6, \$8, and \$10.

$Q =$  \_\_\_\_\_

- 1.6 A physics student, conducting an experiment of a falling object, drops a baseball from the top of a building and records the distance traveled for each second of elapsed time. If the distances recorded are 16 ft., 64 ft., 144 ft., 256 ft., and 400 ft. respectively for each second of time, write this relation in ordered-pair form.

$F =$  \_\_\_\_\_

A relation that consists of ordered pairs of real numbers is a subset of  $R \times R$ . This set, read " $R$  cross  $R$ ," is made up of all the possible combinations of real numbers denoting ordered pairs. To visualize  $R \times R$ , think of a horizontal number line extending infinitely in both directions, crossed by a vertical number line extending infinitely in both directions.



## VII. QUADRANTAL ANGLES

Any angle whose measure is a multiple of  $90^\circ$ ,  $180^\circ$ , or  $270^\circ$  is called a quadrantal angle. From the definitions of the trigonometric functions, these special angles may be evaluated.

For functions of  $90^\circ$ , the coordinates of point T are  $(0, y)$  and  $r = y$ . (See Figure 1.)

Using the information of Figure 1 and the definition of the function, we have:

$$\sin 90^\circ = \frac{y}{r} = \frac{r}{r} = 1$$

$$\text{and } \cos 90^\circ = \frac{x}{r} = \frac{0}{r} = 0$$

$$\text{and } \tan 90^\circ = \frac{y}{x} = \frac{y}{0}$$

Hence,  $\tan 90^\circ$  is an undefined number.

The other functions are evaluated in a similar manner.

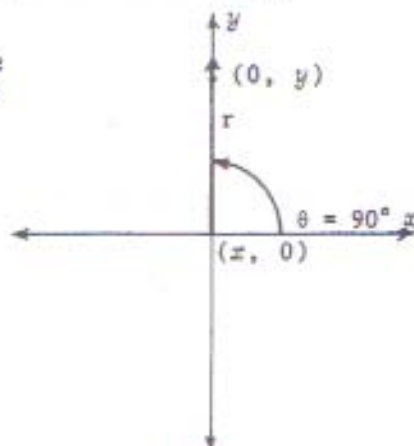


Figure 1

USING THE DEFINITIONS OF THE TRIGONOMETRIC FUNCTIONS AND THE PREVIOUS EXAMPLES, COMPLETE THE FOLLOWING TABLE.

	$\theta$	sin	cos	tan	cot	sec	csc
7.1	$0^\circ$						
7.2	$90^\circ$	1	0	und*			
7.3	$180^\circ$						
7.4	$270^\circ$						

\* undefined

EVALUATE THE FOLLOWING EXPRESSIONS.

7.5  $(2 \cos 90^\circ)(\sin 180^\circ) + (\tan 180^\circ)(\sec 180^\circ)$  \_\_\_\_\_

7.6  $(\sin 180^\circ)(\cos 0^\circ) - 4(\sin 90^\circ)$  \_\_\_\_\_

7.7  $[\csc 90^\circ \cdot \cos 180^\circ]^2$  \_\_\_\_\_

7.8  $\cos 0^\circ + \sec 180^\circ - 5(\sin 270^\circ)$  \_\_\_\_\_



Review the material in this section in preparation for the Self Test. This Self Test will check your mastery of this particular section as well as your knowledge of all previous sections.

### SELF TEST 1

COMPLETE THESE ACTIVITIES (each answer, 5 points).

1.01 Write the general solution for  $y = \arcsin\left(-\frac{\sqrt{3}}{2}\right)$ .

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1.02 Simplify  $\sin[\arcsin 2]$ .

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1.03 Simplify  $\arcsin(\sin 30^\circ)$ .

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1.04 Find  $y$  if  $y = 2 \cdot \arcsin\left[\frac{\sqrt{2}}{2}\right]$  and  $-\frac{\pi}{2} \leq y \leq \frac{\pi}{2}$ .

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1.05 For  $F(x) = 5 \arcsin \frac{2}{3}$ , how many members are in the solution set?

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**MATHEMATICS 1210: LIFE PAC TEST**

Prove the following statement by mathematical induction (proof, 5 points).

1.  $2 + 5 + 8 + \dots + (3n - 1) = \frac{n(3n + 1)}{2}$

Evaluate the following summation (3 points).

2.  $\sum_{i=1}^5 (2i - 1)^2$

Given that  $f(x) = 3x^3 + x - 1$ , evaluate the following function (3 points).

3.  $f(-2)$

Evaluate the difference quotient  $\frac{f(a+h) - f(a)}{h}$  for the following function (3 points).

4.  $f(x) = x^2 + 4x - 5$

Evaluate each of the following limits (each answer, 3 points).

5.  $\lim_{x \rightarrow -2} \frac{1}{x^3}$

6.  $\lim_{x \rightarrow \infty} \frac{3x - 2}{x}$