Definition 8.1.1. *A* _____
is a function whose input uses two variables that do not depend on each other.

Example 8.1.1. *Let $f(x, y) = 2x - 4y^2$. Find*

(1) $f(-2, 3)$

(2) $4f(-2, 3)$

Definition 8.1.2. *In the above example, we call x and y the* _____ *.*

If we say $z = f(x, y)$, then z is the _____ *(which*

depends on x and y). The set of all ordered pairs of real numbers is the _____

and the set of all corresponding values for $f(x, y)$ is the _____

Example 8.1.2. *Find* $4f(-2, 3) - 3g(1, -2)$ *if* $f(x, y) = 2x - 4y^2$ *and* $g(x, y) = 3 - x^2 y^3$.

Example 8.1.3. *Find* $A(100, 0.04, 5, 2)$ *if* $A(P, r, t, n) = P(1 + \frac{r}{n})^{tn}$.

Example 8.1.4. *A company manufactures two types of calculators, A and B. The weekly price-demand equations are*

$$p = 15 - 2x + y$$

$$q = 20 + x - 2y$$

where p is the unit price of A, q is the unit price of B, x is the weekly demand for A, and y is the weekly demand for B. Find the weekly revenue function $R(x, y)$ (in thousands of dollars), and evaluate $R(4, 3)$

Example 8.1.5. *A company manufactures two types of calculators, A and B. The weekly price-demand equations and cost equations are*

$$p = 15 - 2x + y$$

$$q = 20 + x - 2y$$

$$C(x, y) = 20 + 2x + y$$

where p is the unit price of A, q is the unit price of B, x is the weekly demand for A, y is the weekly demand for B, and $C(x, y)$ is the cost function. Find the profit function $P(x, y)$ (in thousands of dollars), and evaluate $P(4, 3)$
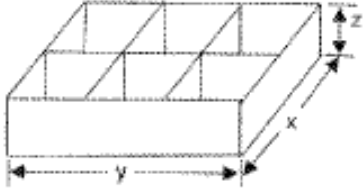
(1) 63
(2) 72
(3) 85
(4) 94

Example 8.1.6. *The packaging department of a company has been asked to design a rectangular box with no top and six compartments. Let x, y, z be the dimensions of the box in inches (see figure). Find the total amount of material $M(x, y, z)$ (in square inches) used to construct the box and evaluate $M(4, 3, 2)$.*

Three Dimensional Coordinate System

Definition 8.1.3. *The three dimensional coordinate system is formed by three perpendicular lines. We use the _____ as the usual convention for where to place the positive x-axis, y-axis and z-axis.*

Homework: 8.1 p. 497 # 3, 9, 15, 17, 21, 39, 41 work e-grade practice at least 2 times.