$$d = \begin{bmatrix} 4 \\ 4 \\ 13 \\ 18 \end{bmatrix}$$

THEOREM **4**

Consider an LP in standard form, having bfs $\mathbf{b}_1$, $\mathbf{b}_2$,..., $\mathbf{b}_k$. Any point $\mathbf{x}$ in the LP's feasible region may be written in the form

$$\mathbf{x} = \mathbf{d} + \sum \frac{i = e}{i = 1} \sigma_i \mathbf{b}_i$$

where $\mathbf{d}$ is $\mathbf{0}$ or a direction of unboundedness and $\sum \frac{i=e}{i=1} \sigma_i = 1$ and $\sigma_i \geq 0$.

If the LP's feasible region is bounded, then $\mathbf{d} = \mathbf{0}$, and we may write $\mathbf{x} = \sum \frac{i=k}{i=1} \sigma_i \mathbf{b}_i$, where the σ_i are nonnegative weights adding to 1. In this case, we see that any feasible $\mathbf{x}$ may be written as a **convex combination** of the LP's bfs. We now give two illustrations of Theorem 2.

Consider the Leather Limited example. The feasible region is bounded. To illustrate Theorem 2, we can write the point $G = (20,\ 10)$ (G is not a bfs!) in Figure 3 as a convex combination of the LP's bfs. Note from Figure 3 that point G may be written as $\frac{1}{6}F + \frac{5}{6}H$ [here $H = (24,\ 12)$]. Then note that point H may be written as $.6E + .4C$. Putting these two relationships together, we may write point G as $\frac{1}{6}F + \frac{5}{6}(.6E + .4C) = \frac{1}{2}F + \frac{1}{4}E + \frac{2}{3}C$. This expresses point G as a convex combination of the LP's extreme points.

$$7x_1 + x_2^2 - \frac{1}{10}e_1 = 28$$

$$Extraadditions$$

$$\Phi(r, \theta, \phi) = \frac{2q}{4\pi\epsilon_0 r} \sum_{s=1}^{\infty} (\frac{a}{r})^2 P_{2s}(cos\theta).$$