Section 3.4

34. T F T T F T F F F T

43.

$$(T_1 + T_2)(\vec{u} + \vec{v}) = T_1(\vec{u} + \vec{v}) + T_2(\vec{u} + \vec{v})$$
$$= T_1(\vec{u}) + T_1(\vec{v}) + T_2(\vec{u}) + T_2(\vec{v})$$
$$= T_1(\vec{u}) + T_2(\vec{u}) + T_1(\vec{v}) + T_2(\vec{v})$$
$$= (T_1 + T_2)(\vec{u}) + (T_1 + T_2)(\vec{v})$$

Similarly,

$$(T_1 + T_2)(r\vec{v}) = T_1(r\vec{v}) + T_2(r\vec{v})$$
$$= rT_1(\vec{v}) + rT_2(\vec{v})$$
$$= r(T_1(\vec{v}) + T_2(\vec{v}))$$
$$= r(T_1 + T_2)(\vec{v})$$

Thus $T_1 + T_2$ is a linear transformation.