Name Answer key

WSU ID# _____

Math 364 Quiz – Week #8

Your company is purchasing several types of vehicles. Let x_k be the number of vehicles of type k you decide to purchase, for $k = 1, 2, \ldots, 9$. Each vehicle costs p_k dollars. Government regulations require that the average (combined) cost of purchased vehicles of types 3 and 4 does not exceed D dollars. Formulate a linear constraint (or constraints) that enforce this condition. Carefully justify its validity.

The average combined cost is $\dfrac{P_3X_3 + P_4X_4}{X_3+X_4}$.

The necessary constraint is $\dfrac{P_3X_3+P_4X_4}{X_3+X_4} \leq D$

Supposing $X_3+X_4 > 0$, this constraint is

$$P_3X_3 + P_4X_4 \leq DX_3 + DX_4$$

or $\boxed{(D-P_3)X_3 + (D-P_4)X_4 \geq 0}$

This constraint also works when $X_3+X_4 = 0$.
Other problem constraints will include $X \geq 0$, so our constraint is appropriate for the problem.