

**PURPOSE**

The purpose of this activity is to provide a framework for you to think about traffic flow at signalized intersections. In this activity, you will build a base of knowledge of modeling traffic flow at a signalized intersection using queuing theory as your model framework. You will learn to recognize patterns through visualizing arrivals and departures at a signalized intersection. You will also make connections between words and charts, finding alignment between alternative ways of representing traffic flow patterns.

**LEARNING OBJECTIVES**

- Connect your observation of traffic flow at a signalized intersection with a model framework
- Represent and interpret queuing diagrams for a range of traffic flow and control conditions

**REQUIRED RESOURCE**

- Activity #8: “Modeling Traffic Flow at Signalized Intersections”

**DELIVERABLE**

- A document with the required sketches from Tasks 1 and 2, plus your answer to the Critical Thinking Question


**CRITICAL THINKING QUESTION**

1. What insights did you gain about intersection operation or performance from these cases?

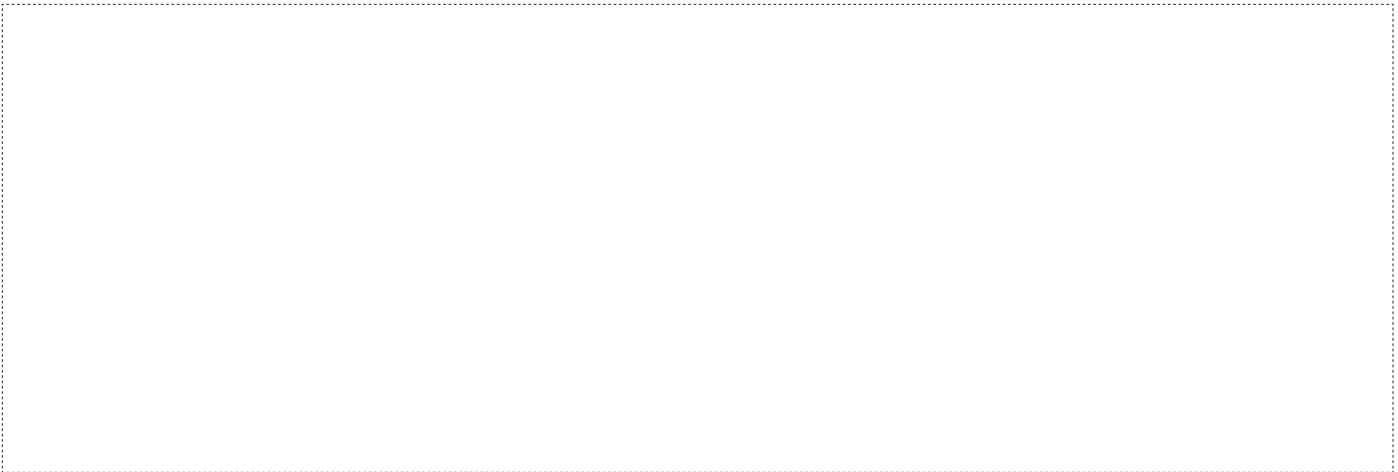
**TASK 1**

Complete the following sketches.

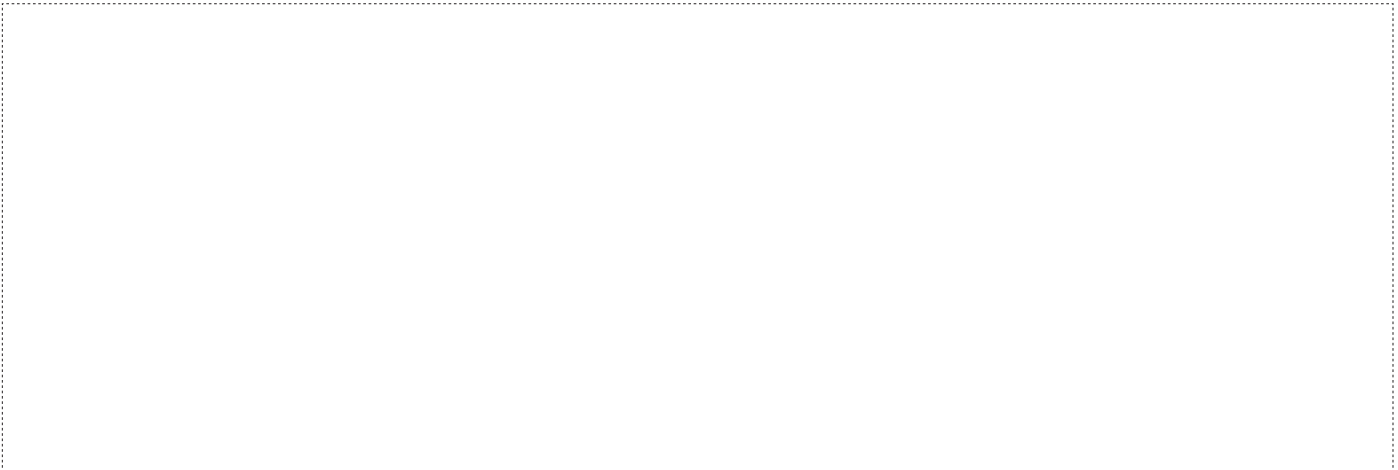
**Make a sketch showing the flow profile of the arrival flow and departure flow at a signalized intersection for a period of one cycle. Assume that the arrival flow is uniform. Label the axes and the important parameter values on the sketch.**



**Make a sketch that shows the cumulative vehicle arrivals and departures during one cycle. Again, assume that the arrival flow is uniform.**



**Based on the two sketches that you made above, sketch the queue accumulation polygon for these same conditions.**



## TASK 2

Draw a flow profile diagram, a cumulative vehicle diagram, and a queue accumulation polygon for the following three cases and describe how each of these cases differs from the original case that you drew in Task 1.

**Case 1: Uniform vehicle arrivals throughout the cycle with the queue clearing just at the end of green.**

Flow profile diagram

Cumulative vehicle diagram

Queue accumulation polygon

**Case 2: Uniform vehicle arrivals throughout the cycle but the queue does not clear before the end of green.**

Flow profile diagram

Cumulative vehicle diagram

Queue accumulation polygon

**Case 3: No vehicle arrivals during red; a platoon (or group of vehicles) arrives during the first half of the green interval only, with no arrivals during the second half of the green interval.**

Flow profile diagram

Cumulative vehicle diagram

Queue accumulation polygon

