

# Comparator Applications 1 Quiz

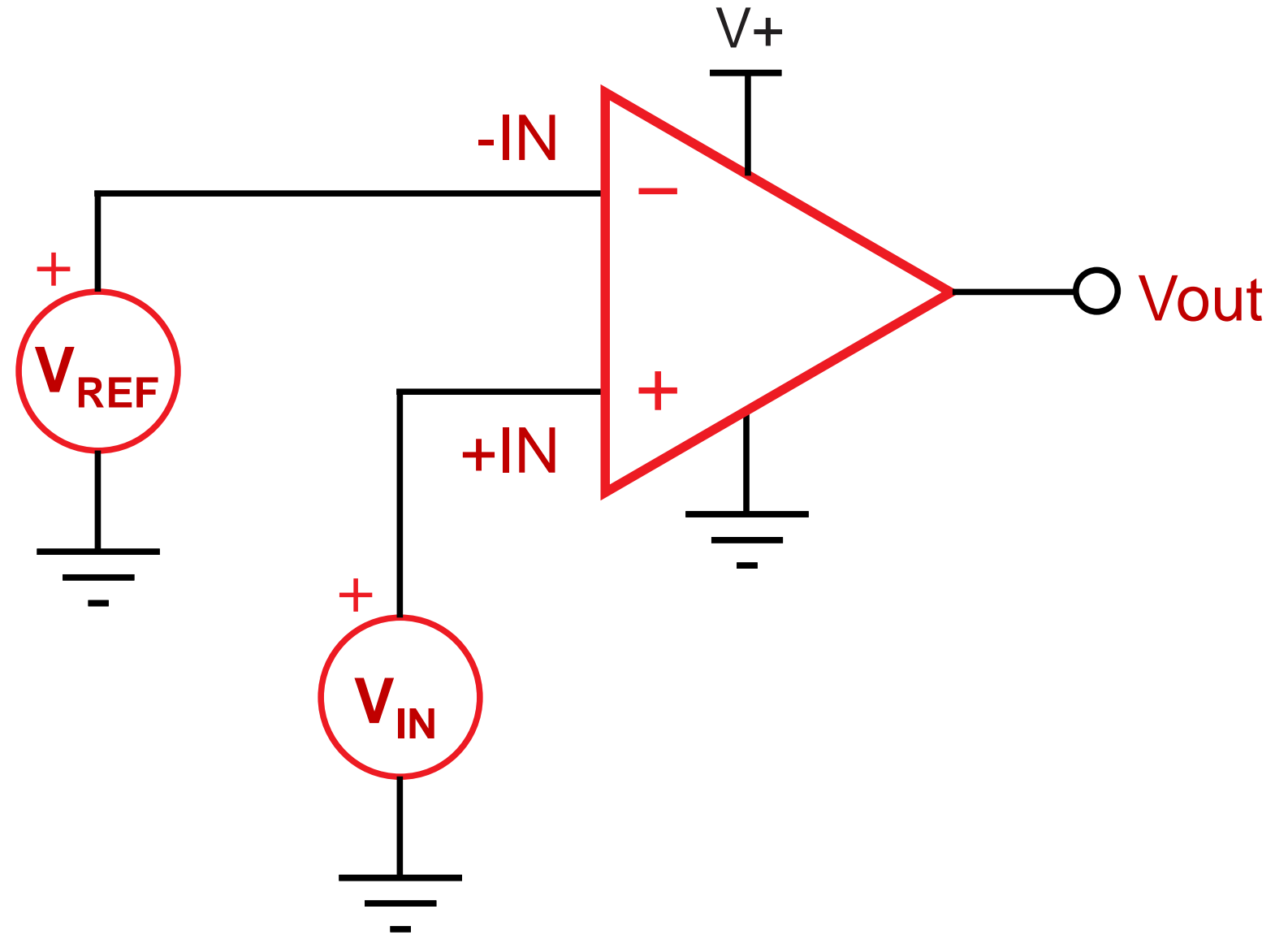
TIPL 2101

TI Precision Labs – Op Amps

# Question 1

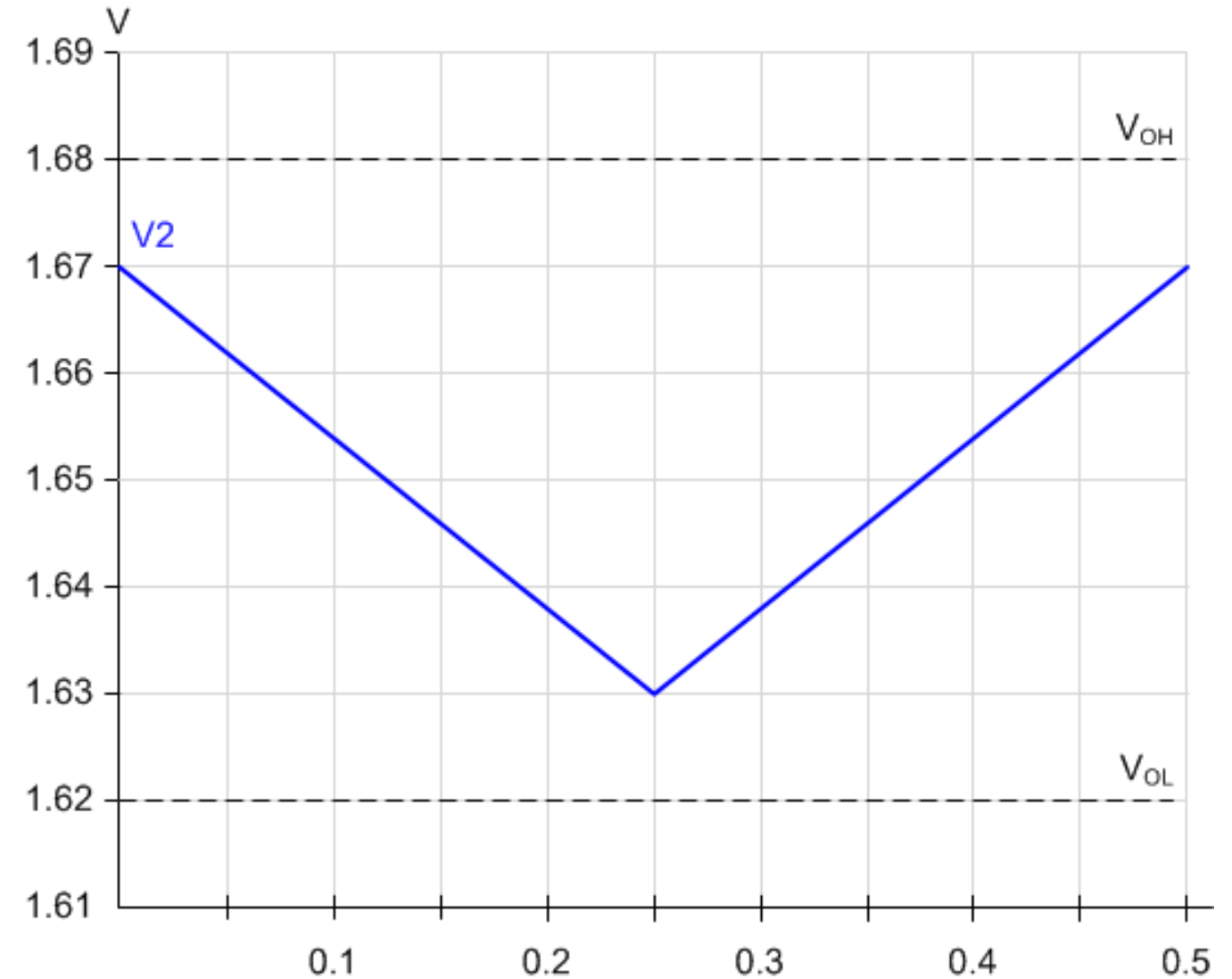
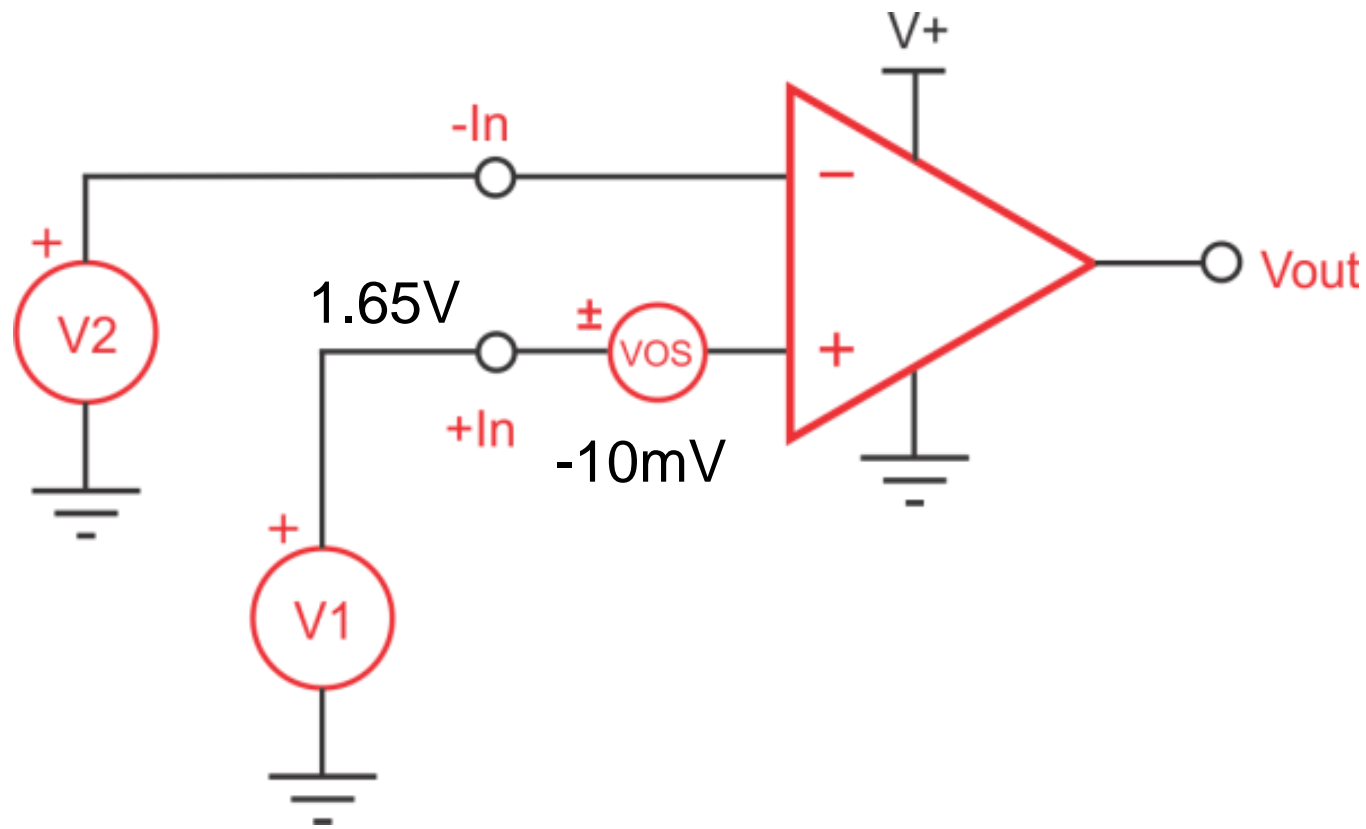
- Is the comparator circuit shown here in an inverting or non-inverting configuration?
- Fill in the  $V_{OUT}$  column of the table below for each input condition.

$V_{IN}$	$V_{REF}$	$V_{OUT}$
1.3 V	1.25 V	
1.2 V	1.25 V	



# Question 2

- For the circuit shown below, draw  $V_{out}$  in the plot on the right when:
  - $V1 = 1.65V$ ,  $V2 = 40mV_{pp}$  triangle wave,  $V_{os} = -10mV$



# Multiple Choice

- When a comparator's open-collector output stage is OFF, it \_\_\_\_\_.
  - a. Sinks current in order to pull the output voltage close to the negative power supply
  - b. Sources current in order to push the output voltage close to the positive power supply
  - c. Looks like a high impedance, allowing the output to be pulled high through a pull-up resistor
  - d. None of the above
  
- When a comparator's push-pull output stage is ON, it \_\_\_\_\_.
  - a. Looks like a high impedance
  - b. Sources or sinks current to drive the load to the required output voltage
  - c. Floats to an unknown state

# Multiple Choice

- Push-pull comparators work well for wired-or applications.
  - a. True
  - b. False
- The maximum  $V_{OS}$  of a comparator ranges from \_\_\_\_\_.
  - a.  $\pm 1\mu\text{V}$  to  $\pm 10\mu\text{V}$
  - b.  $\pm 25\mu\text{V}$  to  $\pm 1\text{mV}$
  - c.  $\pm 2\text{mV}$  to  $\pm 15\text{mV}$
  - d.  $\pm 1\mu\text{V}$  to  $\pm 100\text{mV}$

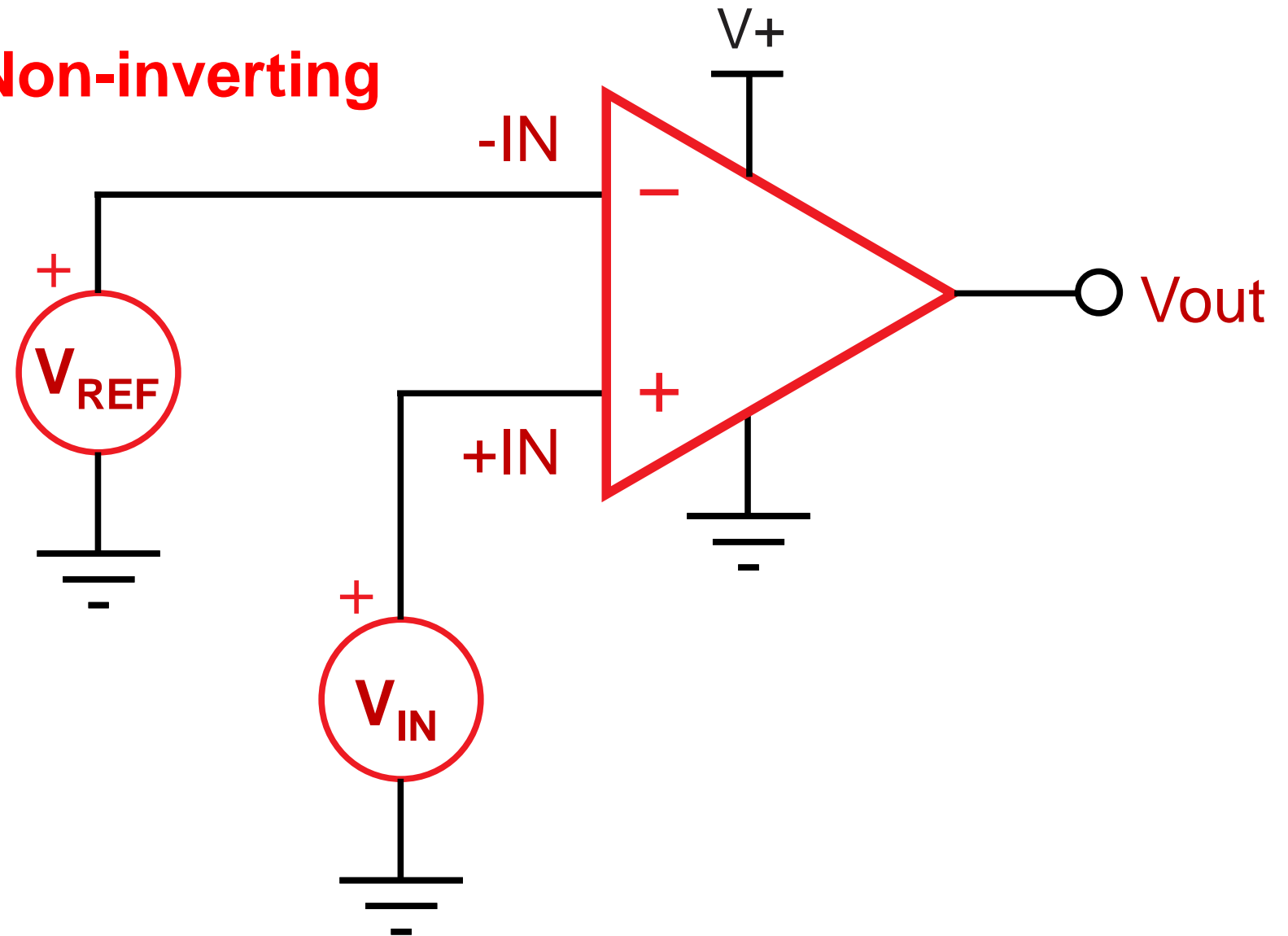
# Solutions



# Question 1 – Solution

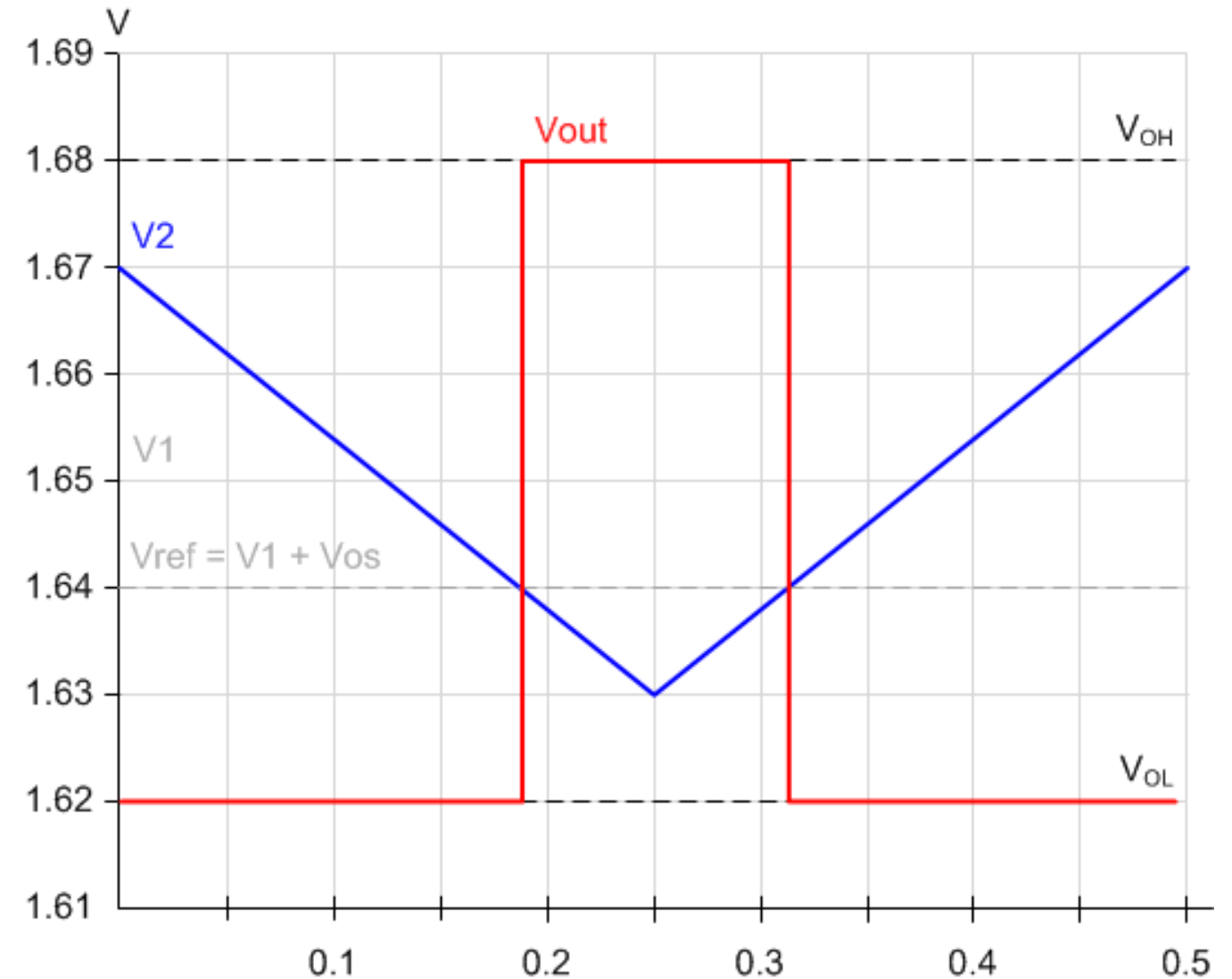
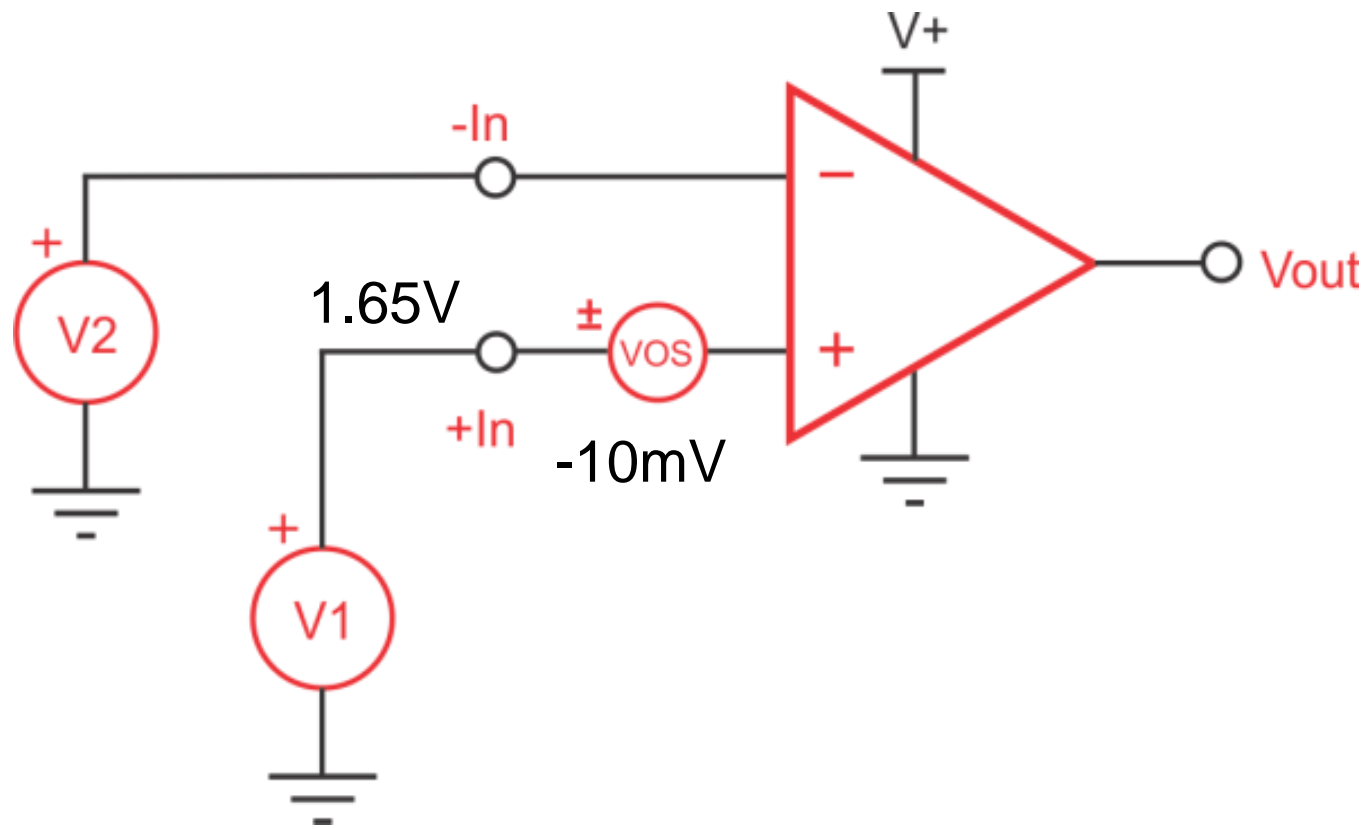
- Is the comparator circuit shown here in an inverting or non-inverting configuration? **Non-inverting**
- Fill in the  $V_{OUT}$  column of the table below for each input condition.

$V_{IN}$	$V_{REF}$	$V_{OUT}$
1.3 V	1.25 V	<b>HIGH (1)</b>
1.2 V	1.25 V	<b>LOW (0)</b>



# Question 2 – Solution

- For the circuit shown below, draw  $V_{out}$  in the plot on the right when:
  - $V_1 = 1.65V$ ,  $V_2 = 40mV_{pp}$  triangle wave,  $V_{os} = -10mV$





# Multiple Choice – Solutions

- When a comparator's open-collector output stage is OFF, it \_\_\_\_\_.
  - a. Sinks current in order to pull the output voltage close to the negative power supply
  - b. Sources current in order to push the output voltage close to the positive power supply
  - c. Looks like a high impedance, allowing the output to be pulled high through a pull-up resistor
  - d. None of the above
  
- When a comparator's push-pull output stage is ON, it \_\_\_\_\_.
  - a. Looks like a high impedance
  - b. Sources or sinks current to drive the load to the required output voltage
  - c. Floats to an unknown state

# Multiple Choice – Solutions

- Push-pull comparators work well for wired-or applications.
  - a. True
  - b. False**
- The maximum  $V_{OS}$  of a comparator ranges from \_\_\_\_\_.
  - a.  $\pm 1\mu\text{V}$  to  $\pm 10\mu\text{V}$
  - b.  $\pm 25\mu\text{V}$  to  $\pm 1\text{mV}$
  - c.  $\pm 2\text{mV}$  to  $\pm 15\text{mV}$**
  - d.  $\pm 1\mu\text{V}$  to  $\pm 100\text{mV}$