RF/R9 = 1 USE 20K OR 10K
RF/R10 = 2 USE (10K, 5K) OR (20K, 10K)
R7/R5 = R6/R4 = 2 USE 100K, 49.9K

TABULATE
1. V1, V2, V3, V4, VX DC VALUES
2. VOUT: AC(Vp-p), AC(RMS), DC VALUE
3. SKETCH VOUT WAVEFORM (1) CRO DC COUPLED
   (2) CRO AC COUPLED LABEL ZERO VOLT REFERENCE
4. PHASE OF VOUT WRT VIN
5. DEMO
TABULATE:
1. VIN, V1, V2, V3, V4, V5  AC(Vp-p), AC(RMS), DC
2. VOUT: AC(Vp-p), AC(RMS), DC VALUE
3. SKETCH VOUT WAVEFORM (1) CRO DC COUPLED
   (2) CRO AC COUPLED  LABEL ZERO VOLT REFERENCE
4. PHASE OF VOUT WRT V4, V1, V2
5. DEMO

RF/R8 = 2  ALTERNATE  20K OR 10K
RF/R10 = 1  VALUES  10K, 5K
RF/R9 = 1 USE 20K OR 10K
RF/R10 = 2 USE (10K, 5K) OR (20K, 10K)
R7/R5 = R6/R4 = 2 USE 100K, 49.9K

TABULATE
1. V1, V2, V3, V4, VX DC VALUES
2. VOUT: AC(Vp-p), AC(RMS), DC VALUE
3. SKETCH VOUT WAVEFORM (1) CRO DC COUPLED
   (2) CRO AC COUPLED LABEL ZERO VOLT REFERENCE
4. PHASE OF VOUT WRT VIN
5. DEMO
USE +/- 15V DUAL SUPPLY FOR ALL OPAMPS

1. TABULATE (DC VALUES):
   V1, V2, V3, V4, V5, V6, VOUT

2. REMOVE VIN = -5VDC AND INSTALL LAG-120
   SET AT 5Vp-p AT 500HZ
   TABULATE (AC VALUES) Vp-p
   V1, V2, V3, V4, V5, V6, VOUT (Vp-p)
   IF VOUT IS DISTORTED REDUCE VIN UNTIL DISTORTION DISAPPEARS
   AND MEASURE VIN

3. PHASE Δ OF: VOUT WRT 5V, VOUT WRT VIN

OP-19
1. SET UP CIRCUIT WITH PIN #S LABELED
2. FIND VREF FOR UPPER AND LOWER OPAMPS
3. FIND VIN FOR EACH LED TO TURN ON/OFF
   MEASURE VDIFF FOR EACH OPAMP FOR THE
   VARIOUS CONDITIONS OF THE LED'S (ON/OFF)
4. CALCULATE VREF FOR EACH OPAMP, USING
   THE VALUES SHOWN IN THE ABOVE CIRCUIT ONLY
5. DEMO
FOR THE CIRCUIT FIND $V_1$ AND $V_2$ FOR
(1) $V_{OUT}= 5V$ AND (2) $V_{OUT}= 0V$

DESIGN A WINDOW DETECTOR USING THE LM339
OPEN COLLECTOR OPAMP(s) AS A COMPARATOR
TO OUTPUT 5 VOLS FOR $V_{IN}=.8V$ TO 2V,
OTHERWISE $V_{OUT}= 0V$