A very common circuit for combining signals is the Summing Amplifier, in which the various signals are combined at a single point, which must be a Virtual Ground in order to work properly. Since we've been investigating ways to remove DC from an incoming signal, we'll begin there, but there's much more that can be done with summing amplifiers.

Build the following circuit in Multisim, and analyze it as follows.
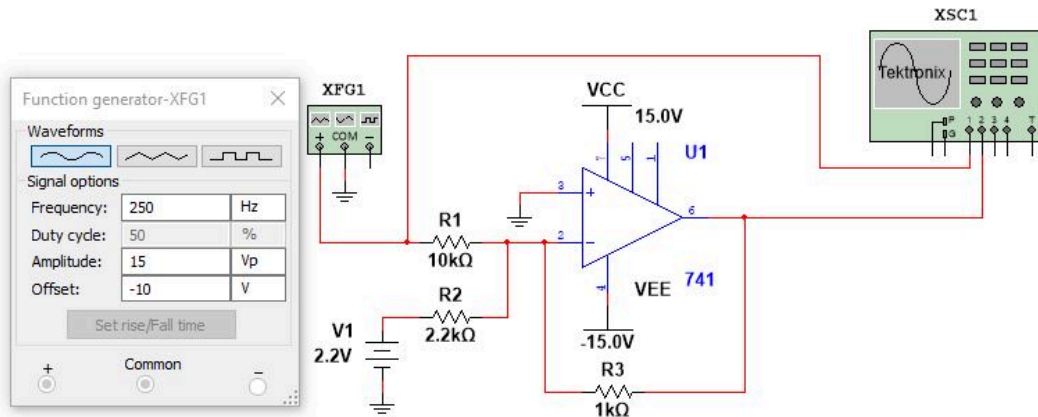
What is the amplitude of the output signal? | 3 | V_{p-p} or | 1.5 | V_p

What is the DC offset of the output signal? | 0 | V_{DC}

Prove that the DC removal was intentional by changing V1 to 3.0 V. What is the DC offset in the output now?

| -364 | mV_{DC}

Now, let's analyze the circuit to see why the DC was effectively eliminated.

By disabling V_1, determine the gain seen by the function generator circuit. | -0.1

By disabling the function generator, determine the offset in the output generated by V_1. | -1 | V_{DC}

Insert these values into the following transfer function:

V_{out} = | -0.1 | x V_{in} - | 1

Now, by entering the two components of the input signal, determine the following:

V_{out} = | 1.5 | V_p + | 0 | V_{DC}

Also note that the output signal is inverted with respect to the input signal.