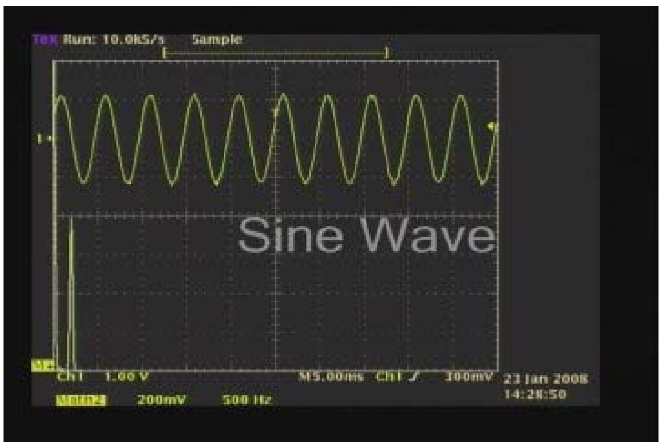
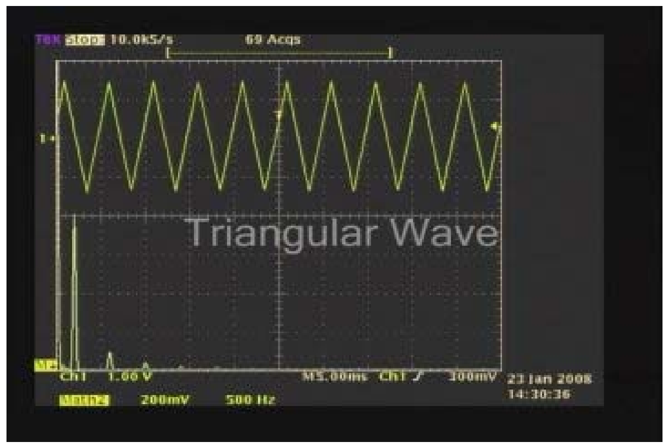
Answer #325

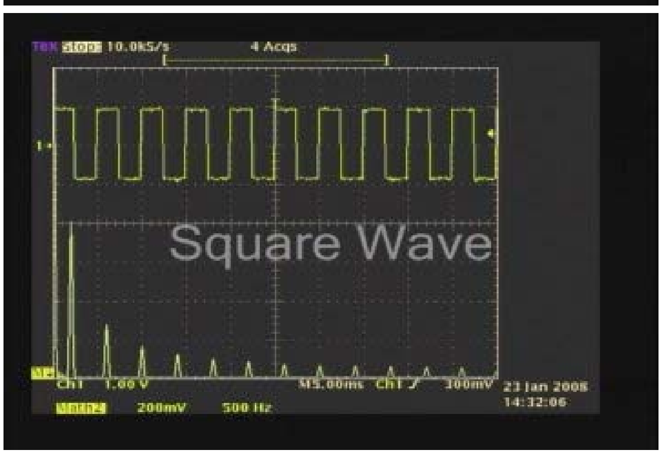
The answer list is as follows:

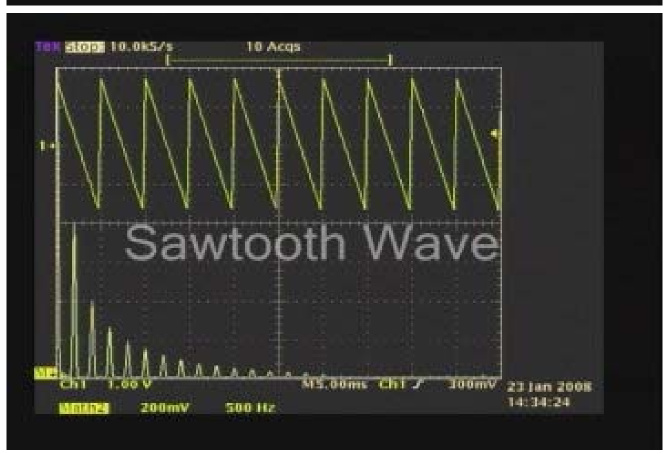
wave name	shape	sound	spectrum
sine wave	a	a	a
triangular wave	b	b	b
square wave	c	c	c
sawtooth wave	d	d	d
pulse train wave	e	e	e

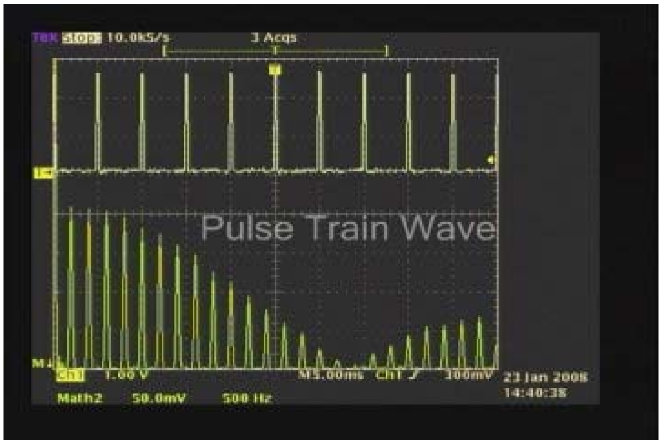
Click your mouse on the links below to hear the waves and to see the wave shape and spectrum displayed on an oscilloscope:











There is a certain systematic logic in all of this. The sine wave is the very simplest type of wave, having the simplest sound, shape, and spectrum. Adding odd harmonics makes the wave symmetric about the peak, as in the triangular wave and the square wave. The triangular and square waves are therefore qualitatively similar, except that the relative amplitudes of the odd harmonics are greater for the square wave than for the triangular wave, so the square wave is sometimes described as being more "woody" than the triangular wave.

the sawtooth wave and the pulse train are similar in that these two waves include *all* harmonics (even and odd). As in the case of the triangle and square waves, the pulse train has greater relative amplitudes of all of the harmonics than the sawtooth, so it sounds even richer and reedier, perhaps even "nasal," but does not have the "woody" character of the triangular and the square waves.

Question of the Week

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For questions and comments regarding the *Question of the Week* contact
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given on the Lecture-Demonstration Home Page.