

The JETS Challenge

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Challenge 60 – The Wake-Up Groove Challenge

Problem:

The wake-up grooves on the side of the turnpike are 3.5-inch gaps on 7-inch centers. As you drive over them, the pitch or frequency they emit represents the number of grooves per second (measured beats per second or Hertz, Hz) that are contracted. The faster you are going the higher the pitch. For example, Middle C on the piano is 256 Hz or 256 grooves per second.

When traveling at exactly 65 MPH, circle below the tone that is closest to the one you would produce.

A	= 110	220	440 Hz
A#	= 115	230	461 Hz
B	= 122	244	488 Hz
C	= 128	256	512 Hz
C#	= 136	272	544 Hz
D	= 144	288	576 Hz
D#	= 153	306	612 Hz
E	= 162	324	648 Hz
F	= 172	344	688 Hz
F#	= 183	365	730 Hz
G	= 194	387	774 Hz
G#	= 205	410	820 Hz

Solution:

$$65 \text{ mph} = \frac{65 \text{ mi}}{3,600 \text{ sec}} = \frac{65 \cdot 5280 \cdot 12 \text{ in}}{3,600} \frac{\text{in}}{\text{sec}}$$

$$= 1,144 \text{ in}/\text{sec}$$

$$\text{Gap every 7 in. , so } \frac{1,144}{7} = 163.43 \text{ Hz}$$