Doppler Effect

If the same direction is considered positive for all three velocities v, v_D, and v_S, then a sound traveling with velocity v produced by a source moving with velocity v_S at frequency f_S is received at frequency f_D by a detector moving with velocity v_D.

$$f_D = f_S \frac{v - v_D}{v - v_S}$$

1. The speed of sound in air is around 342 m/s. To make things simple, we'll say that it is 320 m/s. For a sound emitted at frequency $f_S = 1000$ Hz, find the detected frequencies for the scenarios below.

v_s (m/s)	v_D (m/s)	sketch and scratch	f_D (Hz)
32	0		
–32	0		
0	32		
0	–32		
32	32		
–32	–32		
320	0		
0	320		
–320	0		
0	–320		
480	0		
0	480		
–480	0		
0	–480		