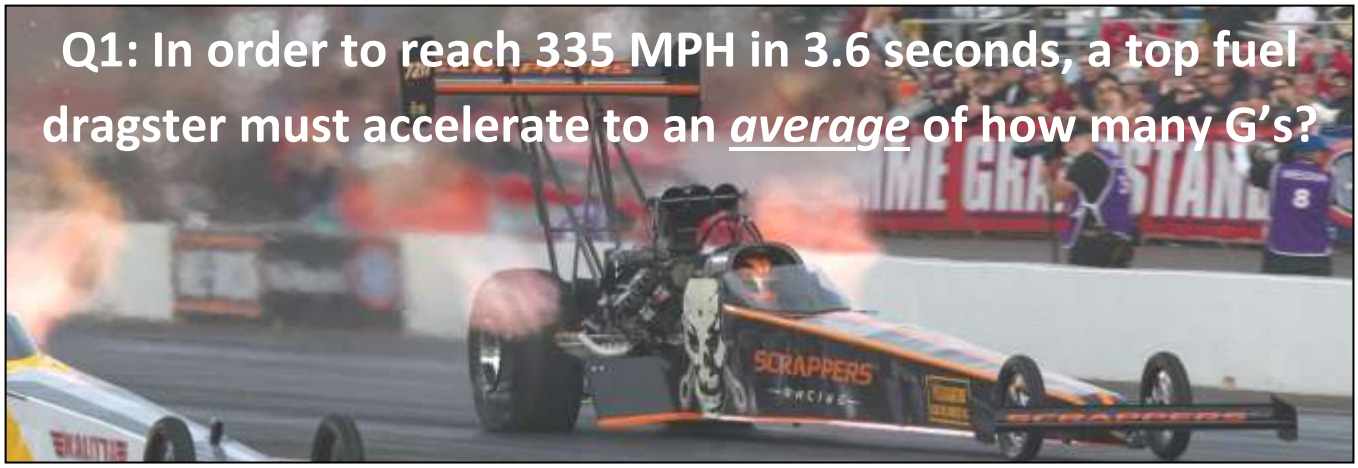
Q1: In order to reach 335 MPH in 3.6 seconds, a top fuel dragster must accelerate to an *average* of how many G's?
SCRAPPERS

Solution:

Q1:

Problem guide:

① Since this obviously involves acceleration, set up **inventory**:

V_i =

V_f =

a =

s =

t =

② Fill in raw data:

V_i = 0 MPH

V_f = 335 MPH* (**491.333 ft/sec**)

a = ? (this is the question)

s = ⊗ **("odd man out")**

t = 3.6 sec

must be converted to ft/sec

$$\frac{335\ \cancel{mi}}{1\ \cancel{hr}} \times \frac{5.28 \times \cancel{10^3} ft}{1\ \cancel{mi}} \times \frac{1\ \cancel{hr}}{3.6 \times \cancel{10^3}\ sec} = \frac{1768.8\ ft}{3.6\ sec} = \mathbf{491.333\ ft/sec}$$

③ Now set up equation using "odd man out" cheat sheet:

$$a = \frac{V_f - V_i}{t} = \frac{491.333 - 0}{3.6} = \mathbf{136.481\ ft/sec^2}$$

④ Convert to G's by dividing answer by 32:

$$136.481 \div 32 = \mathbf{4.265\ G's}$$

Q2: In the video we see that the dragster has achieved 74 MPH in only 21 ft. How many G's does the driver experience in this part of the race?

Q2:

Problem guide:

①	②
Since this obviously involves acceleration, set up **inventory**: V_i = V_f = a = s = t =	Fill in raw data: V_i = 0 MPH V_f = 74 MPH* (**108.533 ft/sec**) a = ? (this is the question) s = 21 t = ⊗ **("odd man out")** **must be converted to ft/sec**

$$\frac{74\ \cancel{mi}}{1\ \cancel{hr}} \text{ X } \frac{5.28 \times \cancel{10^3} ft}{1\ \cancel{mi}} \text{ X } \frac{1\ \cancel{hr}}{3.6 \times \cancel{10^3}\ sec} = \frac{390.72 ft}{3.6\ sec} = \mathbf{108.533\ ft/sec}$$

③ Now set up equation using "odd man out" cheat sheet:

$$a = \frac{V_f^2 - V_i^2}{2s} = \frac{108.533^2 - 0^2}{2(21)} = \frac{11779.412}{42} = \mathbf{280.462\ ft/sec^2}$$

④ Convert to G's by dividing answer by 32:

$$280.462 \div 32 = \mathbf{8.764\ G's}$$