Centripetal Acceleration at Dover Downs

$$centripetal\ acceleration = \frac{(speed)^2}{turn\ radius}$$

$$a = \frac{v^2}{r}$$

First, convert the speed into feet per second:

$$\left(130\ \tfrac{\text{miles}}{\text{hour}}\right) = \left(130\ \tfrac{\text{miles}}{\text{hour}}\right)\left(\tfrac{5280\ \text{feet}}{1\ \text{mile}}\right)\left(\tfrac{1\ \text{hour}}{3600\ \text{seconds}}\right)$$
$$= 190.666667\ \tfrac{\text{feet}}{\text{second}}$$

Plugging the speed into the formula for centripetal acceleration:

$$a = \frac{v^2}{r}$$
$$= \frac{\left(190.66666667\ \tfrac{\text{feet}}{\text{second}}\right)^2}{500\ \text{feet}}$$
$$= 72.8075555\ \tfrac{\text{feet}}{(\text{second})^2}$$

One *g* is 32.2 feet per second squared, so the centripetal acceleration in units of *g* is:

$$a = 72.8075555\ \tfrac{\text{feet}}{(\text{second})^2}\left(\frac{1\ g}{32.3\ \tfrac{\text{feet}}{(\text{second})^2}}\right)$$
$$= 2.26\ g$$