Given

$v_{me} = 9.0 \ m/s$ (20% faster than my brother)

$d = 100 \ m$

Solution

Find the brother's head start for a tie.

The time for my $100 \ m$ run is

$$v = \frac{\Delta x}{\Delta t}$$

$$\Delta t = t_{me} = \frac{\Delta x}{v} = \frac{100 \ m}{9.0 \ m/s} = 11.1 \ s$$

Brother's time for the $100 \ m$ run will be 20% longer. (Multiply by 120%)

$$t_{brother} = 1.2 t_{me} = 1.2(11.1 \ s) = 13.3 \ s$$

The brother should get a $13.3 \ s - 11.1 \ s = 2.2 \ s$ head start.

By the way, your brother's velocity is given by the relationship

$$v_{me} = (120\%) v_{brother}$$

Therefore, the brother's speed is

$$v_{brother} = \frac{v_{me}}{120\%} = \frac{9.0 \ m/s}{1.20} = 7.5 \ m/s$$

Also, since it takes you $11.1 \ s$ to travel $100 \ m$, your brother travels a distance of

$$(7.5 \ m/s)(11.1 \ s) = 83.3 \ m$$

Therefore, you could give your brother a $16.7 \ m$ head start.