2. An adult with a child is cycling along a straight level path. The child is in a trailer, which is connected to the bike by a tow bar.

tow bar

The combined mass of the bike and the adult is 85 kg.

The combined mass of the child and trailer is 28 kg.

The forward force on the bike and trailer is 125 N.

A frictional force of 45 N acts on the bike.

A frictional force of 15 N acts on the trailer.

(a) Show that the acceleration of the bike and trailer is 0.58 m s^{-2}. **2**

Space for working and answer

2. (continued)

(b) Determine the magnitude of the tension in the tow bar. **4**

Space for working and answer

(c) As the speed of the bike and trailer increases, the friction forces on both the bike and the trailer increase.

The acceleration of the bike and trailer remains 0.58 m s^{-2}.

State whether the tension in the tow bar increases, decreases, or stays the same.

Justify your answer. **2**