

Question #53228, Physics / Mechanics | Kinematics | Dynamics |

A powerful motorcycle can produce an acceleration of 3.00 m/s^2 while traveling at 90.0 km/h . At that speed, the forces resisting motion, including friction and air resistance, total 450 N . What force does the motorcycle exert backward on the ground to produce its acceleration if its mass with rider is 240 kg ?

Answer:

The force which pulls the motorcycle forward is defined according the second Newton law:

$F = a \times m$, where a – acceleration, and m – the mass with rider.

Thus, $F = 3 \text{ m/s}^2 \times 240 \text{ kg} = 720 \text{ N}$

Since the forces resisting motion exert in opposite direction to this, the total force exerting backward on the ground equals:

$F_t = F + F_r$, where F_r – the forces resisting motion.

Then $F_t = 720 \text{ N} + 450 \text{ N} = 1170 \text{ N}$

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