

2 Forces and Newton's laws – Part 1

—Answers

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Work through these after you have tried the questions yourself.

2.1 $F_g = mg = 3.0 \times 9.8 = 29.4$ N, directed downward.

2.2 the **weight** (gravity), acting downward, and the **normal force** (the table's push), acting upward.

2.3 $a = \frac{\sum F}{m} = \frac{18}{6.0} = 3.0$ m/s².

2.4 zero –constant velocity means zero acceleration, so by Newton's first law the forces balance (the cable tension equals the weight).

2.5 net force = $10 - 4.0 = 6.0$ N, so $a = \frac{6.0}{2.0} = 3.0$ m/s².

2.6 the two forces act on **different** objects (one on the ground, one on the feet), so they do not cancel; a third-law pair never acts on the same object.