NOTE: Only problems 11.54 and 11.106 will be marked.

Problem 1 (Problem 11.7)

The motion of a particle is defined by the relation $x = t^3 - 6t^2 - 36t - 40$, where x and t are expressed in meters and seconds, respectively. Determine:

(a) When the velocity is zero,

(b) The velocity, the acceleration, and the total distance traveled when $x = 0$.

Problem 2 (Problem 11.41)

Automobiles *A* and *B* are traveling in adjacent highway lanes and at $t = 0$ have the positions and speeds shown. Knowing that automobile *A* has a constant acceleration of 0.5 m/s^2 and that *B* has a constant deceleration of 0.3 m/s^2, determine:

(a) When and where *A* will overtake *B*,

(b) The speed of each automobile at that time.

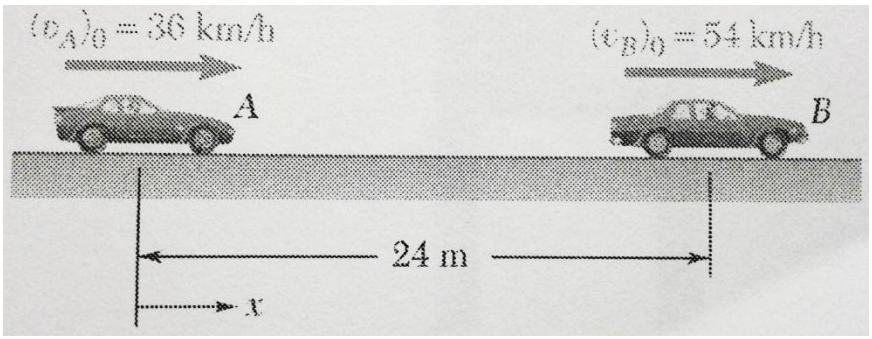

Fig. 2

Problem 3 (Problem 11.54)

At the instant shown, slider block *B* is moving with a constant acceleration, and its speed is 150 mm/s. Knowing that after slider block *A* has moved 240 mm to the right its velocity is 60 mm/s, determine:

(a) The acceleration of *A* and *B*,

(b) The acceleration of portion *D* of the cable,

(c) The velocity and the change in position of slider block *B* after 4 s.

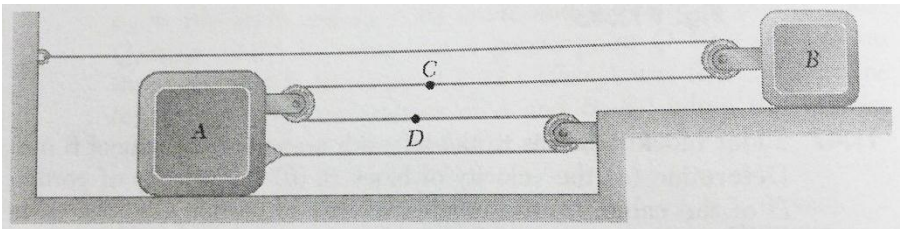

Fig. 3

Problem 4 (Problem 11.97)

An airplane used to drop water on brushfires is flying horizontally in a straight line at 315 km/h at an altitude of 80 m. Determine the distance *d* at which the pilot should release the water so that it will hit the fire at *B*.

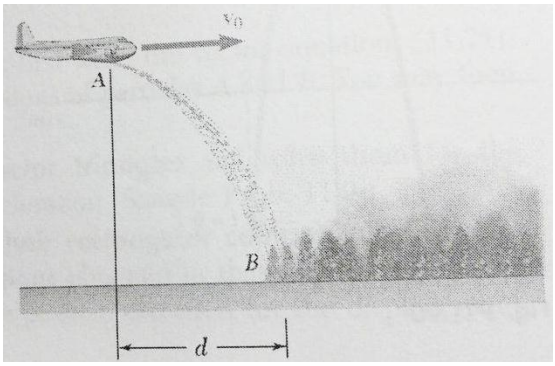

Fig. 4

Problem 5 (Problem 11.106)

A basketball player shoots when she is 5 m from the backboard. Knowing that the ball has as initial velocity V_0 at an angle of 30˚ with the horizontal, determine the value of v_0 when *d* is equal to:

(a) 0.2 m,
(b) 0.38 m.

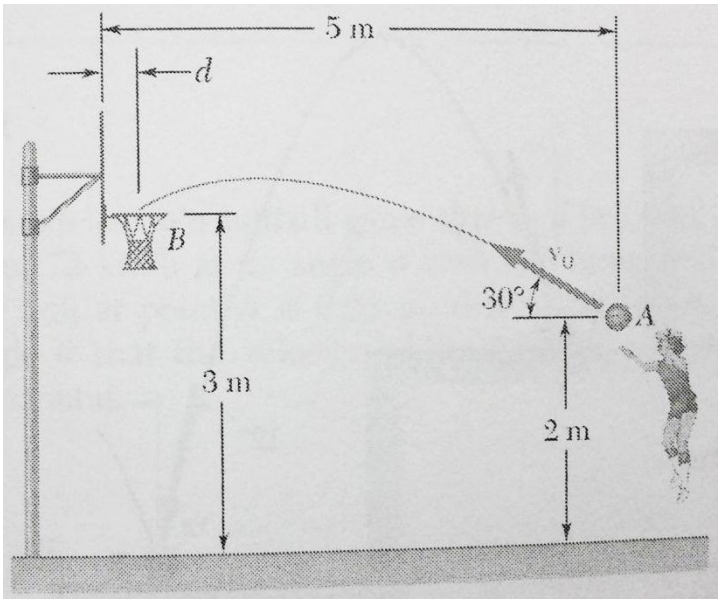

Fig. 5