Physics 11 Kinematics Quiz

Name: KEY Block _____

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1. A car moving at 60.0 km/h comes to a rest in a time of 37.0 s. How far does it travel in that time?

$v_i = (60 \frac{km}{h}) \div 3.6 = 16.667 m/s$

$v_f = 0$

$t = 37.0s$

$\Delta d = \frac{1}{2}(v_i + v_f)\Delta t$

$= \frac{1}{2}(\frac{60}{3.6} + 0)(37)$

$\Delta d = 308m$

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2. Police found skid marks 65.0 m long on a highway showing where a car made an emergency stop.

(a) If the car was moving at 25.0 m/s at the instant the brakes were engaged, what was its acceleration while stopping?

$\Delta d = 65.0m$

$v_f = 0$

$v_i = 25.0 m/s$

$a = \frac{v_f^2 - v_i^2}{2d} = \frac{0 - 25^2}{2(65)}$

$a = -4.81 m/s^2$

(b) How long did it take to stop? (time)

$t = \frac{2d}{v_i + v_f} = \frac{2(65)}{25 + 0}$

$t = 5.20s$

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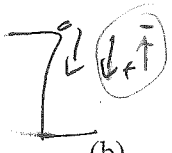
3. A 15.0 kg ball dropped off the edge of a cliff hits the ground with a speed of 45.0 m/s.

(a) How long was the ball in the air? (time)



$v_i = 0$

$v_f = 45.0 m/s$

$t = ?$

$a = 9.8$

$t = \frac{v_f - v_i}{a} = \frac{45 - 0}{9.8}$

$t = 4.59s$

(b) How high was the cliff?

$\Delta d = \frac{v_f^2 - v_i^2}{2a} = \frac{45^2 - 0}{2(9.8)} = 103m$

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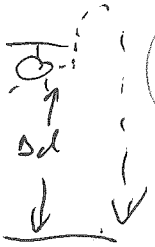
4. A helicopter, 45.0m above the ground, is moving up at 7.50 m/s what a child lets go of a stone that they were holding out the window. How long is the stone in the air? (time from the moment it is released from the boys hand until the instant before it hits the ground)



$v_i = 7.50 m/s$

$\Delta d = -45.0 m/s$

$a = -9.8 m/s^2$

$v_f = ?$

$t = ?$

$\Delta d = \frac{1}{2}at^2 + v_i t$

$0 = -4.9t^2 + 7.5t + 45$

$t = \frac{-7.5 \pm \sqrt{7.5^2 - 4(-4.9)(45)}}{2(-4.9)}$

$t = \frac{-7.5 \pm 30.6}{-9.8} = 3.89s$

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