33. (1) A stone is dropped from the top of a cliff. It hits the ground below after 3.25 s. How high is the cliff?

$t = 3.25s$

$u = 0\ ms^{-1}$

$a = 9.8\ ms^{-2}$

$s =$ ___ m

$s = ut + \frac{1}{2}at^2$ (1pt)

$s = (0)(3.25) + \frac{1}{2}(9.8)(3.25)^2$ (1pt)

$s = 51.75625$

$s = 51.8\ m$ (1pt)

SF -.5

units -.5

34. (I) If a car rolls gently ($v_0 = 0$) off a vertical cliff, how long does it take it to reach 85 km/h?

$u = 0\ ms^{-1}$

$V = 85\ km\ h^{-1}$ *convert*

$a = 9.8\ ms^{-2}$

$t = \_\_\_\_ s$

$\frac{85\ km}{h} \left| \frac{1000m}{1km} \right| \frac{1h}{3600s}$

$23.61\ ms^{-1}$ (1pt)

$V = u + at$ (1pt)

$(23.61) = (0) + (9.8)t$

$\frac{23.61}{9.8} = \frac{9.8t}{9.8}$

$t = 2.4092$

$t = 2.4s$ (1pt)

$V = u + at$

$-u \quad -u$

$\frac{v-u}{a} = \frac{at}{a}$

$t = \frac{v-u}{a} = \frac{(23.61)-(0)}{(9.8)}$

$t = 2.4s$

35. (I) Estimate (*a*) how long it took King Kong to fall straight down from the top of the Empire State Building (380 m high), and (*b*) his velocity just before "landing"?

$s = 380$ m

$a = 9.8\ m s^{-2}$

$u = 0\ m s^{-1}$

$t =$ ___ s

$V =$ ___ $m s^{-1}$

$s = ut + \frac{1}{2}at^2$ 1pt

$(380) = (0)t + \frac{1}{2}(9.8)t^2$

$\frac{380}{4.9} = \frac{4.9t^2}{4.9}$ 1pt

$\sqrt{77.55} = \sqrt{t^2}$

$t = 8.8\ s$ 1pt

$V = u + at$

$V = (0) + (9.8)(8.8)$

$V = 86.24$

$V^2 = u^2 + 2as$ 1p

$V^2 = (0)^2 + 2(9.8)(380)$

$\sqrt{V^2} = \sqrt{7448}$ 1pt

$V = 86.3018$

$V = 86\ m s^{-1}$ 1pt