## Free Fall and Vertical Motion

1. If a rock takes 0.750 s to hit the ground after being thrown down from a height of 4.80 m , determine the rock's initial velocity. ( $\mathbf{2 . 7} \mathbf{~ m} / \mathrm{s}$ [down]).
2. Having scored a touchdown, a football player spikes the ball in the end zone. If the ball was thrown down with an initial velocity of $2.0 \mathrm{~m} / \mathrm{s}$ from a height of 1.75 m , determine how long until it hits the ground ? (0.43 s).
3. An elevator moving downward at $4.00 \mathrm{~m} / \mathrm{s}$ experiences an upward acceleration of $2.00 \mathrm{~m} / \mathrm{s}^{2}$ for 1.80 s . What is its velocity at the end of the acceleration interval and how far has it traveled? $\mathbf{0 . 4 0 ~ m / s}$ [down], 4.0 m ).
4. The Drop Zone drops rides 27.0 m from rest before slowing them down to a stop. How fast are they moving before they start slowing? ( $\mathbf{2 3} \mathbf{~ m} / \mathrm{s}$ ).
5. A pebble falls from a ledge 20.0 m high.
A) Find its velocity just before it hits the ground. ( $\mathbf{2 . 0 \times 1 0 ^ { 1 }} \mathrm{m} / \mathrm{s}$ [down]).
B) Find the time it takes to hit the ground. (2.0 s).
