Values

[10] 5. A ball is thrown upward from ground level with an initial speed of 9.8 m/s so that its height in metres after t seconds is given by

$$y = 9.8t - 4.9t^2.$$

(a) What is the acceleration of the ball at any time ?

VELOCITY: $v(t) = y' = 9.8 - 9.8t$ m/s.

ACCELERATION: $a(t) = y'' = -9.8$ m/s^2.

(b) How high can the ball go?

AT THE ~~HIGHEST~~ POINT $v(t) = 0$. SOLVE $9.8 - 9.8t = 0$, GET $t = 1$. AT THAT MOMENT $y|_{t=1} = 4.9$ m.

(c) How fast is it moving when it strikes the ground?

WHEN THE BALL STRIKES THE GROUND $y = 0$. SOLVE $9.8t - 4.9t^2 = 0$ TO GET $t = 0$ (start) AND $t = 2$ (finish.). SO THE BALL STRIKES THE GROUND AFTER 2 SECONDS.

VELOCITY AT THAT MOMENT: $v(2) = 9.8 - 9.8(2) =$

$= -9.8$ m/s.

SPEED $= |v(2)| = 9.8$ m/s