

## Solve:

- 1) Find the intervals on which  $w(x) = -2x^2 - 2x - 4$  is increasing or decreasing.
- 2) Find the intervals on which  $a(x) = x^2 - 4x + 2$  is increasing or decreasing.
- 3) Find the intervals on which  $a(x) = x^3 + 3x^2 - 9x + 3$  is increasing or decreasing.
- 4) Apply the first derivative test on  $c(x) = x^2 - 4x$  to find all local maximum and minimums.
- 5) Apply the first derivative test on  $c(x) = 4x^2 - 2x - 2$  to find all local maximum and minimums.
- 6) Apply the first derivative test on  $h(x) = -x^3 + 9x^2 - 27x + 3$  to find all local maximum and minimums.
- 7) Starting at a height of 0 feet, a ball is thrown upwards with an initial velocity of 128 feet/sec. The ball's height after  $t$  seconds is  $s(t) = -16x^2 + 128x$ . Find the time when the ball is at its maximum height.
- 8) Starting at a height of 2 feet, a ball is thrown upwards with an initial velocity of 96 feet/sec. The ball's height after  $t$  seconds is  $s(t) = -16x^2 + 96x + 2$ . Find the maximum height of the ball.
- 9) Find the intervals on which  $h(x) = x^3 - 6x^2 + 9x - 2$  is concave up or down.
- 10) Find the intervals on which  $k(x) = -5x^3 - x^2 + 4x - 4$  is concave up or down.

11) Find the intervals on which  $y(x) = x^3 - 12x^2 + 45x - 1$  is concave up or down.

12) Find all inflection points of  $y(x) = 3x^4 - 5x^3 + 4x - 2$

13) Find all inflection points of  $m(x) = x^4 - 2x^3 - 5x - 3$ .

14) Find all inflection points of  $r(x) = 3x^5 - 5x^4 + 3x - 3$ .

15) Apply the second derivative test on  $w(x) = x^3 - 3x^2 - 24x + 3$  to find all local maximum and minimums.

16) Apply the second derivative test on  $u(x) = -x^2 + 4x + 4$  to find all local maximum and minimums.