**WORKSHEET VI**

**Shortcuts**



I Using the short cuts of differentiation *when appropriate*, compute the derivative of each of the following functions.

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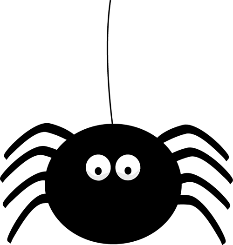
II (a) Find the equations of the *tangent* and *normal lines* to the curve

(b) Find the equations of the *tangent* and *normal* lines to the curve

y = sin x at x = /4.

III Using appropriate shortcuts, find formulas for the derivatives of

y = tan x and y = sec x.

IV  Charlotte, the spider, dances along the x-axis according to the rule

x(t) = t3 – 3t + 5. (Here time is measured in *seconds* and distance in *cm*.)

1. Find Charlotte’s *velocity* at time t = 2 sec.
2. Find Charlotte’s *acceleration* at time t = 2 sec.

V Sketch the curve y = x2(x – 2)2. Over which interval(s) is the graph *rising?* *falling?* Locate any local maxima or minima.

VI Sketch the curve (cf. problem II a). Over which interval(s) is the graph *rising*? *falling*? Locate any *local maxima* or *minima*.

VII Sketch the curve y = xex. Over which interval(s) is the graph rising? falling? Locate any local maxima or minima.

VIII Sketch the curve Over which interval(s) is the graph rising? falling? Locate any local maxima or minima.

IX Consider the curve *y = b + c sin x*. For each of the following values of *b* and *c*, determine when the graph is rising and when it is falling:

1. b = 3, c = 1
2. b = c = 1
3. b = 1, c = 2

X Sketch the curve y = 1/x + x2 over the interval (0, ∞). Over which interval(s) is the graph *rising*? *falling*? Locate any local maxima or minima.

*What Romantic terminology called genius or talent or inspiration is nothing other than finding the right road empirically, following one’s nose, taking shortcuts.*

* Italo Calvino (1923 – 1985)

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