Application of Derivatives (Revision Worksheet-15/09/17)

y are the side of 2 squares s.t. $y = x - x^2$, find the te of change of area of 2nd sq w.r.t. area of 1st sq. (Ans: $2x^2 - 3x + 1$)

The approx value of $f(3.02)$ if $f(x) = 3x^2 + 5x + 3$ (Ans: 45.46)

eqn of tangent at $(2, 3)$ on the curve $y^2 = ax^3 + b$ is $4x - 5$. Find a, b. (Ans: $a = 2, b = -7$)

d the eqn of tangent(s) to the curve $y = x^3 + 2x - 4$ which - ⊥ to the line $x + 14y + 3 = 0$ (Ans: $y = 14x - 20$ & $14x - y = -12$)

man 2m tall walks at a uniform speed of 6 km/hr ay from a lamp post 6m high. Find the rate at which ength of his shadow increases (Ans: 3 km/hr)

the intervals in which (i) $f(x) = \sin x + \cos x$, $0 \le x \le 2\pi$ is st. inc/dec

(ii) $f(x) = 4x^3 - 6x^2 - 72x + 30$.

(iii) $f(x) = x^4 - 8x^3 + 22x^2 - 24x + 21$

ing differentials find the approx. value of $(3.968)^{5/2}$

w that the semi vertical angle of the cone of max^m ume and given slant height is $\cos^{-1}\frac{1}{\sqrt{3}}$.

Tank with rectangular base & rectangular sides n at the top is to be constructed so that its pth is 3m & volume is 75 cm^3. If the building of k costs ₹100 per sq m for the sides, find the cost of st expensive tank (Ans: ₹ 5500)

Find the point P on the curve $y^2 = 4ax$ which is earest to the point $(11a, 0)$ (Ans: $(9a, \pm 6a)$)

A given rectangular area is to be fenced off, in a ield whose length lies along the river. Show that e least length will be required when length of the ield is twice its breadth

$(l = x)$
$(b = y)$
$L = x + 2y$
$A = xy$ given

of all closed right circular cylindrical cans of volume 128π cm^3, find the dimensions of the can which has min^m S.A. (Ans: $r = 4$ cm, $h = 8$ cm)

|r

e fuel cost for running a train is proportional to
eq. of the speed generated in km/hr. If the fuel
₹ 48/hr at the speed of 16 km/hr & the fixed charges
ount to ₹ 1200 per hour, find the most economical
d of the train when total distance covered by the
is 5 km. Keeping the economical duties of the
ny in mind, justify the values promoted in
question.

(Ans: 80 km/hr ; national rev inc by minimizing expenditure/cost)

$f(x) = x\sqrt{1-x}$, $x \in [\frac{1}{3}, 1]$, find the local max/
l min values (if any). Also find abs. max & abs
. values.

nd the eqn of normal to the curve $y = \sin^2 x$ at
$= \pi/4$.

angent to the circle $x^2+y^2 = 4$ at any pt on it
the 1st quadrant makes intercepts OA & OB on
x & y axes respectively, O being the centre of the
cle. Find the min^m value of OA+OB. (Ans: $4\sqrt{2}$ units)

nd the co-ords of the points on the curve $y = \frac{x^2-1}{x^2+1}$,
0 s.t. the tangent at these point(s) has the
reatest slope.

find the intervals on which $f(x) = xe^{x(1-x)}$ is
rictly inc/dec. Also find local max^m & min^m values
the func.