John Mushkiewicz

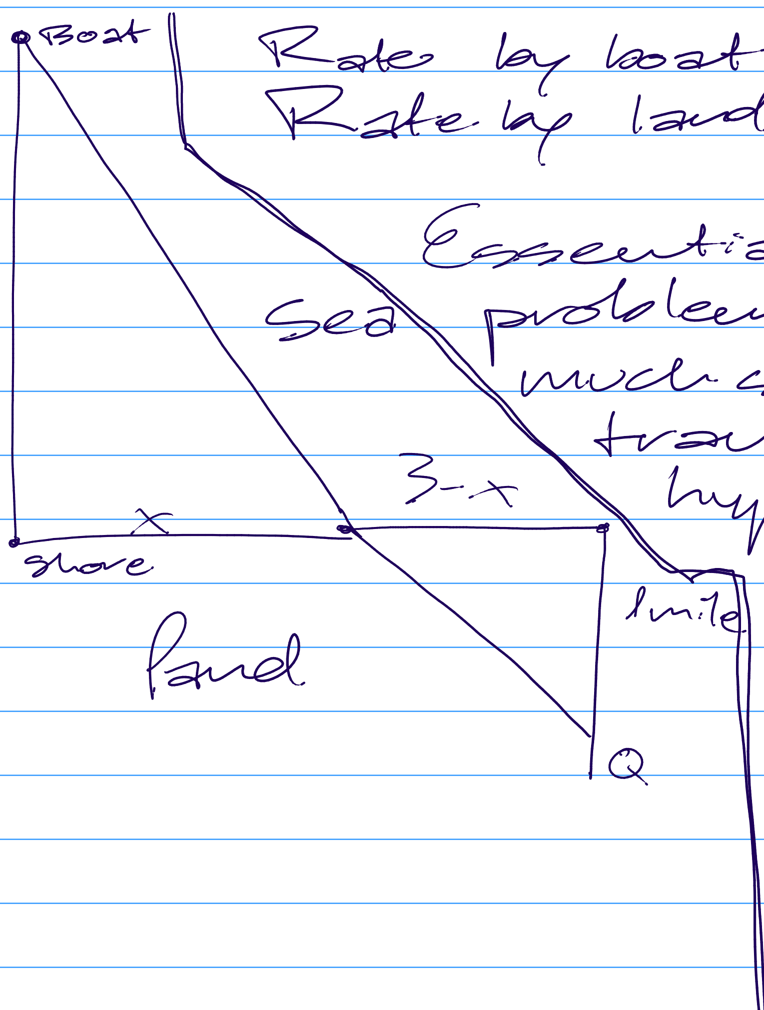
234/35, 37, 39

35) $f(x) = 4 - x^2$ point most distant from (1, 2).

Tue
Thea + science
Wed
Math + SS
Thur
Eng + World Lang

37)

Rate by boat = 3mph
Rate by land = 4mph



Essentially, the problem asks how much should be traveled on each hypotenuse to be the most efficient.

39) $P = -76x^3 + 4360x^2 - 320{,}000$

find the smaller x such that $P = 2{,}500{,}000$

2

pp. 93/5,6,8,9   161/Aa-c, 10

5) a) $\frac{-12}{5}$

b) $y+12=\frac{5}{12}(x-5)$ opp. recip. slope

c) $(5,-12)$ $(x, f(x))$

$$x^2+y^2=169$$

$$\frac{\sqrt{169-x^2}+12}{x-5}$$

y_2-y_1

x_2-x_1

d) $\frac{5}{12}$

6) $$\lim_{x\to 0}\frac{\sqrt{a+bx}-\sqrt{3}}{x}=\sqrt{3}$$

$$\lim_{x\to 0}\frac{a+bx-3}{x(\sqrt{a+bx}+\sqrt{3})}=\sqrt{3}$$

$b=6$

$a=3$

?

8) $f(x)=\begin{cases}\frac{ax}{\tan x} & x\geq 0 \\ a^2-2 & x<0\end{cases}$

$$\frac{ax}{\tan x} = a^2 - 2 \quad \text{at } x = 0$$

$$ax = (a^2 - 2)\tan x$$

Eh, you realize eventually that shit like this is impossible.

9) (a) g_4,

(b) g',

(c) g_3

DVNO

__ __ __ __ __ __

4) (a) $m = 4$

(b) $y - 4 = -\frac{1}{4}(x - 2)$

(c) find eqn. of tangent + normal line of $y = x^2$ at $(0, 0)$

10) Particle moving along $y = \sqrt[3]{x}$, at $x = 8$ y is increasing at 1 cm/sec.

a) how fast is the x component changing at this point?

$dy = 1$
$dx = 12$

cm/s

b) how fast is the distance from the origin changing at this point?

$\frac{dy}{dx}$

c) how fast is the $\angle$ of inclination θ changing at this point.

mumble arctan mumble

253/11-39 EOO

11) $\int \frac{1}{x\sqrt{x}}\,dx = \int \left(x^{-1} \cdot x^{-1/2}\right)dx$

$= \int x^{-3/2}\,dx = \frac{-2}{5}x^{5/2} + C$

15) $\int (x+3)\,dx = \frac{1}{2}x^2 + 3x + C$

19) $\int (x^3+2)\,dx = \frac{3}{4}x^9 + 2x + C$

23) $\int \sqrt[3]{x^2}\,dx = \int (x^2)^{1/3}\,dx = \int x^{2/3}\,dx = \frac{3}{5}x^{5/3} + C$

27) $\int \frac{x^2+x+1}{\sqrt{x}}\,dx = \int (x^2+x+1)(x^{-1/2})\,dx$

$= \int \left(x^{3/2} + x^{1/2} + x^{-1/2}\right)dx = \frac{2}{5}x^{5/2} + \frac{2}{3}x^{3/2} + 2x^{1/2} + C$

doh

6 Jan

256/47, 49, 51, 63, 67-79 odds

47) $\int \frac{dy}{dx} = \int (2x-1)$

$y = \int (2x-1)\,dx$

$y = x^2 - x + c$ for the point $(1, 1)$

$1 = 1^2 - 1 + c$

$c = 1$

ergo $\boxed{y = x^2 - x + 1}$

49) $\frac{dy}{dx} = \frac{1}{2}x - 1$ going through $(4, 2)$

$\int \frac{dy}{dx} = \int (\frac{1}{2}x - 1)$

$y = \int (\frac{1}{2}x - 1)\,dx$

$y = \frac{1}{4}x^2 - x + c$

$2 = \frac{1}{4}(16) - 4 + c$

$c = 2$

$\boxed{y = \frac{1}{4}x^2 - x + 2}$

51) $\int \frac{dy}{dx} = \int \cos x$ going through $(0, 4)$

$y = \int \cos x \, dx$

$y = \sin x + c$

$4 = \sin 0 + c$ $\boxed{y = \sin x + 4}$

$c = 4$

63) a) $\frac{dh}{dt} = 1.5t + 5$ through $(0, 12)$

$\int \frac{dh}{dt} = \int (1.5t + 5)$

$h = \int (1.5t + 5) \, dt$

$h = \frac{1.5}{2} t^2 + 5t + c$

$h = \frac{3}{4} t^2 + 5t + c$

$12 = c$

$h = \frac{3}{4} t^2 + 5t + 12$

b) $h = \frac{3}{4}(36) + 30 + 12$ $t = 6$

$= 27 + 30 + 12$

$= 69$ cm

67) $a(t) = -32$

$v(t) = \int -32\,dt$

$v(t) = -32t + c$

$p(t) = \int (-32t + c)\,dt$

$p(t) = -16t^2 + ct + k$

neglect air resistance

$p(t)$ is position

$(0, 6)$

$k = 6$

$c = 60$ ft/sec

$p(t) = -16t^2 + 60t + 6$

$v(t) = -32t + 60$

$0 = -32t + 60$

$32t = 60$

et cetera -