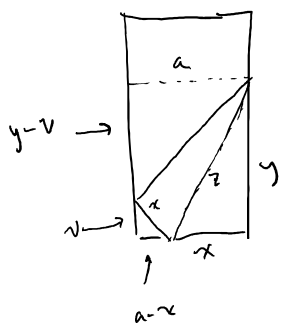
Lec 10/25

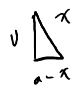
Tuesday, October 25, 2016 9:08 AM

More Review



(a) Area $= \frac{1}{2}xy$

(b) Length $= z = \sqrt{x^2+y^2}$



$$v = \sqrt{x^2-(a-x)^2}$$
$$= \sqrt{2ax-a^2}$$

$$(y-v)^2 = y^2 - a^2$$

$$y^2 - 2vy + 2ax - a^2 = y^2 - a^2$$

$$ax = vy$$
$$y = \frac{ax}{\sqrt{2ax-a^2}}$$

The sequence $\{d_n\}$ given by $d_n = |x_n - a|$ is bounded below by 0 (clearly)

and is decreasing. Therefore, by Monotone Convergence Theorem, $\lim_{n\to\infty} d_n$ exists.

if it $\lim_{n\to\infty} d_n = l \neq 0$, then $\forall \varepsilon > 0$, $\exists N$ s.t.

$$n > N \Rightarrow \big||x_n - a| - l\big| < \varepsilon$$

Choose $\varepsilon = \frac{l}{2}$. $\exists N$ s.t.

$$n > N \Rightarrow \big||x_n - a| - l\big| < \frac{l}{2}$$

Relation to take-home 2:

Alt. approach for finding global minima: ↗ P2 th.

$$f(x) = \frac{ax^2}{\sqrt{2ax - a^2}}$$

candidates for min	$f(x)$
$\frac{a}{2}$	$\lim_{x \to \frac{a}{2}^+} f(x) = \infty$
$\frac{2}{3}a$	$\frac{a\left(\frac{2}{3}a\right)^2}{\sqrt{\cdots}} = \frac{4}{9}a^3 \Big/ \sqrt{a^2/3} = \frac{4\sqrt{3}}{9}a^2$
a	$\frac{a^3}{\sqrt{2a^2 - a^2}} = \frac{a^2}{a} = a^2$

$\frac{4\sqrt{3}}{9}a^2 < a^2$

$\frac{4\sqrt{3}}{9} < 1$ b.c. $\frac{16 \cdot 3}{81} = \frac{48}{81} < 1$