AP Calculus AB

Tuesday, December 18, 2012

WE ARE THE CHAMPIONS!

Given $f(x)=\sqrt{x^2-5x+8}-x+2$

(a) Find the slope of the secant line from the y-intercept to the point $(1, f(1))$.

(b) Find the slope of the tangent line to $f(x)$ @ $x=1$.

(c) Find the equation of the line perpendicular to the line tangent to $f(x)$ @ $x=1$.

Given $f(x)=\sqrt{x^2-5x+8}-x+2$

(a) Find the slope of the secant line from the y-intercept to the point $(1, f(1))$.

$f(0)=\sqrt{0-0+8}-0+2$

$f(0)=\sqrt{8}+2$

$f(1)=\sqrt{1-5+8}-1+2$

$f(1)=\sqrt{4}+1$

$f(1)=2+1$

$f(1)=3$

$$m=\frac{3-(\sqrt{8}+2)}{1-0}$$

$$m=\frac{-\sqrt{8}+1}{1}$$

$$m=-\sqrt{8}+1$$

(b) Find the slope of the tangent line to $f(x)$ @ $x=1$.

$$f(x)=(x^2-5x+8)^{1/2}-x+2$$

$$f'(x)=\frac{1}{2}(x^2-5x+8)^{-1/2}(2x-5)-1$$

$$f'(x)=\frac{(2x-5)}{2\sqrt{x^2-5x+8}}-1$$

$$f'(1)=\frac{2(1)-5}{2\sqrt{4}}-1$$

$$f'(1)=\frac{-3}{4}-\frac{4}{4}$$

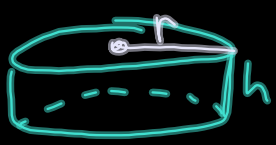
$$f'(1)=-\frac{7}{4}$$

(c) Find the equation of the line perpendicular to the line tangent to $f(x)$ at $x=1$.

$(1, 3)$ perp. slope $\frac{4}{7}$

$$y-3=\frac{4}{7}(x-1)$$

Be Prepared
p. 318 #6



$A = \pi r^2$

$V = \pi r^2 h$

$V = 100000\ m^3$

$\frac{dr}{dt} = 3\ m/min$

$A = 100\pi\ m^2$

$r = 10\ m$

(a) $\frac{dA}{dt} = ?$

$A = \pi r^2$

$\frac{dA}{dt} = 2\pi r \cdot \frac{dr}{dt}$

$\frac{dA}{dt} = 2\pi \cdot 10\ m \cdot 3\ m/min$

$\frac{dA}{dt} = 60\pi\ \frac{m^2}{min}$