PCBC 2.3,3.3,3.1 Quiz Key

Wednesday, September 10, 2008
10:08 PM

Precalculus BC Quiz #1-1B **Name:** Key **Per:**___
Hungerford 2.3, 3.3, 3.1 **September 9-10, 2008**

Instructions: Show work, including calculator setups (e.g. Solved by graphing y1 = ...). All values should be **exact** (ie. 5/17 or $\sqrt{2}$, not 0.29 or 1.414).

1. The parametric equations below describe a line.

$x = -1 + 6t$
$y = 4 + 3t$

a. Find the slope of the line.

$m = \frac{3}{6} = \frac{1}{2}$ (Theorem from class)

b. Name the coordinates of a point on the line.

Use $t=0$: $x=-1$, $y=4$.
$(-1, 4)$

c. Write an equation in Taylor form for the line.

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

2. Consider the parametric equations

$x = t^2 - 5$
$y = 4 + 4t$

a. Compute the x-intercept(s) of the curve.

$y=0 \Rightarrow 4+4t=0 \Rightarrow t=-1$

$\therefore \boxed{x = (-1)^2 - 5 = -4}$

b. Compute the y-intercept(s) of the curve

$x=0 \Rightarrow t^2-5=0 \Rightarrow t=\pm\sqrt{5}$

$\therefore \boxed{y = 4 \pm 4\sqrt{5}}$

c. Find the coordinates of the *leftmost* point of the curve.

x is min $\Rightarrow t=0$, so $y = 4+4(0) = 4$; $x = 0^2-5 = -5$

$\boxed{(-5, 4)}$

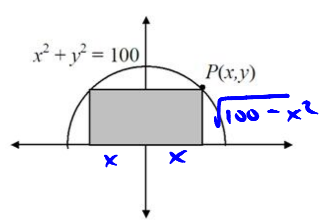
3. Find the domain of the function $f(x) = \frac{\sqrt{4-x}}{x^2-25}$.

Need $4-x \geq 0$ and $x^2-25 \neq 0$

$x \leq 4 \quad \cap \quad x \neq \pm 5 \Rightarrow x \in (-\infty, -5) \cup (-5, 4]$
(either form ok)

4. A rectangle is inscribed in the semicircle $x^2 + y^2 = 100$ as shown.

Find a formula for the rectangle's area in terms of x.



$A = 2x \cdot y$
$= 2x\sqrt{100-x^2}$

Precalculus BC Quiz #1-1B **Name:** ________________________ **Per:**___
Hungerford 2.3, 3.3, 3.1 **September 8-9, 2008**

Instructions: Show work, including calculator setups (e.g. Solved by graphing y1 = ...). All values should be **exact** (ie. 5/17 or $\sqrt{2}$, not 0.29 or 1.414).

1. The parametric equations below describe a line.

$x = -1 + 12t$
$y = 16 + 4t$

a. Find the slope of the line.

$m = \frac{4}{12} = \frac{1}{3}$ (Theorem from class)

b. Name the coordinates of a point on the line.

Use $t = 0$

$x = -1 + 12 \cdot 0 = -1$
$y = 16 + 4 \cdot 0 = 4$

$\boxed{(-1, 4)}$

c. Write an equation in Taylor form for the line.

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

2. Consider the parametric equations

$x = t^2 - 11$
$y = 8 + 8t$

a. Compute the x-intercept(s) of the curve.

$y = 0 \Rightarrow 8 + 8t = 0 \Rightarrow t = -1$

$\therefore x = (-1)^2 - 11 = -10$

$(-10, 0)$

b. Compute the y-intercept(s) of the curve

$x = 0 \Rightarrow t^2 - 11 = 0 \Rightarrow t = \pm\sqrt{11}$

$\therefore y = 8 \pm 8\sqrt{11}$

$(0, 8 \pm \sqrt{11})$

c. Find the coordinates of the *leftmost* point of the curve.

x min $\Rightarrow t = 0 \Rightarrow y = 8$ and $x = -11$ $(-11, 8)$

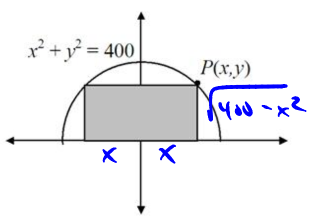
3. Find the domain of the function $f(x) = \frac{\sqrt{6-x}}{x^2 - 49}$.

Need $6 - x \geq 0$ & $x^2 \neq 49$

$\therefore x \leq 6$ & $x \neq \pm 7 \Rightarrow x \in (-\infty, -7) \cup (-7, 6]$
(either form ok)

4. A rectangle is inscribed in the semicircle $x^2 + y^2 = 400$ as shown.

Find a formula for the rectangle's area in terms of x.



$A = 2x \cdot y$
$= 2x \cdot \sqrt{400 - x^2}$