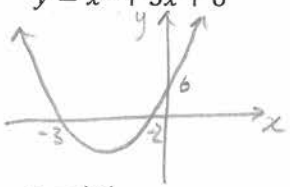
Math 203 Quiz 2
June 4, 2014

Name: ANSWERS

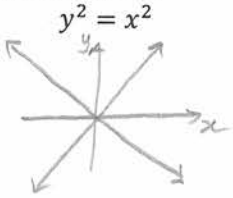
Instructions: No calculators! Use your own scrap paper (Don't write rough work on this sheet; scrap paper is not to be submitted). Answer all problems in the space provided!

1. Sketch the following below the equations.

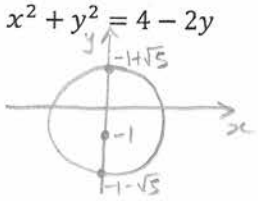
$y = x^2 + 5x + 6$



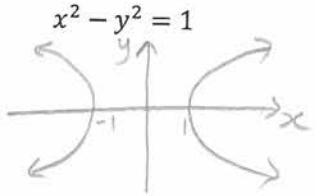
$y^2 = x^2$



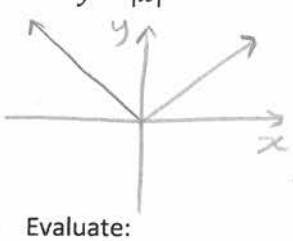
$x^2 + y^2 = 4 - 2y$



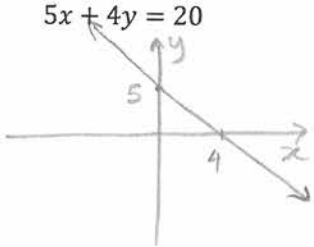
$x^2 - y^2 = 1$



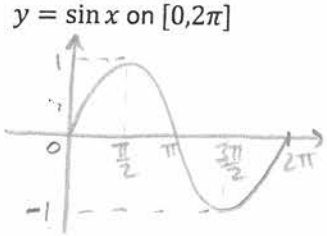
$y = |x|$



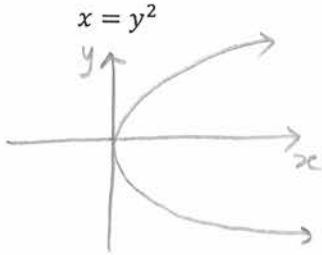
$5x + 4y = 20$



$y = \sin x$ on $[0, 2\pi]$



$x = y^2$



2. Evaluate:
(a) $\csc\frac{7\pi}{6} =$ -2 (b) $\sec\frac{5\pi}{3} =$ 2 (c) $\tan^{-1}\frac{1}{\sqrt{3}} =$ $\pi/6$ (d) $\ln e =$ 1 (e) $\ln(-4) =$ DNE

3. For an arbitrary triangle ABC, state:
(a) The law of sines $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$ or $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$

(b) $b^2 =$ $a^2 + c^2 - 2ac\cos B$ (by the law of cosines)

4. State the double angle formula for cosine: $\cos 2x = \cos^2 x - \sin^2 x = 1 - 2\sin^2 x = 2\cos^2 x - 1$

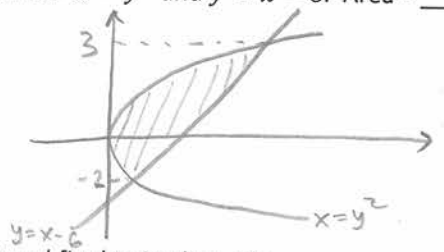
5. State the double angle formula for sine: $\sin 2x = 2\sin x \cos x$

6. Compute/Evaluate/Write down:
(a) $\frac{d}{dx}\sqrt[3]{x} =$ $\frac{1}{3}x^{-2/3}$ (b) $\int \ln x\, dx =$ $x\ln x - x + C$ (c) $\frac{d}{dx}e^{f(x)} =$ $f'(x)\,e^{f(x)}$ (d) $\frac{d}{dx}\ln f(x) =$ $\frac{f'(x)}{f(x)}$

(d) $\lim_{x\to 2}\frac{4-x^2}{x^2+x-6} =$ $-4/5$ (e) $\frac{d}{dx}2^x =$ $2^x \ln 2$ (g) $\int x^3 e^{x^2}\, dx =$ $\frac{1}{2}\left(x^2e^{x^2} - e^{x^2}\right) + C$

(h) $\frac{d}{dx}\sin^2 x =$ $2\sin x\cos x$ (i) $\int \frac{1}{x^2+6x+5}\, dx =$ $\frac{1}{4}\ln\left|\frac{x+1}{x+5}\right| + C$ (j) $\frac{d}{dx}\frac{3}{5x+x^2e^{x^3}} =$ $\frac{-3(5+2xe^{x^3}+3x^4e^{x^3})}{(5x+x^2e^{x^3})^2}$

7. (a) What is the area bounded between the curves $x = y^2$ and $y = x - 6$. Area = $125/6$ or $20\,5/6$
(b) Sketch the region described above:



8. Bonus: Find a vector with initial point (1,-3,4) and final point (0,7,-2): $\langle -1, 10, -6\rangle$

9. Bonus: Suppose $\vec{a} = \langle a_1, a_2, a_3\rangle$ and $\vec{b} = \langle b_1, b_2, b_3\rangle$.
(a) Find $\vec{a}\cdot\vec{b} =$ $a_1b_1 + a_2b_2 + a_3b_3$ (b) Find $\vec{a}\times\vec{b} =$ $\langle a_2b_3 - a_3b_2,\ a_3b_1 - a_1b_3,\ a_1b_2 - a_2b_1\rangle$

10. Bonus: State what kind of quantity it is: $\vec{a}\cdot\vec{b} =$ scalar $\vec{a}\times\vec{b} =$ vector