Math 180 Name _______________

Winter, 2008

Exam 2

No Calculator!

No Notes!

Find each derivative.

1. $y = e^{\arcsin x^2}$

2. $y = x\csc(\sin x)$

3. $y = \dfrac{2x+1}{\sqrt{3x^2-1}}$

4. $\tan(xy) = \cot(x - 2y)$

5. $2y^3 - 3x^2 + 4xy^2 + x - y = 4$

6. $y = arc\cot(4x)$

7. $y = (\cos x)^x$

8. $y = x^2 \ln(\arcsin(3x))$

9. $y = |x^2 - 4|$

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Exam 2
Part 2
No Work = No Credit!

1. Find the absolute maximum and absolute minimum values of *f* on the given interval.

$$f(x) = x - 2\cos x$$
$$[-\pi, \pi]$$

2. A paper cup has the shape of a cone with height 10 cm and radius 3 cm (at the top). If water is poured into the cup at a rate of 2 cubic cm per second, how fast is the water level rising when the water is 5 cm deep?

$$V = \frac{1}{3}\pi r^2 h$$

3. Find the points on the curve $y = \frac{\cos x}{2 + \sin x}$ at which the tangent is horizontal.

4. Find each limit.

a) $\lim_{x \to \infty} \arctan(e^x)$

b) $\lim_{x \to 0} \frac{\sin x}{2x^2 - x}$

c) $\lim_{x \to 0} \frac{\sin(\sin x)}{x}$

d) $\lim_{x \to -1^+} \arccos x$

5. Prove that the derivative of an even function is an odd function.

6. Derive the derivative of $\cot x$ using the quotient rule.

7. Derive the derivative of $\arccos x^2$ using implicit differentiation.

8. Use differentials to approximate $\sqrt[3]{8.5}$.

9. A police cruiser, approaching a right-angled intersection from the north, is chasing a speeding car that has turned the corner and is now moving straight east. When the cruiser is 0.6 miles north of the intersection and the car is 0.8 miles to the east, the police determine with radar that the distance between them and the car is increasing at 20 mph. If the cruiser is moving at 60 mph at the instant of measurement, what is the speed of the car?