

NO CALCULATORS

Do all ten problems. For maximum credit, show your work and justify your answers; answers alone will seldom receive full credit. If you show your work and if your answer is wrong, you may still receive partial credit. Each of the problems is worth 10 points.

Medicine makes people ill, mathematics make
them sad and theology makes them sinful.

— Martin Luther (1483-1546)

1. Compute $\frac{d}{dx} \sec(2x - x^3)$.

2. Compute $\frac{d}{dx} 5^{2 \ln(x)}$.

3. Compute $\frac{d}{dx} \ln(\sin x)$.

4. Compute $\frac{d}{dx} \arcsin(3x + 1)$.

5. Compute $\frac{d}{dx} x^{x^3}$.

6. Compute $\frac{d}{dx} \cos(\ln x)$.

7. Compute the derivative y' if $\tan(y) = e^{y^2} + \cos(xy)$.

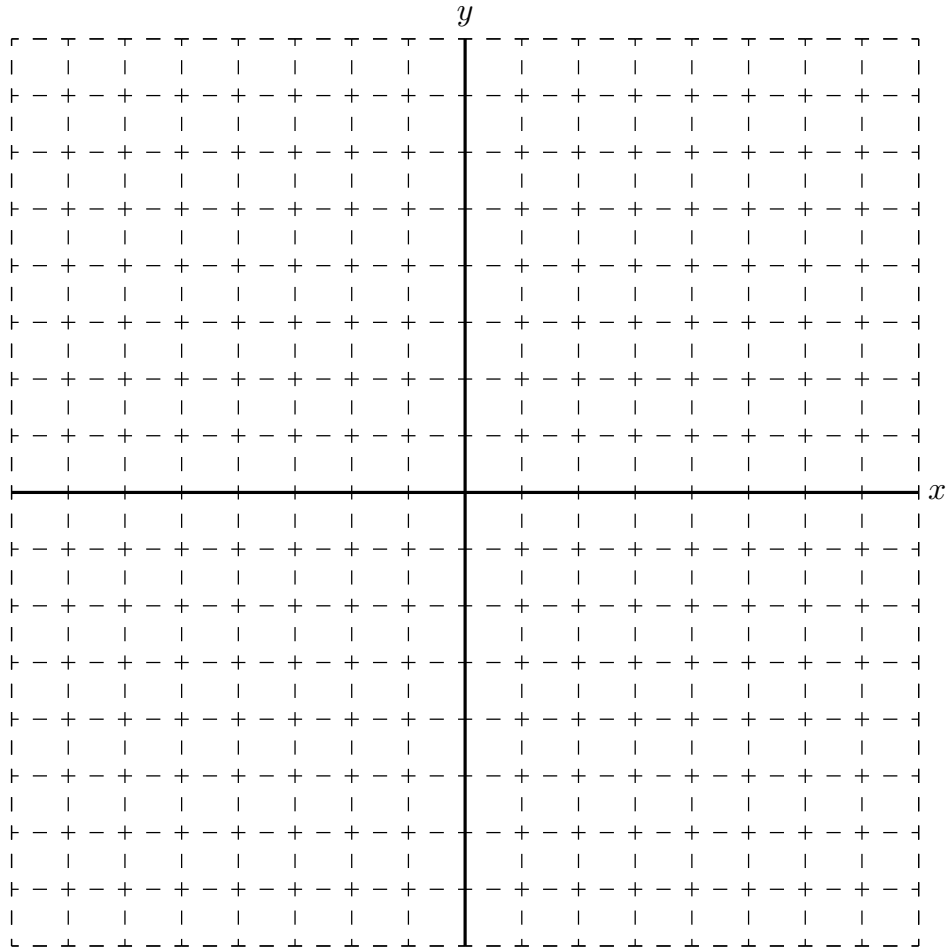
8. Find $\lim_{x \rightarrow \pi/2} \frac{2x - 4(x^2/\pi)}{\cos x}$.

9. Identify all local maximum points, local minimum points and inflection points for the function f below.

$$f(x) = x^4 - 2x^2 + 1 \quad f'(x) = 4x(x - 1)(x + 1) \quad f''(x) = 12x^2 - 4$$

10. Sketch the graph of the function from the previous problem. You may use the grid below for the graph; be sure to indicate the scales you use; you may use different scales for the two axes. If you prefer you may draw your own axes.

$$f(x) = x^4 - 2x^2 + 1 \quad f'(x) = 4x(x-1)(x+1) \quad f''(x) = 12x^2 - 4$$



I've had a wonderful time, but this wasn't it.

— Groucho Marx