

Try each problem, showing all your work. Partial credit may be given, but unsupported answers will receive no credit. Cellphones, calculators, computers, and other electronic devices are prohibited.

**Quiz time: 30 minutes.**

1. Differentiate each function with respect to  $x$ .

(a) (2 points)  $f(x) = \sinh(3x^2 + e^{2x})$ .

(b) (3 points)  $g(x) = \sqrt{4 + x \ln(2x)}$ .

(c) (3 points)  $h(x) = 7^{\tan(2x)}$ .

2. (3 points) Find an equation of the sphere with center  $(1, -3, 4)$  and diameter 10.

3. (3 points) Find the unit vector in the same direction as  $\overrightarrow{PQ}$ , where  $P(-1, 4, 0)$  and  $Q(5, 1, 8)$ .

4. Evaluate the following integrals.

(a) (3 points)  $\int_1^3 \sqrt[3]{2+4t} \, dt$

(b) (3 points)  $\int 3x \cos(4x) \, dx$