

Math 163
Fall 2023
Assessment 4
Dusty Wilson

Name: _____

*I have hardly ever known a mathematician
who was capable of reasoning.*

Plato
427 - 347 BC (Greek philosopher)

No work = no credit

1. Warm-ups

(a) (1 point) $\vec{i} \times \vec{k} =$

(b) (1 point) $5^2 =$

(c) (1 point) $\vec{i} \cdot \vec{j} =$

2. (1 point) Based upon Plato's experience (above), how good were mathematicians at thinking/reasoning?
Answer using complete English sentences.

3. (4 points) Find the exact length of the curve $x = 1 + 3t^2$, $y = 4 + 2t^3$, on $0 \leq t \leq 1$.

4. (4 points) Find all *point(s)* on the curve $x = t^3 - 3t$ and $y = t^2 - 10t$ where the tangent is horizontal or vertical.
5. (4 points) Find parametric equations for the tangent line to the curve $x = \ln(t + 1)$, $y = t \cos(2t)$, and $z = e^t$ at the point $(0, 0, 1)$.
6. (4 points) Find the unit tangent vector $\vec{T}(t)$ of $\vec{r}(t) = \arctan(t)\vec{i} + 2e^{2t}\vec{j} + 8te^t\vec{k}$ at the point where the parameter $t = 0$.