Worksheet 15
Arc Length, Surface Areas, and Average Value Problems
Dr. M. P. M. M. McLoughlin
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Let $U = \mathbb{R} \times \mathbb{R}$
Let M be the arc defined by $y = -x^2 + 2x + 1$ from $x = 1$ to $x = 5$.

Exercise 15.1. Find the arclength of the M (if by its evaluation we create an integrable expression with respect to x. If it is not integrable, then just leave your solution in integral form.

Exercise 15.2. Find the surface area of the figure created by spinning M about the y - axis (if by its evaluation we create an integrable expression with respect to x. If it is not integrable, then just leave your solution in integral form (obviously this figure is in $\mathbb{R} \times \mathbb{R} \times \mathbb{R}$).

Exercise 15.3. Find the average value of the arc.

Let K be the arc defined by $y = \sqrt[3]{x^2}$ from $x = 1$ to $x = 8$.

Exercise 15.4. Find the arclength of the K (if by its evaluation we create an integrable expression with respect to x. If it is not integrable, then just leave your solution in integral form.

Exercise 15.5. Find the surface area of the figure created by spinning K about the y - axis (if by its evaluation we create an integrable expression with respect to x. If it is not integrable, then just leave your solution in integral form (obviously this figure is in $\mathbb{R} \times \mathbb{R} \times \mathbb{R}$).

Exercise 15.6. Find the average value of the arc.

Let W be the arc defined by $y = x^3$ from $x = 1$ to $x = 8$.

Exercise 15.7. Find the arclength of the W (if by its evaluation we create an integrable expression with respect to x. If it is not integrable, then just leave your solution in integral form.

Exercise 15.8. Find the surface area of the figure created by spinning K about the y - axis (if by its evaluation we create an integrable expression with respect to x. If it is not integrable, then just leave your solution in integral form (obviously this figure is in $\mathbb{R} \times \mathbb{R} \times \mathbb{R}$).

Exercise 15.9. Find the average value of W.