

Problem 1. (4 points) Differentiate

$$y = \frac{x^6 - 7\sqrt{x}}{\sqrt{x}}.$$

Hint: Simplify the expression into separate terms before differentiating.

Solution.

$$y = \frac{x^6}{\sqrt{x}} - \frac{7\sqrt{x}}{\sqrt{x}} = x^{6-\frac{1}{2}} - 7x^{\frac{1}{2}-\frac{1}{2}} = x^{\frac{11}{2}} - 7.$$

Differentiate termwise:

$$y' = \frac{11}{2}x^{\frac{9}{2}} - 0 = \frac{11}{2}x^{\frac{9}{2}}.$$

Problem 2. (4 points) Evaluate using the Fundamental Theorem of Calculus:

$$\int_0^1 (3t^2 + 2t) dt.$$

Solution.

$$\int (3t^2 + 2t) dt = t^3 + t^2 + C.$$

Apply the bounds:

$$\left[t^3 + t^2 \right]_0^1 = (1^3 + 1^2) - (0 + 0) = 2.$$

Grading note: Name & date at top of the quiz = 2 free points.