

3. (20 points) Sketch the graph of $f(x) = \frac{x^3}{1-x^2}$, given $f'(x) = -\frac{x^2(x+\sqrt{3})(x-\sqrt{3})}{(1-x^2)^2}$, $f''(x) = \frac{2x(x^2+3)}{(1-x^2)^3}$ and $\sqrt{3} \approx 1.73$. Use the back side of Page 1 for more space.

Domain:

Intercepts

Symmetries

Asymptotes

Monotonicity

Concavity

Shapes

4. (10 points) Use the limit definition to find $\int_0^3 (x^2 - 8x + 7) dx$, given $1 + 2 + \cdots + n = n(n+1)/2$ and $1^2 + 2^2 + \cdots + n^2 = n(n+1)(2n+1)/6$.

5. (5 points) Compute $\frac{d}{dx} \int_{x^4+1}^{\tan x} \frac{dt}{t}$.

6. (5 points each) Evaluate definite integrals.

$$\int_{-2}^3 (x^5 + 8x) dx$$

$$\int_4^1 (5x + 3)\sqrt{x} dx$$

7. (5 points each) Find antiderivatives.

$$\int \sqrt[8]{3-5x} \, dx$$

$$\int x^3(x^4+2)^5 \, dx$$

$$\int x \cos(3-x^2) \, dx$$

$$\int (1+\cos x)^6 \sin x \, dx$$

$$\int x \cot(x^2) \csc(x^2) \, dx$$