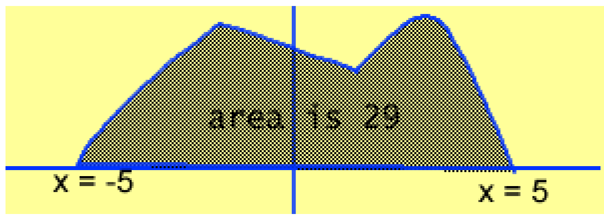
REVIEW PROBLEMS

1. Find the area bounded by $\begin{cases} y = x^3 - x \\ y = 3x \end{cases}$
2. If f′(x) = e^{2x} and f(0) = 5 find f(10),
3. If 0 ≤ f′(x) for -5 ≤ x ≤ 5 and if the area bounded by y = f′(x), x = -5, x = 5, and y = 0 is 29



   a. find:
   b. f(5) if f(-5) =10.
   c. $\int_{-5}^{5} \left| f'(x) \right| dx$
4. Find the radius of convergence of
   a. $\sum_{n=0}^{\infty} \frac{4}{3^n (n!)} x^{2n}$
   b. $\sum_{n=0}^{\infty} \frac{4^n x}{3^n}$
5. Determine if the following series are absolutely convergent:
   a. $\sum_{n=0}^{\infty} \frac{4n+1}{(2n+1)!}$
   b. $\sum_{n=0}^{\infty} \frac{4^n}{3^n}$
   c. $\sum_{n=1}^{\infty} \frac{1}{4^n - 2^n}$
6. Determine if $\int_{5}^{\infty} \frac{1}{x} dx$ converges or diverges
7. Find the radius of convergence of $\sum_{n=1}^{\infty} \frac{n}{3^n} x^n$

8. Let f(x) = $\frac{1}{1+x^2}$

   a. Find a power series, $\sum_{n=0}^{\infty} a_n x^n$ whose sum is equal to f(x) for |x| < 1. (Hint: Use infinite geometric series.)
   b. Find a power series whose sum is $\tan^{-1}$ x for |x| < 1. (Hint: $\int \frac{1}{1+x^2} dx$ = $\tan^{-1}$ x.)

9. F(x) = $\int_3^{3x} e^{t^2} dt$,

   a. Find F′(x)
   b. F′(0)
   c. F(1)

10. Let C be the curve described by $\begin{cases} x = e^t + t^2 \\ y = \sin t + 2t - 3 \end{cases}$

    a. Find $\frac{dy}{dx}$
    b. Find $\frac{ds}{dt}$ (s stands for arc length).
    c. Find the length of the arc from t = 0 to t = 1.
    d. Find an equation of the line tangent to the curve C at (1, -3) (t = 0)

11. Show that $\sum \frac{4n^3}{2n^3}$ is divergent.

12. Find $\int \frac{e^x dx}{e^{2x}+1}$