

*You must show all work! 7 points each*

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**Evaluate the integral. Use integration by parts**

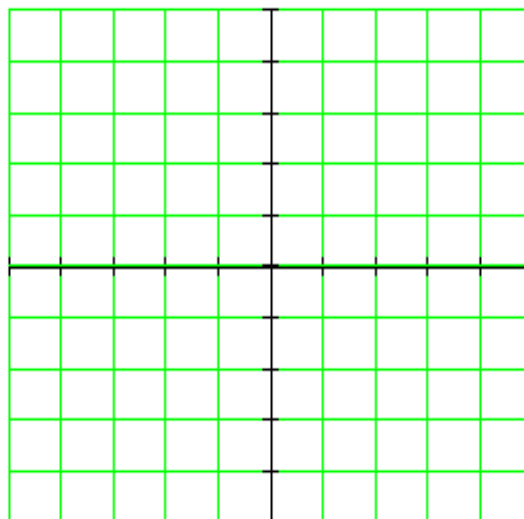
1.  $\int x e^{-3x} dx$

**Just set up using partial fractions. Do not evaluate. Ask if you are confused.**

2.  $\int \frac{3x^2 + 4x - 6}{(x-3)^2(x^2+9)} dx$

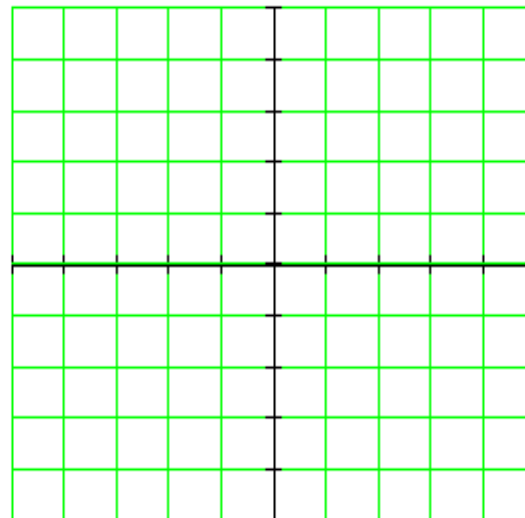
3. Find the **area** of the region bounded by the graphs: Please Graph!

$$y = x^2 + 3, y = 0, x = 1 \text{ and } x = 3$$



4. Find the **volume** of the solid formed by revolving the region bounded by

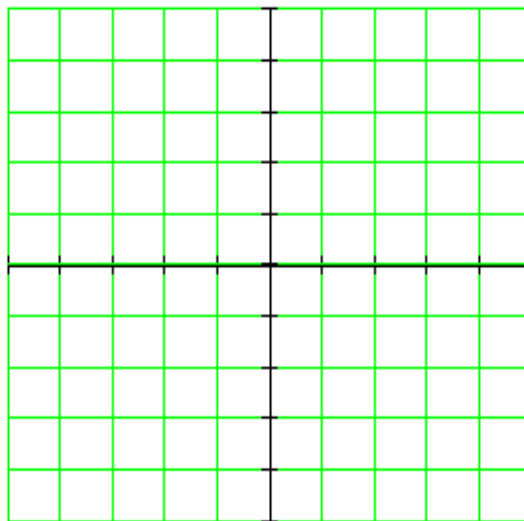
$$x = y^2 - 4, x = 0 \text{ about the line } y\text{-axis. Use **Any Method**.$$



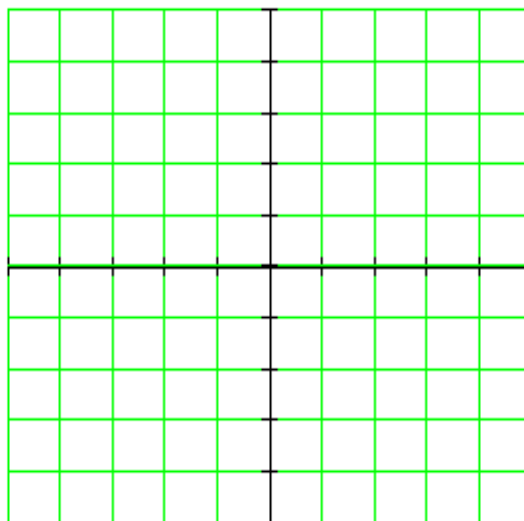
5. - 6. Find the **volume** of the solid formed by revolving the region bounded by

$$y = x^2, y = 0, \text{ and } x = 4$$

5. about the line  $y$ -axis. Use **Shell Method**.



6. about the line  $y = 2$ . Use **Disk Method**.



**Evaluate the integral.**

7.  $\int \sqrt{4-x^2} dx$

**Evaluate the integral.**

8.  $\int \sin^3 x \cos^2 x dx$

**Evaluate the following integrals**

9.  $\int \sin^2 x \, dx$

10.  $\int \ln x \, dx$  Hint: Use integration by parts.

**Evaluate the following integrals**

11.  $\int \frac{1}{x^2 - 4x + 8} dx$

12.  $\int \frac{x+4}{x^2 - 4x} dx$

Use partial fractions.

**Evaluate the integral.** Memorized answer or prove if you must.

Bonus Points for using trig substitution. State trig substitution.

13.  $\int \frac{2}{x\sqrt{x^2-4}} dx$

14. **Evaluate the integral.**  $\int x^4 \cos(2x) dx$

Hint: Use the table or chart method.

Extra credit.

**Solve one of the following: (circle the one you choose)**

6 points  $\int \sec^3 dx$  or

5 points  $\int \sin^{-1} x dx$