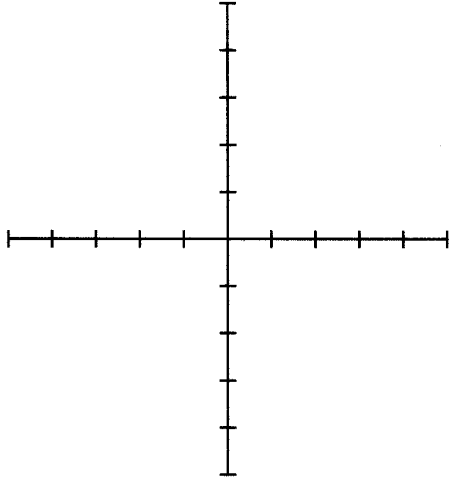


**SAMPLE TEST "E" -- CALCULUS (CONTINUED)**

10. Graph  $y = 4x^3 - x^4$ . Locate maxima, minima, and inflection points.



11. The function  $y = \frac{x^2 + x}{x}$  is defined and continuous for all  $x$  except  $x = 0$ . What value must be assigned to  $y$  when  $x = 0$  in order to make the function continuous at  $x = 0$  ?

12. Find the area under the curve  $y = x^2 + x + 1$  from  $x = 0$  to  $x = 3$ .

13. Integrate:  $\int 2\sin(5x) dx = \underline{\hspace{2cm}}$

14. Evaluate:  $\lim_{h \rightarrow 0} \frac{(x+h)^2 - x^2}{h} = \underline{\hspace{2cm}}$

15. Integrate:  $\int \frac{1}{x} dx = \underline{\hspace{2cm}}$

## SAMPLE TEST "E" -- CALCULUS

1. Find the distance between the points (3, 8) and (-4, 2).
2. Find the equation of the line tangent to the curve  $y = x^3 - 2$  at  $x = 2$ .
3. Evaluate:  $\lim_{x \rightarrow \infty} \frac{2x^3 - 3x + 10}{x^3 - 5} = \underline{\hspace{2cm}}$
4. Evaluate:  $\int_1^3 2x^3 dx = \underline{\hspace{2cm}}$
5. Find the first derivative of  $y = \sqrt{x^2 - 4x + 2}$ .
6. Suppose  $y = \sin^2(e^x)$ . Find  $y'$ .
7. Find relative maxima and minima for the function  $y = x^2 - 5x + 6$  over the interval (0, 5].
8. Use implicit differentiation to find  $\frac{dy}{dx}$ , where  $x^2y + \sqrt{y} = xy$ .
9. A spherical gas balloon is deflating at the rate of  $12\pi$  cubic feet per minute. At what rate is the radius of the sphere decreasing when the radius is 20 feet.

The formula for the volume of a sphere is:  $V = \frac{4}{3} \pi r^3$