1) $\lim_{x \to 1} \frac{x^3 - x^2 - 3x + 3}{x - 1} = -2$

2) $\frac{d}{dx}\left(6\sqrt{x^3} + 4\right) = 9\sqrt{x}$

3) $\int\left(6\sqrt{x^3} + 4\right) dx = \frac{12}{5} x^{5/2} + 4x + c$

4) $\lim_{x \to 0} \frac{(3 - 3\cos(x))}{x} = 0$

5) $\frac{d}{dx} \sec^4(2x) = 8\sec(2x)^4 \tan(2x)$

6) $\int_0^2 \frac{x^2}{\left(x^3 + 4\right)^2} dx = \frac{1}{18}$

7)
a. x2, x5
b. x3, x4
c. x3
d. x2, x4
e. x6
f. x6
g. x1
h. x1
i. x1, x2, x6
j. x1, x2, x6
k. none
l. none
m. x5
n. x5

8) $p = x + 2y$
min when $x = 200 ft.$ and $y = 100 ft.$
min. fencing required = 400 ft.

9) $L^2 = (9t)^2 + (100 - 13t)^2$
$d = (9t)^2 + (100 - 13t)^2$
min. at $t = 5.2$ seconds
min. distance $= 56.9$ feet

10) $x^2 + y^2 = 5^2$
$\frac{dy}{dt} = -0.3$ m/sec.

11) $v = \frac{\pi}{12} h^3$
$\frac{dv}{dt} = 12.5\pi ft^3/\text{min}$
$\approx 39.27 ft^3/\text{min}$