Problems 1 through 12: evaluate the indefinite integral.

1. $\displaystyle\int \sqrt{9x^2 - 6x + 2}\,dx$

2. $\displaystyle\int y \arctan y \, dy$

3. $\displaystyle\int \frac{x - 1}{25x^2 - 20x + 13}\,dx$

4. $\displaystyle\int \frac{\sqrt{1 - 3w^2}}{w}\,dw$

5. $\displaystyle\int \frac{1}{\sqrt{e^{2x} - 1}}\,dx \quad (x > 0)$

6. $\displaystyle\int \frac{2\,x^4 + 2\,x^3 - 6\,x^2 + 3\,x + 6}{(x + 1)\,(x^2 - 4)}\,dx$

7. $\displaystyle\int \ln(x^2 + 4)\,dx$

8. $\displaystyle\int \frac{1}{(u^2 + 5)^2}\,du$

9. $\displaystyle\int \theta^2 \sin 5\theta^3 \, d\theta$

10. $\displaystyle\int \frac{1}{t^3\sqrt{t^2 - 6}}\,dt \quad (t > \sqrt{6})$

11. $\displaystyle\int \frac{1}{x^4 - x^3}\,dx$

12. $\displaystyle\int \sin^{\frac{4}{3}} \phi \cos^3 \phi \, d\phi$

13. The base of a certain solid is the region in the xy-plane bounded by $y = \sin x$, $y = \cos x$, $x = \pi/4$ and $x = 5\pi/4$. If the cross sections of this solid perpendicular to the x-axis are equilateral triangles with *their* bases in the xy-plane, determine the volume of the solid.

14. A bowl-shaped solid is obtained by rotating the bounded region between the curves $y = x^2$ and $4y = 3x^2 + 4$ about the y-axis. Find the volume of this solid.

15. Find the area of the surface obtained by rotating the portion of the curve $y = \ln x$ between $x = -1/2$ and $x = 2$ about the y-axis.