

AP Calculus AB

$$1) \int \frac{1}{x^2+9} dx$$

$$\boxed{\frac{1}{3} \arctan \frac{x}{3} + C}$$

check:

$$\frac{\frac{1}{3}(\frac{1}{3})}{(\frac{x}{3})^2+1} = \frac{\frac{1}{9}}{\frac{x^2}{9}+\frac{9}{9}}$$

$$= \frac{\frac{1}{9}}{\frac{1}{9}(x^2+9)} = \frac{1}{x^2+9}$$

$$3) \int \cos(3z+4) dz$$

$$\boxed{\frac{1}{3} \sin(3z+4) + C}$$

$$5) \int 6 \cos t (2+\sin t)^{-2} dt$$

$$\boxed{-6(2+\sin t)^{-1} + C}$$

check

$$-1(2+\sin t)^{-2} \cdot \cos t$$

$$7) \int \frac{40}{x^2+25} dx$$

$$\frac{40}{5} \arctan\left(\frac{x}{5}\right) + C$$

$$9) \int 2y (4y^2-1)^{-1} dy$$

$$\boxed{\frac{1}{4} \ln |4y^2-1| + C}$$

check:

$$\frac{8y}{4y^2-1}$$

Integrals Involving Inverse Trig.

$$2) \int \frac{9r^2}{\sqrt{1-r^3}} dr = \int 9r^2(1-r^3)^{-1/2} dr$$

$$\boxed{-6(1-r^3)^{1/2} + C}$$

check:

$$\frac{1}{2}(1-r^3)^{-1/2}(-3r^2)$$

$$-\frac{3}{2} \left[-\frac{10}{3}\right] = 9$$

$$4) \int \csc^2 3x dx$$

$$\boxed{-\frac{1}{3} \cot 3x + C}$$

$$6) \int x (x^2+1)^{-1} dx$$

$$\boxed{\frac{1}{2} \ln |x^2+1| + C}$$

check

$$\frac{2x}{x^2+1}$$

$$8) \int \frac{dx}{\sqrt{1-4x^2}}$$

$$\boxed{\frac{1}{2} \arcsin(2x) + C}$$

$$10) \int \frac{dx}{\sqrt{9-x^2}} = \boxed{\arcsin\left(\frac{x}{3}\right) + C}$$