Directions: Show all work and simplify your answers.

1. For each function $f(x)$, find the domain and range.

   a) $f(x) = \tan^{-1}(3x)$

   b) $f(x) = \cos^{-1}(x - 2)$

   c) $f(x) = \sin(\sin^{-1}(x/3))$

2. Differentiate the following functions.

   a) $f(x) = \arctan(5x^4 + 3)^3$

   b) $y = \sin^{-1}(3x^3)$

   c) $r(\theta) = [\sec^{-1}(\theta^2 + 1)]^5$

3. Evaluate the following integrals:

a

$$\int_{-2}^{2} \frac{dx}{4+x^2}$$

b

$$\int \frac{2e^{2x}}{\sqrt{4-e^{4x}}}\, dx$$

c

$$\int \frac{12x^2}{4x^3\sqrt{16x^6-9}}\, dx$$