Exam 3 Review

1) Find $\tan(\arcsin(1/4))$

2) Compute the following derivatives:

    a) $\frac{d}{dx} 2^{\sin x}$ b) $\frac{d}{dx} \arctan(e^x)$ c) $\frac{d}{dx} \arcsin(\sqrt{x})$

3) Compute the following integrals:

    a) $\displaystyle\int_0^{1/2} \frac{\arcsin x}{\sqrt{1-x^2}}\, dx$ b) $\displaystyle\int \frac{dx}{4+16x^2}$

    c) $\displaystyle\int \frac{1+x}{1+x^2}\, dx$ d) $\displaystyle\int \frac{e^{2x}}{\sqrt{1-e^{4x}}}\, dx$

4) Find the area of the region enclosed by the curves:

    a) $y = \sin(\frac{\pi}{2}x)$, $y = x$ b) $x = \cos y$, $x = 2 - \cos y$, $y = 0$, $y = 2\pi$
       in the first quadrant

5) Find the volume of the solid whose base is the region bounded by the curves $y = x^2$ and $y = 4$, and whose cross sections perpendicular to the x-axis are equilateral triangles.

6) Compute the volume of the solid obtained by revolving the region bounded by:

    a) $y = 3x$, $y = x^2$ b) $y = \frac{1}{1+x^2}$, $x = 1$, $x = \sqrt{3}$, and $y = 0$
       about the line   about the line $x = -3$
         $y = 5$.

7) Set up, but do not evaluate, the integral to compute the volume of the solid obtained by revolving the region bounded by $y = x^3$, $y = 0$, $x = 8$ about:

(a) the x-axis using washers

(b) the x-axis using shells

(c) the y-axis using washers

(d) the y-axis using shells

(e) the line $y = 518$ using washers

(f) the line $y = 518$ using shells

(g) the line $x = -2$ using washers

(h) the line $x = -2$ using shells