Additional Review Questions for the Chapter 5/6 Test

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

2. Find the particular solution that satisfies the initial condition:

$$y\sqrt{1-x^2}\,y' - x\sqrt{1-y^2} = 0 \qquad \text{y(0) = 1}$$

3. $\int \frac{2x^2+7x-3}{x-2}dx$

4. $\int \frac{2x-5}{x^2+2x+2}dx$

5. Find the general solution of the differential equation:

$$\sqrt{x^2-16}\,y' = \frac{5}{x}$$

6. Find $\frac{dy}{dx}$ if $y = \ln\left(\frac{\sqrt[3]{x}}{x+6}\right)$

7. Find the derivative of $y = \frac{1}{4}(x(1+x^2)^{-1} + arc\cot x)$

8. Find the exact area defined by $y = 4e^{-3x}$, the x-axis, and the lines x = 1 and x = 4

Answers:

1. $\frac{1}{2}\ln((x+1)^2+4)-\frac{3}{2}\arctan\left(\frac{x+1}{2}\right)+C$

2. $x^2+2(1-x^2)^{1/2}-y^2=1$

3. $x^2+11x+19\ln|x-2|+C$

4. $\ln|x^2+2x+2|-7\arctan(x+1)+C$

5. $y=\frac{5}{4}arc\sec\frac{|x|}{4}+C$

6. $\frac{dy}{dx}=\frac{-2(x-3)}{3x(x+6)}$

7. $\frac{dy}{dx}=\frac{-x^2}{2(1+x^2)^2}$

8. $\frac{4}{3}\left(\frac{1}{e^3}-\frac{1}{e^{12}}\right)$