Due date: _____ **Name:** _____

1. Evaluate the following integrals. If you use any even/odd shortcuts (like Ex 6 and 7 from the notes), be sure to show why the integrand is even or odd.

   a) $\int_0^1 \frac{x^3}{\sqrt{x^4+9}}\,dx$

   b) $\int_{-\pi/2}^0 \frac{\sin x}{(3+2\cos x)^2}\,dx$

   c) $\int_1^2 \frac{\ln x}{3x}\,dx$

d) $\int_0^{\ln\sqrt{3}} \frac{e^x}{1+e^{2x}}\,dx$

e) $\int_0^1 (x^2+1)e^{-x}\,dx$

f) $\int_0^3 x\cosh 2x\,dx$

g) $\int_0^{\pi/2} e^{2x} \sin x \, dx$

h) $\int_1^2 x^3 (\ln x)^2 \, dx$

i) $\int_{\pi/4}^{\pi/2} \cos x \ln(\sin x)\ dx$

j) $\int_0^1 \sin^{-1} x\ dx$

k) $\int_{-4}^{4} |x|\, dx$

l) $\int_{-2}^{2} x^3 e^{x^4}\, dx$

m) $\int_{-\pi/3}^{\pi/3} |x| \tan x\, dx$

n) $\int_{-\pi/2}^{\pi/2}(x^3 + x^4 \sin x)\, dx$

Review

2. Find the following limits.

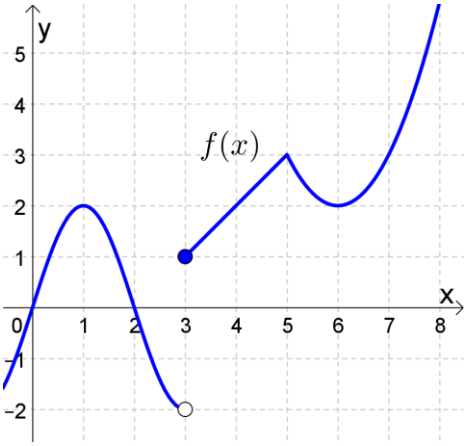
a) $\lim_{x\to 3^+} \ln(x^2 - 9)$

b) $\lim_{x\to -2^-} \frac{5x-2}{x+2}$

c) $\lim_{x\to 2^-} \tan^{-1}\left(\frac{1}{x-2}\right)$

3. Find the derivative of $f(x) = \sqrt{2-x}$ using the limit definition. Then find the rate of change of f at $x = 1$.

4. The graph of $f(x)$ is given below.



a. Find the x-value(s) where $f'(x) = 0$. Answer: _____

b. Find the x-value(s) where f is not differentiable. Answer: _____

c. Find $f'(3.5)$. Answer: _____

d. Find an equation of the tangent line at $x = 1$. Answer: _____

e. Find an equation of the tangent line at $x = 6$. Answer: _____

f. Find an equation of the tangent line at $x = 4$. Answer: _____

g. Find $\lim_{x \to 3^-} f(x)$. Answer: _____

h. Find $\lim_{x \to 5} f(x)$. Answer: _____

i. Find $\lim_{x \to \infty} f(x)$. Answer: _____

j. Find $\lim_{x \to 2} f(x)$. Answer: _____

k. Find $\int_3^5 f(x)\,dx$. Answer: _____

Q: What's the next row of this sequence?

1 2

1 1 1 2

3 1 1 2

1 3 2 1 1 2

Optional exercises from the Stewart textbook if you'd like more practice:

5.5 (p.418) #53-71 odd, 77, 81

7.1 (p.476) #23-35 odd