

Due date: \_\_\_\_\_

Name: \_\_\_\_\_

1. Evaluate the following integrals.

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.

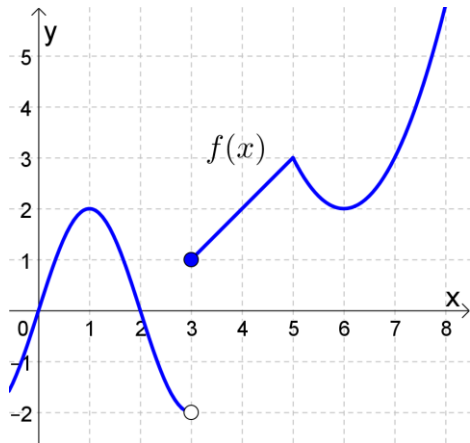
a)  $\lim_{x \rightarrow 3^+} \ln(x^2 - 9)$

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

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

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.



- Find the  $x$ -value(s) where  $f'(x) = 0$ . Answer: \_\_\_\_\_
- Find the  $x$ -value(s) where  $f$  is not differentiable. Answer: \_\_\_\_\_
- Find  $f'(3.5)$ . Answer: \_\_\_\_\_
- Find an equation of the tangent line at  $x = 1$ . Answer: \_\_\_\_\_
- Find an equation of the tangent line at  $x = 6$ . Answer: \_\_\_\_\_
- Find an equation of the tangent line at  $x = 4$ . Answer: \_\_\_\_\_
- Find  $\lim_{x \rightarrow 3^-} f(x)$ . Answer: \_\_\_\_\_
- Find  $\lim_{x \rightarrow 5} f(x)$ . Answer: \_\_\_\_\_
- Find  $\lim_{x \rightarrow \infty} f(x)$ . Answer: \_\_\_\_\_
- Find  $\lim_{x \rightarrow 2} f(x)$ . Answer: \_\_\_\_\_
- 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