1.(1 pt) Find the area under the curve $y = 1/(6x^3)$ from $x = 1$ to $x = t$ and evaluate it for $t = 10, t = 100$. Then find the total area under this curve for $x \geq 1$.
(a) t = 10

(b) t = 100

(c) Total area

2.(1 pt) Find the area under the curve

$$y = 0.5x^{-1.5}$$

from $x = 9$ to $x = t$ and evaluate it for $t = 10$, $t = 100$.
Then find the total area under this curve for $x \geq 9$.
(a) t = 10

(b) t = 100

(c) Total area

3.(1 pt) Determine whether the integral is divergent or convergent. If it is convergent, evaluate it. If not, state your answer as "divergent."

$$\int_0^\infty 7e^{-x}dx$$

4.(1 pt) Determine whether the integral is divergent or convergent. If it is convergent, evaluate it. If it diverges to infinity, state your answer as "INF" (without the quotation marks). If it diverges to negative infinity, state your answer as "MINF". If it diverges without being infinity or negative infinity, state your answer as "DIV".

$$\int_{1.7}^\infty e^{-1.7x}dx$$

5.(1 pt) Determine whether the integral is divergent or convergent. If it is convergent, evaluate it. If not, state your answer as "divergent."

$$\int_2^\infty \frac{8}{(x+3)^{3/2}}dx$$

6.(1 pt) Determine whether the integral is divergent or convergent. If it is convergent, evaluate it. If it diverges to infinity, state your answer as "INF" (without the quotation marks). If it diverges to negative infinity, state your answer as "MINF". If it diverges without being infinity or negative infinity, state your answer as "DIV".

$$\int_8^\infty \frac{1}{x^{7/6}}dx$$

7.(1 pt) Determine whether the integral is divergent or convergent. If it is convergent, evaluate it. If not, state your answer as "divergent."

$$\int_{-\infty}^1 \frac{3}{(2x-3)^2}dx$$

8.(1 pt) Determine whether the integral is divergent or convergent. If it is convergent, evaluate it. If not, state your answer as "divergent."

$$\int_{-\infty}^\infty (6x^4)dx$$

9.(1 pt) Determine whether the integral is divergent or convergent. If it is convergent, evaluate it. If it diverges to infinity, state your answer as "INF" (without the quotation marks). If it diverges to negative infinity, state your answer as "MINF". If it diverges without being infinity or negative infinity, state your answer as "DIV".

$$\int_{-\infty}^\infty x^4 e^{-x^5}dx$$

10.(1 pt) Determine whether the integral is divergent or convergent. If it is convergent, evaluate it. If not, give the answer -1.

$$\int_7^\infty xe^{-4x}dx$$

11.(1 pt) Determine whether the integral is divergent or convergent. If it is convergent, evaluate it. If not, state your answer as "divergent."

$$\int_{-\infty}^5 \frac{1}{x^2+1}dx$$

12.(1 pt) Determine whether the integral is divergent or convergent. If it is convergent, evaluate it. If not, state your answer as "divergent."

$$\int_6^\infty \frac{\ln(x)}{x}dx$$

13.(1 pt) Determine whether the integral is divergent or convergent. If it is convergent, evaluate it. If not, give the answer -1.

$$\int_8^\infty \frac{\ln(3x)}{x}dx$$

14.(1 pt) Determine whether the integral is divergent or convergent. If it is convergent, evaluate it. If it diverges to infinity, state your answer as "INF" (without the quotation marks). If it diverges to negative infinity, state your answer as "MINF". If it diverges without being infinity or negative infinity, state your answer as "DIV".

$$\int_0^8 \frac{1}{x^{1.2}}dx$$

15.(1 pt) Define the functions $F(x)$ and $G(x)$ by

$$F(x) = \int_{-x}^x t^9 dt, \quad G(x) = \int_{-x+4}^{x+4} t^9 dt$$

Determine whether each of the following improper integrals and limits is divergent or convergent. If it is convergent, evaluate it. If it diverges to infinity, state your answer as "INF" (without the quotation marks). If it diverges to negative infinity, state your answer as "MINF". If it diverges without being infinity or negative infinity, state your answer as "DIV".

(a)

$$\int_{-\infty}^{\infty} x^9\,dx$$

(b)

$$\lim_{x\to\infty} F(x)$$

(c)

$$\lim_{x\to\infty} G(x)$$

16.(1 pt) Determine whether the integral is divergent or convergent. If it is convergent, evaluate it. If it diverges to infinity, state your answer as "INF" (without the quotation marks). If it diverges to negative infinity, state your answer as "MINF". If it diverges without being infinity or negative infinity, state your answer as "DIV".

$$\int_1^{9.5} \frac{-6}{(x-4)^2}dx$$

17.(1 pt) Determine whether the integral is divergent or convergent. If it is convergent, evaluate it. If it diverges to infinity, state your answer as "INF" (without the quotation marks). If it diverges to negative infinity, state your answer as "MINF". If it diverges without being infinity or negative infinity, state your answer as "DIV".

$$\int_3^9 \frac{9}{\sqrt[3]{x-3}}dx$$

18.(1 pt) Consider the following integrals. Label each as "P", "C", "D", according as the integral is proper, improper but convergent, or improper and divergent.

— 1. $\displaystyle\int_7^{15} \ln(x-7)\,dx$

— 2. $\displaystyle\int_7^{\infty} \frac{1}{\sqrt{t^2-49}}\,dt$

— 3. $\displaystyle\int_0^{15} \frac{1}{\sqrt[3]{x-7}}\,dx$

— 4. $\displaystyle\int_{-8\pi}^{21\pi} \sin(x)\tan^{-1}(x)\,dx$

— 5. $\displaystyle\int_1^{\infty} se^{7s^2}\,ds$

— 6. $\displaystyle\int_{-\infty}^{\infty} \sin(7x)\,dx$

— 7. $\displaystyle\int_{-\infty}^{\infty} \frac{x}{x^2+8}\,dx$

— 8. $\displaystyle\int_{-\pi/7}^{15\pi/2} \tan^2(7x)\,dx$

19.(1 pt)

Let $f(x)$ be a continuous function defined on the interval $[2,\infty)$ such that

$$f(3) = 5$$
$$|f(x)| < x^7 + 1$$

and

$$\int_3^{\infty} f(x)e^{-x/8}\,dx = 4$$

Determine the value of

$$\int_3^{\infty} f'(x)e^{-x/8}\,dx$$