

Name: _____

4-digit code: _____

- Write your name and the last 4 digits of your SSN in the space provided above.
- The test has six (6) pages, including this one.
- Enter your answer in the box(es) provided.
- You must show sufficient work to justify all answers unless otherwise stated in the problem. Correct answers with inconsistent work may not be given credit.
- Credit for each problem is given in parentheses at the right of the problem number.
- No books, notes or calculators may be used on this test.

Page	Max. points	Your points
2	20	
3	20	
4	20	
5	30	
6	10	
Total	100	

Problem 1 (5 pts). Find $f(3)$ and $f(\pi)$ for $f(x) = \begin{cases} \sqrt{x+1} & \text{if } x \geq 1, \\ 3 & \text{if } x < 1. \end{cases}$

$f(3) =$

$f(\pi) =$

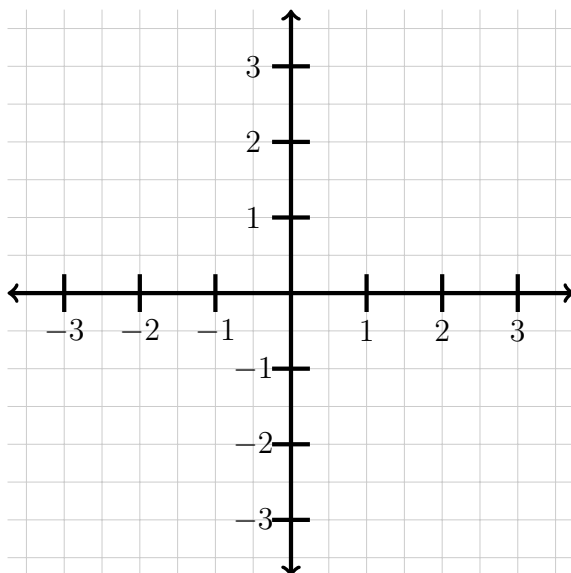
Problem 2 (10 pts). Find the domain and range of $f(x) = 2 + \sqrt{x-1}$.

range =

domain =

Problem 3 (5 pts). Sketch the graph of the function

$$f(x) = \begin{cases} 3 - \frac{1}{2}x & \text{if } x \leq 2 \\ 2x - 5 & \text{if } x > 2 \end{cases}$$



Problem 4 (15 pts). Let $f(x) = x^2 + 3$ and $g(x) = \sqrt{x}$. Find $g \circ f$, $f \circ g$, and compute the domain of the latter.

$$(g \circ f)(x) =$$

$$(f \circ g)(x) =$$

$$\text{domain of } (f \circ g)(x) =$$

Problem 5 (5pts). Find the domain of the function $f(x) = \frac{1}{1 - e^x}$.

$$\text{domain} =$$

Problem 6 (5 pts). Solve for x :

$$\log(3x) - 3\log(x^{-1/3}) = \log 27.$$

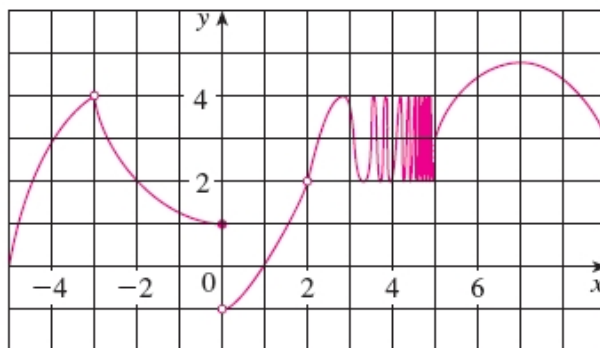
$x =$

Problem 7 (5 pts). Solve for x :

$$e^{5-3x} = 10.$$

$x =$

Problem 8 (10 pts). For the function f with graph given below, state the value of each quantity, if it exists:



$$\lim_{x \rightarrow -3^-} f(x) = \boxed{}. \quad \lim_{x \rightarrow 0^+} f(x) = \boxed{}.$$

$$\lim_{x \rightarrow -3^+} f(x) = \boxed{}. \quad \lim_{x \rightarrow 0^-} f(x) = \boxed{}.$$

$$\lim_{x \rightarrow -3} f(x) = \boxed{}. \quad \lim_{x \rightarrow 0} f(x) = \boxed{}.$$

Problem 9 (30 pts). Compute the following limits:

(a) $\lim_{x \rightarrow 1} \frac{x^2 - 2x - 8}{x^2 - 4} =$

(b) $\lim_{x \rightarrow 2} \frac{x^2 - 2x - 8}{x^2 - 4} =$

(c) $\lim_{x \rightarrow 0} \frac{\sqrt{x+4} - 2}{2x} =$

Problem 10 (10 pts). Find the value of the constant k for which the following function is continuous everywhere:

$$f(x) = \begin{cases} 2k^2x^3 & \text{if } x < 2, \\ x + 32k - 18 & \text{if } x \geq 2. \end{cases}$$

 $k =$