Name: ____________________

4-digit code: ____________________

- Write your name and the last 4 digits of your SSN in the space provided above.
- The test has five (5) 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	40	
Total	100	

Problem 1 (5 pts)**.** Find $f(-3)$ and $f(\pi^2-1)$ for $f(x) = \begin{cases} \sqrt{x+1} & \text{if } x \geq 1, \\ 3 & \text{if } x < 1. \end{cases}$

$f(-3) =$

$f(\pi^2-1) =$

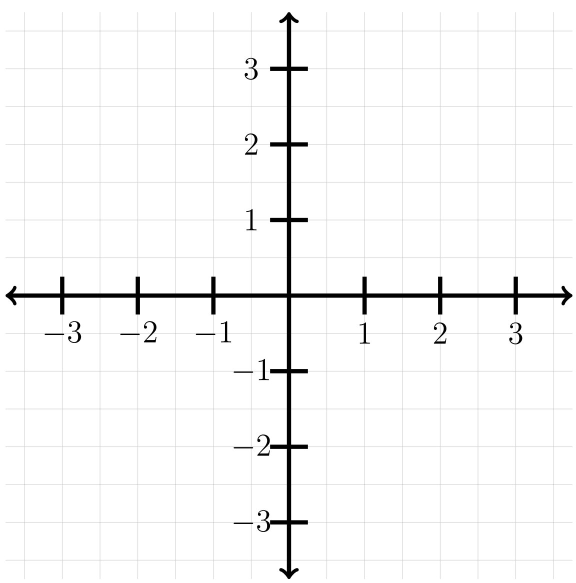
Problem 2 (10 pts)**.** Find the domain and range of $f(x) = 2 + \sqrt{2x-1}$.

domain $=$

range $=$

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.

$\big(g \circ f\big)(x) = \boxed{}$

$\big(f \circ g\big)(x) = \boxed{}$

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

Problem 5 (5pts)**.** Find the domain of the function $f(x) = \dfrac{x}{3 - e^{2x}}$.

domain $= \boxed{}$

Problem 6 (5 pts)**.** Solve for x:

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

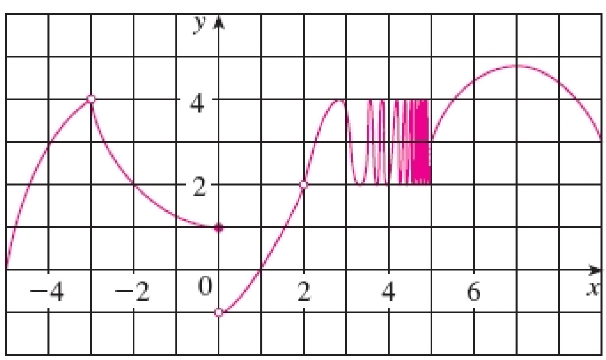
$x =$ $\boxed{}$

Problem 7 (5 pts)**.** Solve for x:

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

$x =$ $\boxed{}$

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



$\lim\limits_{x\to -3^-} f(x) = \boxed{}$. $\lim_{x\to 0^+} f(x) = \boxed{}$.

$\lim\limits_{x\to -3^+} f(x) = \boxed{}$. $\lim_{x\to 0^-} f(x) = \boxed{}$.

$\lim\limits_{x\to -3} f(x) = \boxed{}$. $\lim_{x\to 0} f(x) = \boxed{}$.

Problem 9 (40 pts)**.** Compute the following limits:

(a) $\lim_{x \to -2} \sqrt{x^4 - 2x^2 + 8} = \boxed{}$

(b) $\lim_{x \to 1} \dfrac{x^2 - 2x - 8}{x^2 - 4} = \boxed{}$

(c) $\lim_{x \to 2} \dfrac{x^2 - 2x - 8}{x^2 - 4} = \boxed{}$

(d) $\lim_{x \to 0} \dfrac{\sqrt{x + 4} - 2}{2x} = \boxed{}$