

Name: _____

4-digit code: _____

- Write your name and the last 4 digits of your SSN in the space provided above.
- The test has seven (7) 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	15	
4	15	
5	30	
6	10	
7	10	
Total	100	

Problem 4 (5 pts). Let $f(x) = x^2 + 3$ and $g(x) = \sqrt{x}$. Find $(g \circ f)(x)$.

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

Problem 5 (5 pts). Classify the function $f(x) = x^5$ as even, odd or neither.

f is

Problem 6 (5 pts). Find the amplitude and period of

$$y = 3 \cos \left(2x + \frac{\pi}{2} \right).$$

period =

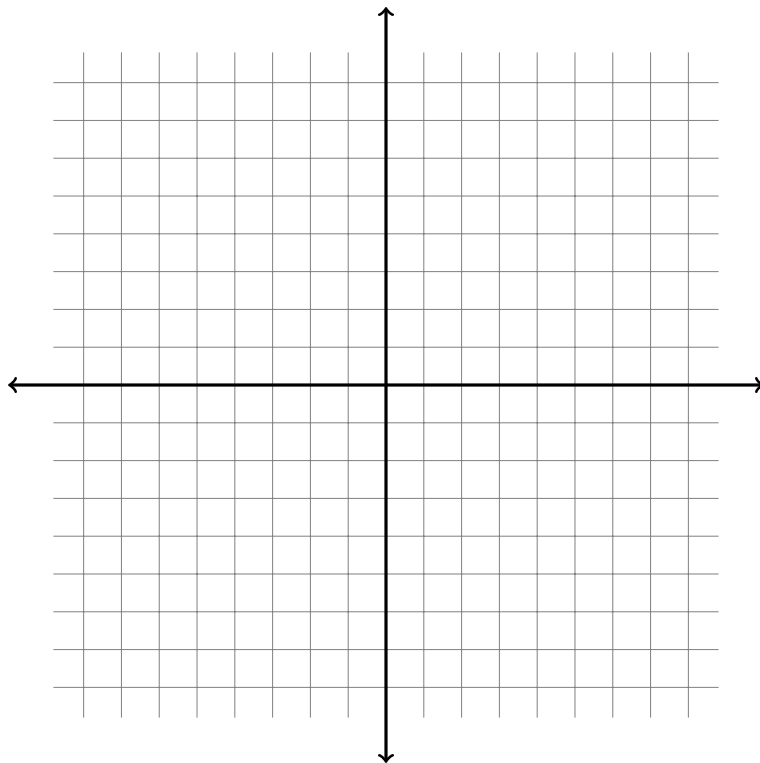
amplitude =

Problem 7 (5 pts). Solve for x : $\log(3x) - 3\log(x^{-1/3}) = \log 27$.

 $x =$

Problem 8 (10 pts). *Sketch the curve by eliminating the parameter (i.e. try to write $y = f(x)$), and indicate the direction of increasing t*

$$x = \sqrt{t}, \quad y = \frac{3}{4}t + 3 \quad (0 \leq t \leq 4).$$



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

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

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

(c) $\lim_{x \rightarrow \infty} \left(1 + \frac{5}{x}\right)^{3x} =$

Problem 10 (10 pts). Recall the “ ε - δ ” definition of limit:

We write $\lim_{x \rightarrow a} f(x) = L$ if for all $\varepsilon > 0$ there exists $\delta > 0$ such that $|x - a| < \delta$ implies $|f(x) - L| < \varepsilon$.

Use this definition to prove that $\lim_{x \rightarrow 4} 5x - 2 = 18$.

Problem 11 (10 pts). Find the value of the constant k for which the following function is continuous everywhere:

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

$k =$