

Name _____ Test 1, Fall 2018

1) Find the limit below. (4 points)

$$\lim_{x \rightarrow 5} \frac{x^2 - 25}{x - 5}$$

2) Find the limit below. (4 points)

$$\lim_{x \rightarrow 7} x^2 - x - 2$$

3) Using the table to the right, guess the value of the limit below. (4 points)

$$\lim_{x \rightarrow 2^-} f(x)$$

x	$f(x)$
-4	8
-3	10
-2.5	12.75
-2.1	13.8
-2.01	13.985
-2	14
-1.99	14.0023
-1.9	14.46
-1.5	15.2
-1	17
0	23
1	24
1.5	25.6
1.9	25.78
1.99	25.97
2	30
2.01	30.024
2.1	30.14
2.5	30.686
3	31.2
4	34

4) Using the table to the right, estimate the value of the derivative below. (4 points)

$$f'(-2)$$

5) Find the limit below. (4 points)

$$\lim_{x \rightarrow 5^+} \frac{(x-2)(x+3)}{x-5}$$

6) Find the limit below. (4 points)

$$\lim_{x \rightarrow 5} \frac{\sqrt{x} - \sqrt{5}}{x - 5}$$

7) Find the limit below. (4 points)

$$\lim_{x \rightarrow \infty} \frac{(x-2)(x+3)}{x-5}$$

8) If $2x \leq f(x) \leq 2x^2$, what can be said about the limit below? (4 points)

$$\lim_{x \rightarrow 3} f(x)$$

9) Use the graph shown here to estimate the limit below. (4 points)

$$\lim_{x \rightarrow 1^+} f(x) \approx$$

10) Use the graph shown here to estimate the derivative below. (4 points)

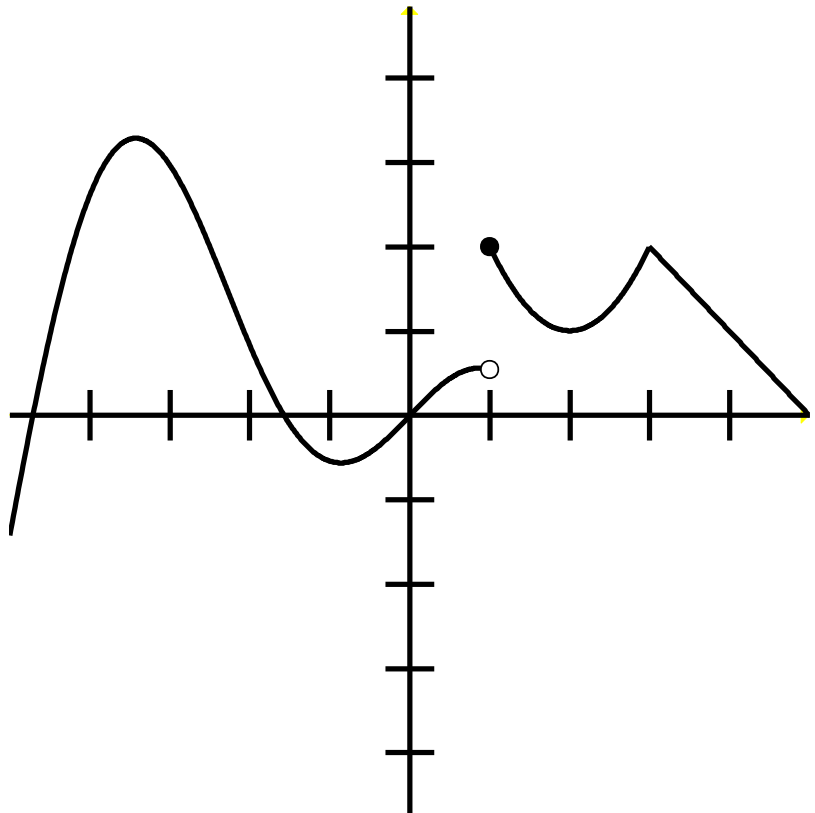
$$f'(2.5) \approx$$

11) Use the graph shown here to identify all x-coordinates where the function is not continuous. (4 points)

12) Use the graph shown here to identify all x-coordinates where the function is not differentiable. (4 points)

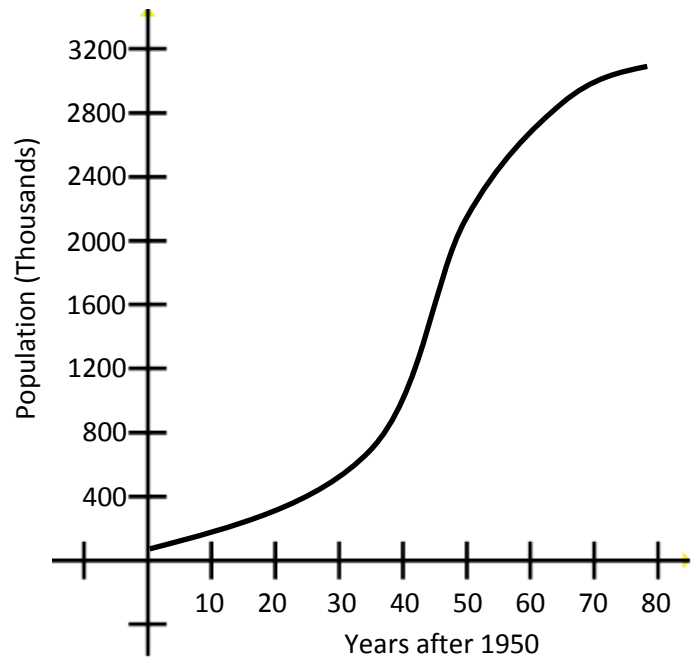
13) Sketch a graph of the derivative on the domain $(-\infty, 0)$. (4 points)

(Meaning you can ignore the right half of the graph)



14) Shown here is a graph of the population of a certain city over a period of 60 years. Identify what year had the largest rate of growth. (6 points)

(Please remember that contextual problems have contextual answers. Don't lose easy points because you leave off the units!)



15) Find the derivative of the function below. (4 points)

$$f(x) = x^5$$

16) Find the derivative of the function below. (4 points)

$$f(x) = 2g(x) + h(x) + c$$

17) Find the derivative of the function below. (6 points)

$$f(x) = x^2g(x)$$

18) Find the derivative of the function below. (4 points)

$$f(x) = 6x^2$$

19) Find the derivative of the function below. (6 points)

$$f(t) = 3t^2 + \frac{6}{t^7}$$

20) Find the derivative of the function below. (4 points)

$$f(x) = \sqrt{x}(\sqrt{x} - 1)$$

21) Find the second derivative of the function below. (4 points)

$$f(x) = \sqrt{x}(\sqrt{x} - 1)$$

22) Find the derivative of the function below. (4 points)

$$f(x) = \frac{x^4 + 5x^2 + x}{x^2}$$

23) On the axis below, sketch a graph of a function with the following properties. (6 points)

$$\lim_{x \rightarrow 2^-} f(x) = 1$$

$$\lim_{x \rightarrow 2^+} f(x) = 2$$

$$\lim_{x \rightarrow 2^+} f'(x) = -1$$

