

Review: PC Quiz Sec 2.1 – 2.3

1) Evaluate  $h(-5)$  to the nearest tenth if  $h(t) = t^3 + t^2 - t + 5$ .

$$h(-5) = (-5)^3 + (-5)^2 - (-5) + 5$$

$$h(-5) = -90$$

2) Evaluate  $f(x)$  to the nearest hundredth if  $f(x) = -x^2 - x + 31$ .

$$f(8) = -(8)^2 - 8 + 31$$

$$f(8) = -41$$

3) If  $f(x) = -8x^2 + 7$ , what is  $f(3a)$ ?

$$f(3a) = -8(3a)^2 + 7$$

$$= -8(3a)(3a) + 7$$

$$= -8(9a^2) + 7$$

$$= -72a^2 + 7$$

4) If  $g(x) = 9x^2 + x - 2$ , what is  $g(4b)$ ?

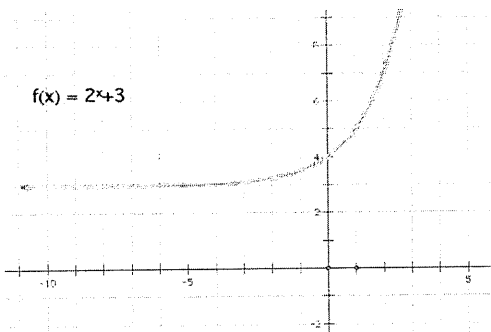
$$g(4b) = 9(4b)^2 + 4b - 2$$

$$= 9(4b)(4b) + 4b - 2$$

$$= 9(16b^2) + 4b - 2$$

$$= 144b^2 + 4b - 2$$

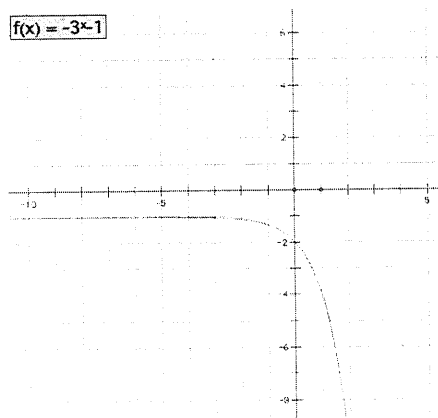
5) Below is a graph of  $f(x) = 2^x + 3$ . The line  $y = 3$  is a horizontal asymptote. Give what seems to be the domain and range of the function.



$$D: \{x \mid x \in \mathbb{R}\}$$

$$R: \{y \mid y > 3\}$$

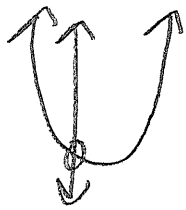
6) Below is a graph of  $f(x) = -3^x - 1$ . The line  $y = -1$  is a horizontal asymptote. Give what seems to be the domain and range of the function.



$$D: \{x \mid x \in \mathbb{R}\}$$

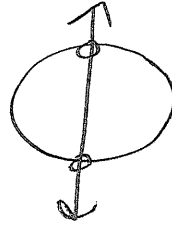
$$R: \{y \mid y < -1\}$$

7) Draw an example of a graph that is a function. Explain how you can tell from the graph that it is a function.



- Passed VLT
- NO repeat X-values

8) Draw an example of a graph that is NOT a function. Explain how you can tell from the graph that it is NOT a function.



- Fails VLT
- Repeat X-values

9) Sonia researched the number of fast-food restaurants in her city in several years and recorded the data in the table below.

Years after 2000	Number of Restaurants
1	31
2	36
3	39
4	48
5	53
6	63
7	71

a) Find the linear model for the relationship between the number of years after 2000 and the number of restaurants. *\* Round to thousandths.*

$$y = 6.714x + 21.857$$

b) Use your model from Part a to estimate the number of restaurants 10 years after 2000.

$$y = 6.714(10) + 21.857$$

$$y = 88.997 \text{ restaurants}$$

c) Is your estimate from Part b interpolation, or extrapolation? Explain.

Goes beyond scope of data, 1-7 years.

d) Give a data value for the year that would be considered interpolation.

e) Give a data value for the year that would be considered extrapolation.

f) Calculate the residual for the 5<sup>th</sup> year after 2000.

$$y = 6.714(5) + 21.857$$

$$y = 55.427 \text{ (predicted)}$$

$$R = \text{Obs} - \text{Pred} \\ = 53 - 55.427$$

$$R = -2.427$$

g) What is the correlation coefficient for the line?

$$r = 0.989$$

What does this value tell you?

- Strong positive correlation
- Years  $\uparrow$ , # Rest.  $\uparrow$

h) What is the sum of the squared residuals for the data?

$$\sum x^2 = 27.143$$