

1. (p. 79 #44) Determine *algebraically* whether the function is even, odd, or neither.

$$f(x) = \frac{2x}{|x|}$$

2. (p. 60 #54) Find the domain of the function:

$$G(x) = \frac{x + 4}{x^3 - 4x}$$

3. (p. 61 #80) Find the difference quotient and simplify:

$$f(x) = \frac{1}{x + 3}$$

4. (p. 70 #40 *modified*) Sketch a graph that best represents the following scenarios

- The temperature of a bowl of soup as a function of time
- The number of hours of daylight per day over a two year period
- The population of Florida as a function of time
- The distance travelled by a car going a constant velocity as a function of time
- The height of a golf ball hit with a 7-iron as a function of time

5. For the given function, (i) find the domain of each function, (ii) locate any intercepts, (iii) graph the function, and (iv) based on the graph, find the range.

$$f(x) = \begin{cases} -x^3 & \text{for } x \leq -1 \\ |x| & \text{for } -1 < x \leq 1 \\ \sqrt{x} & \text{for } 1 < x < 9 \end{cases}$$

Challenge Problems

6. If the general equation of a circle is $2x^2 + 2y^2 + 8x + 7 = 0$, (i) find the standard form of the circle (ii) determine whether the point $(1,1)$ on the circle (iii) find all intercepts of the circle
7. A line is *tangent* to another figure if it only strikes that figure at precisely one point. To find the tangent line, first find the difference quotient and let h go to zero – that is, just put in zero for h (LIMITS ☺). At the point of interest, determine the corresponding value(s) of the variable(s) in your difference quotient and substitute these values into the difference quotient. The result is the **slope** of the tangent line. Together with the slope and the point that you used, the equation for the tangent line is.....
- a) Find the line tangent to the circle at the point $(1,1)$ whose equation is $x^2 + y^2 = 2$
- b) Find the line tangent to the parabola at the point $(-1,1)$ whose equation is $y = x^2$
8. There are five houses in a row, each of a different color, and inhabited by 5 people of different nationalities, with different pets, favorite drinks, and favorite sports. Use the clues below to determine **who owns the monkey and who drinks water**. ****Hint: A table is a good way to organize your data!!****
1. The Englishman lives in the red house.
 2. The Spaniard owns the dog.
 3. Coffee is drunk in the green house.
 4. The Russian drinks tea.
 5. The green house is immediately to the right of the white house.
 6. The hockey player owns hamsters.
 7. The football player lives in the yellow house.
 8. Milk is drunk in the middle house.
 9. The American lives in the first house on the left.
 10. The table tennis player lives in the house next to the man with the fox.
 11. The football player lives next to the house where the horse is kept.
 12. The basketball player drinks orange juice.
 13. The Japanese likes baseball.
 14. The American lives next to the blue house