

**Calculator Section**

1. Find the domain and range of the relation given by the ordered pairs  $(-2, 3)$ ,  $(-1, 2)$ ,  $(2, 4)$ , and  $(5, 8)$ .

Domain:

Range:

2. Find the solution to each of the following systems of equations.

$$\text{a. } \begin{cases} 2x - y + 3z = 8 \\ x - 6y - z = 0 \\ -6x + 3y - 9z = 24 \end{cases}$$

$$\text{b. } \begin{cases} 2x - 3y = 4 \\ 4x + y = -6 \end{cases}$$

3. Find the inverse of each of the following.

$$\text{a. } f(x) = \sqrt{x-2} + 1$$

$$\text{b. } g(x) = \frac{1}{2}x + 7$$

4. A certain radioactive element decays over time according to the equation  $y = A\left(\frac{1}{2}\right)^{\frac{t}{300}}$  where  $A$  is the number of grams present initially and  $t$  is the time in years.

a. By what percent does the radioactive element decay per year?

b. If 1000 grams were present initially, how many grams will remain after 900 years?

5. Bacteria in a culture are growing exponentially with time, as shown in the table to the right. Write an equation that expresses the number of bacteria,  $y$ , present at any time,  $t$ .

Day	Bacteria
0	100
1	200
2	400

6. Find the domain of each of the following:

$$\text{a. } f(x) = 3 \ln(3x + 4)$$

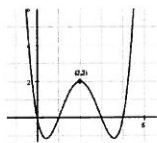
$$\text{b. } f(x) = \frac{1}{2x+3}$$

7. Write an explicit and recursive rule for the following arithmetic sequence:  $-2, -\frac{5}{4}, -\frac{1}{2}, \frac{1}{4}, \dots$

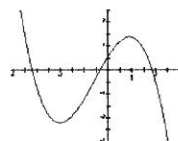
8. Write an explicit and recursive rule for the following geometric sequence: 112, 56, 28, 14, ...

9. State the degree and the end behavior of each of the following.

a.



b.



10. Find the sum of each infinite geometric series, if it exists.

a.  $2 + \frac{6}{4} + \frac{18}{16} + \frac{54}{64} + \dots$

b.  $\frac{1}{2} - \frac{5}{3} + \frac{50}{9} - \frac{500}{27} + \dots$

11. Find the average rate of change of the function  $g(x) = 2x^3 + 3$  from  $x = 1$  to  $x = 4$ .

12. The data in the table to the right shows the relationship between temperatures measured in Fahrenheit and Celsius. What is the equation of the regression **line** for the data?

Fahrenheit degrees (°F)	Celsius degrees (°C)
32	0
68	20
86	30
122	50
158	70
194	90
212	100

13. Given: 56, 32, 54, 34, 23, 67, 23, 45, 12, 32, 34, 24, 36, 47, 19, and 43.

a. Make a box-and-whisker plot to represent the data (Label min, max, Q1, Q2, and Q3)

b. Find and interpret the range of the data.

c. Find and interpret the interquartile range of the data

14. Identify the y-intercept, x-intercept(s), holes, vertical asymptotes, and horizontal/slant asymptotes of each of the following.

a.  $h(x) = \frac{x^3 - 16x}{-3x^2 + 3x + 18}$

b.  $g(x) = \frac{-3x^2 - 12x - 9}{x^2 + 5x + 4}$

15. Simplify each of the following.

a.  $\frac{x+3}{x+5} + \frac{6}{x^2 + 3x - 10}$

b.  $\frac{2x^2 - 10x}{x^2 + 8x + 16} \cdot \frac{4x + 16}{x^2 - 25}$

c.  $\frac{x^2 + 4x}{x+3} \div \frac{x^2 + x - 12}{x^2 - 9}$

d.  $\frac{m}{m-n} - \frac{m}{n-m}$

16. Solve each of the following equations:

a.  $\frac{6}{p} = \frac{1}{p-5} - \frac{p+4}{p^2 - 5p}$

b.  $\frac{5x-20}{x^2 - 9x + 18} + \frac{1}{x-6} = \frac{x-4}{x^2 - 9x + 18}$

17. If  $\sin \theta = \frac{3}{5}$  and  $\theta$  lies in Quadrant II, find  $\cos \theta$  and  $\tan \theta$ .

18. If  $\cos \theta = -\frac{8}{9}$  and  $\sin \theta < 0$ , find  $\sin \theta$ .

19. Given that  $\sin \theta = -\frac{1}{4}$  and  $\cos \theta > 0$ , find  $\cos \theta$ .

20. The average test score on a college exam was 83 points, and the standard deviation was 4 points, where the scores are normally distributed. About what percent of the students who took the test scored between 71 points and 87 points?

21. You survey the senior class to see what programs they prefer the most. The results are shown in the table below.

Gender	Preferred Program			
	Dance	Sports	Movies	Total
Women	16	6	8	30
Men	2	10	8	20
Total	18	16	16	50

a. If a senior is randomly selected, what is the probability that they are a male, given that they like movies?

b. If a senior is randomly selected, what is the probability that they like dance, given that they are female?

22. An equation that relates the height of the rider on a Ferris wheel from the ground in feet vs. time in seconds is

$h = -20 \cos\left(\frac{\pi}{4}t\right) + 23$ . How many solutions are there to the equation  $h = 33$  feet on the interval  $0 < t < 16$ ?

23. What is the average rate of change of the function  $f(x) = \frac{1}{x+2}$  from  $x = 2$  to  $x = 6$ ?

24. The amount of water that high school students drink is normally distributed with a mean of 33 ounces and a standard deviation of 5. What percentage of students in the high school drink more than 37 ounces?

25. Given the polynomial  $g(x) = 2x^4 + x^3 - 4x^2 - 1$ , fill in the blank: As  $x \rightarrow \infty$ ,  $f(x) \rightarrow$  \_\_\_\_\_.