

7. Given $f(x) = 3x^2 - 6x + 4$ and $g(x) = x^2 - 3x - 10$, find $(f - g)(x)$ and state the domain of $(f - g)(x)$ in interval notation.

$$(f - g)(x) = f(x) - g(x)$$

$$= (3x^2 - 6x + 4) - (x^2 - 3x - 10)$$

$$= (3x^2 - 6x + 4) + (-x^2 + 3x + 10)$$

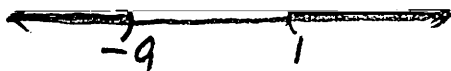
$$= 2x^2 - 3x + 14$$

$$(f - g)(x) = \underline{2x^2 - 3x + 14} \quad (2\text{pts})$$

$$\text{Domain of } (f - g)(x): \underline{(-\infty, \infty)} \quad (1\text{pt})$$

13. Solve and write interval notation for the solution set: $|x+4| > 5$

$$x+4 > 5 \text{ or } x+4 < -5$$



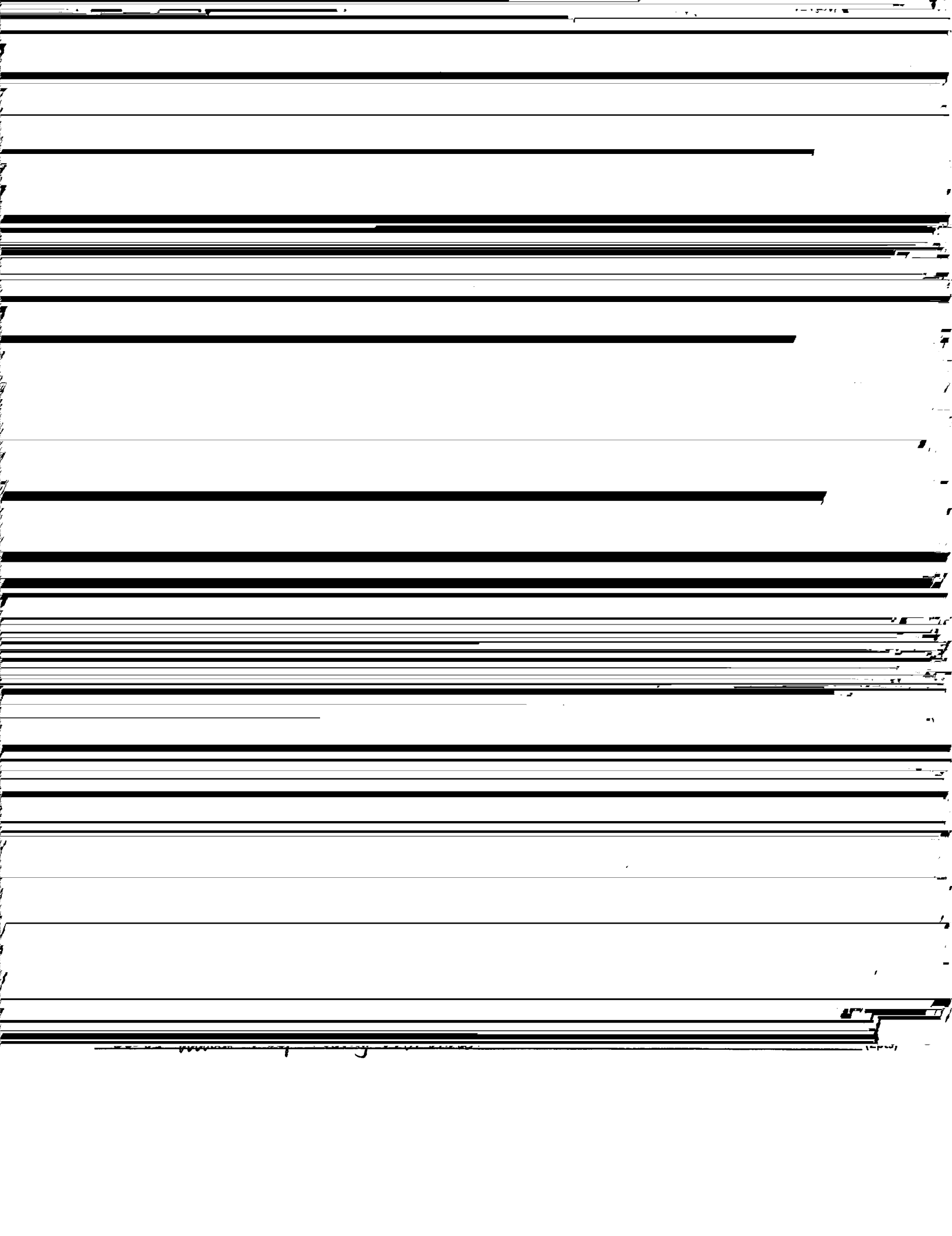
$$(-\infty, -9) \cup (1, \infty)$$

(3pts)

17. a. Graph the function using the given viewing window $[-10, 10, -50, 20]$. Determine all relative maxima and minima of the function. Round answers to two decimal places.

b. Determine the interval(s) where $f(x)$ is increasing. Write your answer in interval notation.

Increasing: $(-\infty, -2.57) \cup (3.24, \infty)$ (1pt)



d. Equation of the oblique asymptote:

none

(1pt)

f. y-intercept as an ordered pair:

$$x = -\frac{9}{2}$$

$$f(0) = \frac{9}{-3} = -3$$

(0, -3)

(1pt)

22. Find the critical values and solve the inequality. Give the solution in interval notation.

$$\frac{x-3}{x+2} \leq 0$$

Critical values: -2, 3
✓ ✓

	⊖	⊕	⊕
(x-3)	-	-	+
(x+2)	-	+	±
$\frac{x-3}{x+2}$	+	⊖	+
	-2	3	

(-2, 3]

(4pts)

$$\log_3 18 = \frac{\log 18}{\log 3} \approx 2.6309$$

2.6309 (2pts)

24. Solve the exponential equation algebraically. Write solution(s) in exact form.

$$3^{4x+2} = 27$$

$$3^{4x+2} = 3^3 \quad \checkmark$$

$$4x+2=3 \quad \checkmark$$

$$4x=1$$

$$x = \frac{1}{4} \quad \checkmark$$

{ 1/4 } (3pts)

25. Solve the logarithmic equations algebraically. Write solution(s) in exact form.

$$\log_3(x+5) + \log_3(x-5) = 2$$

$$\log_3(x+5)(x-5) = 2 \quad \checkmark$$

$$3^2 = (x+5)(x-5) \quad \checkmark$$

$$9 = x^2 - 25 \quad \checkmark$$

$$34 = x^2 \quad \checkmark$$

$$x = \sqrt{34} \text{ or } x = -\sqrt{34}$$

{ \sqrt{34} } (4pts)

26. Jennifer recently graduated and landed a new job earning \$34,000. Even though retirement is not in her immediate future, she remembers her math teacher stressing the benefits of investing over a long period of time. Jennifer decided to invest \$3,400. Assuming that she earns 5% compounded quarterly, how much

money will Jennifer have in her account upon her retirement 42 years later? $B = P \left(1 + \frac{r}{n} \right)^m$

$$B = 3400 \left(1 + \frac{0.05}{4} \right)^{4(42)}$$

$$\approx \$27,405.91 \quad \checkmark$$

\$27,405.91 (4pts)

30. Suppose the following matrix equation is true. Find x and y.

$$\begin{bmatrix} 5 & \frac{x}{2} \\ 2y & -8 \end{bmatrix} = \begin{bmatrix} 5 & 3 \\ -2 & -8 \end{bmatrix}$$

$$\frac{x}{2} = 3 \Rightarrow x = 6$$

$$2y = -2 \Rightarrow y = -1$$

$$x = \underline{6} \quad (1\text{pt})$$

$$y = \underline{-1} \quad (1\text{pt})$$