

HW 4-1
Polynomial Inequalities

Name Key
Period _____

Part 1: Determine the x-values that cause the polynomial to be (a) zero, (b) positive, (c) negative.

1. $f(x) = (x+2)(x+1)(x-5)$

- a.) $x = -2, -1, 5$
b.) $(-2, -1) \cup (5, \infty)$
c.) $(-\infty, -2) \cup (-1, 5)$

3. $f(x) = (x+7)(x+4)(x-6)^2$

- a.) $x = -7, -4, 6$
b.) $(-\infty, -7) \cup (-4, 6) \cup (6, \infty)$
c.) $(-7, -4)$

2. $f(x) = (x-7)(3x+1)(x+4)$

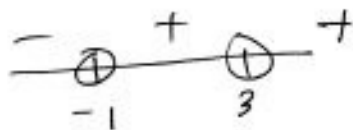
- a.) $x = 7, -1/3, -4$
b.) $(-4, -1/3) \cup (7, \infty)$
c.) $(-\infty, -4) \cup (-1/3, 7)$

4. $f(x) = (5x+3)(x-1)(x-2)^3$

- a.) $x = -3/5, 1, 2$
b.) $(-3/5, 1) \cup (2, \infty)$
c.) $(-\infty, -3/5) \cup (1, 2)$

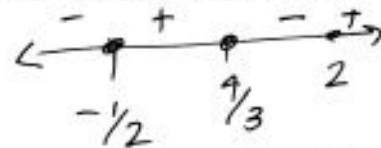
Part 2: Solve the inequality using a sign chart. Complete the factoring if needed.

5. $(x+1)(x-3)^2 > 0$



$(-1, 3) \cup (3, \infty)$

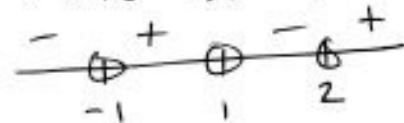
6. $(2x+1)(x-2)(3x-4) \leq 0$



$(-\infty, -1/2] \cup [4/3, 2)$

7. $(x+1)(x^2-3x+2) < 0$

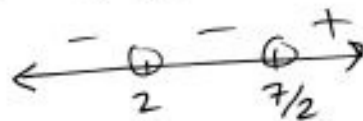
$(x+1)(x-1)(x-2) < 0$



$(-\infty, -1) \cup (1, 2)$

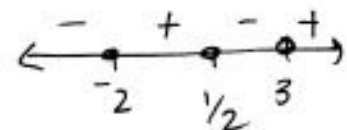
8. $(2x-7)(x^2-4x+4) > 0$

$x = 2, 7/2$



$(7/2, \infty)$

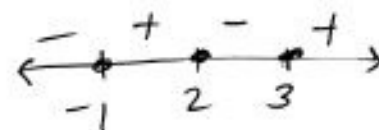
9. $(x+2)(2x-1)(x-3) \geq 0$



$[2, 1/2] \cup [3, \infty)$

10. $(x+1)(x^2-5x+6) \leq 0$

$(x+1)(x-3)(x-2) \leq 0$



$(-\infty, -1] \cup [2, 3]$

11. $x^3 - x^2 - 2x \geq 0$

$x(x^2 - x - 2)$
 $x(x-2)(x+1) \geq 0$

$[-1, 0] \cup [2, \infty)$

13. $x^3 - 4x^2 - x + 4 \leq 0$

$x^2(x-4) - 1(x-4)$
 $(x-1)(x+1)(x-4) \leq 0$

$(-\infty, -1] \cup [1, 4]$

12. $2x^3 - 5x^2 + 3x < 0$

$x(2x-3)(x-1) < 0$

$(-\infty, 0) \cup (1, 3/2)$

14. $x^3 - 4x^2 + x + 6 \leq 0$

$2 \overline{) 1 \quad -4 \quad 1 \quad 6}$
 $\quad \downarrow \quad 2 \quad -4 \quad -6$
 $\hline 1 \quad x^2 - 2x - 3 \quad \textcircled{0}$
 $(x-2)(x-3)(x+1)$

$(-\infty, -1] \cup [2, 3]$

15. Johnson Electric Co. charges \$25 per service call plus \$18 per hour for home repair work. How long did an electrician work if the charge was less than \$100? Assume the electrician rounds off time to the nearest quarter hour.

$25 + 18x < 100$
 $18x < 75$
 $x < 4$

less than 4 hours

16. Cami's Candy Company finds that the cost of making a certain candy bar is \$0.13 per bar. Fixed costs amount to \$2000 per week. If each bar sells for \$0.35, find the minimum number of candy bars that will earn the company a profit.

$2000 + .13x < .35x$
 $2000 < .22x$
 $9090.9 < x$

more than 9091 candy bars

Review

Find the factors of the following polynomials

1. $f(x) = 2x^3 - x^2 - 13x - 6$

$-2 \overline{) 2 \quad -1 \quad -13 \quad -6}$
 $\quad \downarrow \quad -4 \quad 7 \quad 6$
 $\hline 2x^2 - 5x - 3 \quad \textcircled{0}$
 $(2x^2 - 6x) + (1x - 3)$
 $2x(x-3) + 1(x-3)$
 $(x-3)(2x+1)(x+2)$

2. $g(x) = x^4 - 5x^2 + 4$

$(x+2)(x+1)(x-1)(x-2)$