

Algebra 2 – Post Ch. 6 D2 Worksheet: Polynomial Inequalities

Name: Key Hour: _____

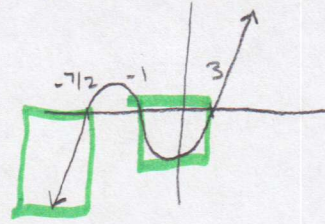
Solve the following polynomial inequalities.

1. $(3x - 9)^3(x + 1)(2x + 7) < 0$

Zeros: $3x - 9 = 0 \Rightarrow 3x = 9 \Rightarrow x = 3$
 $x + 1 = 0 \Rightarrow x = -1$
 $2x + 7 = 0 \Rightarrow 2x = -7 \Rightarrow x = -\frac{7}{2}$

Multiplicities: $\rightarrow 3$ (at $x=3$), $\rightarrow 1$ (at $x=-1$), $\rightarrow 1$ (at $x=-\frac{7}{2}$)
 Behavior: cross, cross, cross

Answer: $(-\infty, -\frac{7}{2}) \cup (-1, 3)$



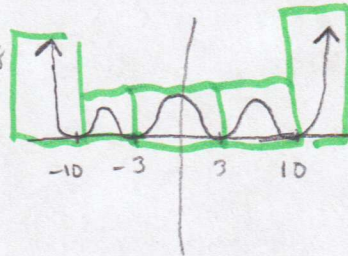
Degree: 5
 Shape:

Even multiplicity bounce
 odd multiplicity cross

2. $(x + 10)^2(x + 3)^2(x - 3)^2(x - 10)^2 \geq 0$

Zeros: $-10, -3, 3, 10$

Degree: 8



Answer: $(-\infty, \infty)$

Since every interval is positive and we include the zeros, Every x value works.

Mult: 2, 2, 2, 2
 Behavior: B, B, B, B

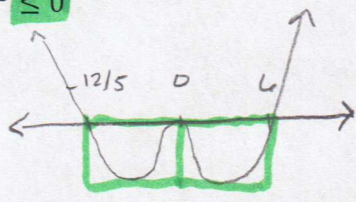
Shape:

3. $x^2(5x + 12)(x - 6)^3 \leq 0$

Zeros: $0, -\frac{12}{5}, 6$

Mult: 2, 1, 3

Behavior: B, C, C



Degree: 6

Shape:

Answer: $[-\frac{12}{5}, 6]$

include the zeros since we have \leq & we only need 1 interval. since they are linked on the graph

4. (This one is a bit tricky) $x^2(2x + 8)^2(x - 9)^2 \leq 0$

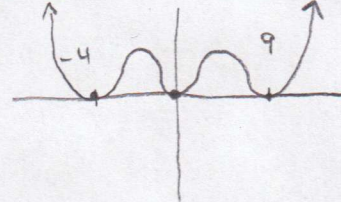
Zeros: $0, -4, 9$

Degree: 6

Mult: 2, 2, 2

Behavior: B, B, B

Shape:



Answer: $\{-4, 0, 9\}$
 or
 $[-4] \cup [0] \cup [9]$

We only include the zeros since there are no negative intervals.

5. $(x + 8)^3(x + 2)^2(x - 5)^2 > 0$

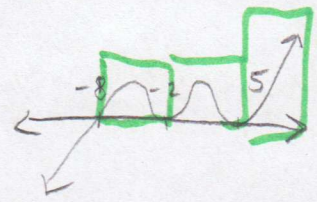
Zeros: $-8, -2, 5$

Degree: 7

Mult: 3, 2, 2

Behavior: C, B, B

Shape:



Answer: $(-8, -2) \cup (-2, 5) \cup (5, \infty)$

6. $x(6x - 54)(x + 9)^3 \geq 0$

Alternate method

Answer: $[-9, 0] \cup [9, \infty)$

