

**Interval Notation, Polynomial and Absolute Value Equations and Inequalities**

Section 1: Rewrite the expression without using the absolute value symbol.

1.  $|5 - 23|$   
 $| -18 |$   
 $18$

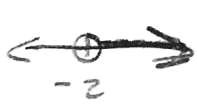
2.  $|\sqrt{5} - 5|$   
 $-(\sqrt{5} - 5)$   
 $-\sqrt{5} + 5$


3.  $|x - 2|$  if  $x < 2$   
 $-(x - 2)$   
 $-x + 2$

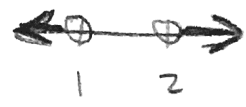
4.  $|x + 1|$   
 $x + 1$  if  $x \geq -1$   
 $-x - 1$  if  $x < -1$


5.  $|x^2 + 1|$   
 $x^2 + 1$

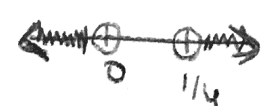
Section 2: Solve the polynomial inequality, express the solution in interval and set notation. Graph solution on a number line.

6.  $2x + 7 > 3$   
 $x > -2$   
 $(-2, \infty)$   


7.  $1 - x \leq 2$   
 $x \geq -1$   
 $[-1, \infty)$   


8.  $(x - 1)(x - 2) > 0$   
  
 $(-\infty, 1) \cup (2, \infty)$   
 $x < 1$  OR  $x > 2$

9.  $x^3 - x^2 \leq 0$   
 $x = 0$   $x = 1$   
  
 $(-\infty, 1]$   
 $x \leq 1$

10.  $\frac{1}{x} < 4$   
 $x \neq 0$   $x > \frac{1}{4}$   
  
 $(-\infty, 0) \cup (1/4, \infty)$   
 $x < 0$  OR  $x > 1/4$

11. If a ball is thrown upward from the top of a building that is 128 ft. high with an initial velocity of 16 ft./s, the height  $h$  above the ground  $t$  seconds later will be  $h = 128 + 16t - 16t^2$ . During what time interval will the ball be at least 32 ft. above the ground?

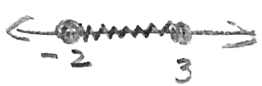
$$h \geq 32 \quad h = 128 + 16t - 16t^2$$

$$128 + 16t - 16t^2 \geq 32$$

$$-16t^2 + 16t + 96 \geq 0$$

$$-16(t^2 - t - 6) \geq 0$$

$$t^2 - t - 6 \leq 0 \quad \text{Land}$$

$$(t+2)(t-3)$$


Must start at 0  
 $[0, 3]$

Section 3: Solve the absolute value inequality, express the solution in interval and set notation. Graph solution on a number line.

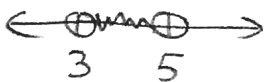
12.  $|x - 4| < 1$

13.  $|x + 5| \geq 2$

$$x - 4 < 1 \quad x - 4 > -1$$

$$x < 5 \quad x > 3$$

$$x \geq -3 \quad x \leq -7$$



$$(3, 5)$$

$$3 < x < 5$$

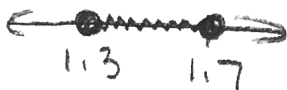


$$(-\infty, -7] \cup [3, \infty)$$

$$x \leq -7 \text{ or } x \geq 3$$

14.  $|2x - 3| \leq 0.4$

$$x \leq 1.7 \quad x \geq 1.3$$



$$[1.3, 1.7]$$

$$1.3 \leq x \leq 1.7$$