

Average Rate of Change $f(x) = -2x^3$ interval: $[-2, 0]$

$$\text{average rate of change: } \frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{0 - 16}{0 - (-2)} = \frac{-16}{2} = -8$$

$$f(x_1) = f(-2) = -2(-2)^3 = 16$$

$$f(x_2) = f(0) = -2(0)^3 = 0$$

Section 2.3: Equations and Inequalities Involving Absolute Value

example: $|x| = 5$ $x = 5$ or $x = -5$

$|x| = 10$ $x = 10$ or $x = -10$

$|x+2| = 4$ $x+2 = 4$ or $x+2 = -4$
 $-2 -2$ $-2 -2$
 $x = 2$ or $x = -6$

$|2x-4| = 10$ $2x-4 = 10$ or $2x-4 = -10$
 $+4 +4$ $+4 +4$
 $2x = 14$ $2x = -6$
 $\frac{2x}{2} = \frac{14}{2}$ $\frac{2x}{2} = \frac{-6}{2}$
 $x = 7$ or $x = -3$

★
 Isolate the expression in abs. values

$2|x-5| = 16$

$|x-5| = 8$

$x-5 = 8$ or $x-5 = -8$
 $+5 +5$ $+5 +5$
 $x = 13$ or $x = -3$

example: $5|x+6| - 10 = 20$
 $+10 +10$

$5|x+6| = 30$
 $\frac{5|x+6|}{5} = \frac{30}{5}$

$|x+6| = 6$

$x+6 = 6$ or $x+6 = -6$
 $-6 -6$ $-6 -6$

$5|x+6| - 10 = 20$
 $\frac{5|x+6|}{5} - \frac{10}{5} = \frac{20}{5}$

$|x+6| - 2 = 4$
 $+2 +2$

$|x+6| =$

$$\text{example: } |x-7| < 10 \quad \begin{array}{c} -10 < x-7 < 10 \\ +7 \quad +7 \quad +7 \end{array}$$

$$f(x) = |x-7|$$

$$f(x) = 10$$

$$-3 < x < 17$$

→ example: $2|x+1|+4 \leq 16$

$$\begin{array}{c} -4 \quad -4 \\ \hline 2|x+1| \leq \frac{12}{2} \end{array}$$

↓ Isolate
| |

$$|x+1| \leq 6$$

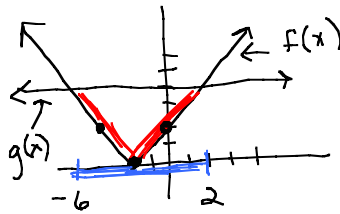
$$\begin{array}{c} -6 \leq x+1 \leq 6 \\ -1 \quad -1 \quad -1 \end{array}$$

$$-7 \leq x \leq 5$$

example: $|x+2| < 4$

$$f(x) = |x+2|$$

$$g(x) = 4$$



x	f(x)
0	2
1	3
-1	1
4	6

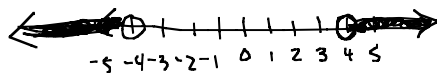
$$|x+2| < 4$$

$$-4 < x+2 < 4$$

$$\begin{array}{c} -2 \quad -2 \quad -2 \end{array}$$

$$-6 < x < 2$$

$$|x| > 4$$



$$x < -4 \quad \text{or} \quad x > 4$$

$$|x| > 10$$

$$x < -10 \quad \text{or} \quad x > 10$$

example: $|x+2| > 8$

$$\begin{array}{c} x+2 < -8 \\ -2 \quad -2 \end{array} \quad \text{or} \quad x+2 > 8$$

$$x < -10 \quad \text{or} \quad x > 6$$

$$(-\infty, -10) \cup (6, \infty)$$

Section 2.5: 9-27 (odd), 41-61 (odd)