

**Vocabulary:**

Increasing: left to Right, the graph goes uphill  
 Use  $x$  values to describe the intervals.

ALWAYS going to use  $( )$  because we can't increase or decrease at endpoints.

Decreasing: left to Right, the graph goes downthill  
 Use  $x$  values

Extrema

Minimum: lowest point

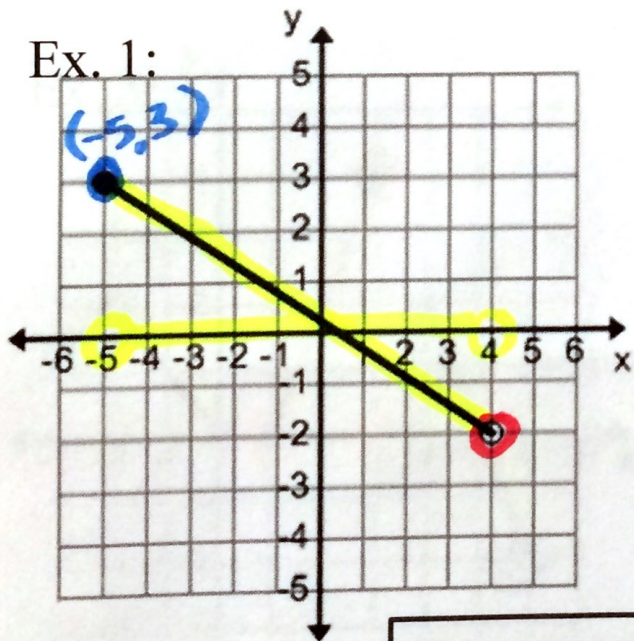
Maximum: highest point

$(-7, -3) \rightarrow f(-7) = -3$

$(3, 10) \rightarrow f(3) = 10$

Identify the indicated characteristics for each graph using set builder and interval notation.

Ex. 1:



Increasing

Set Builder: NA

Interval: NA

Decreasing

Set Builder:  $-5 < x < 4$

Interval:  $(-5, 4)$

Extrema

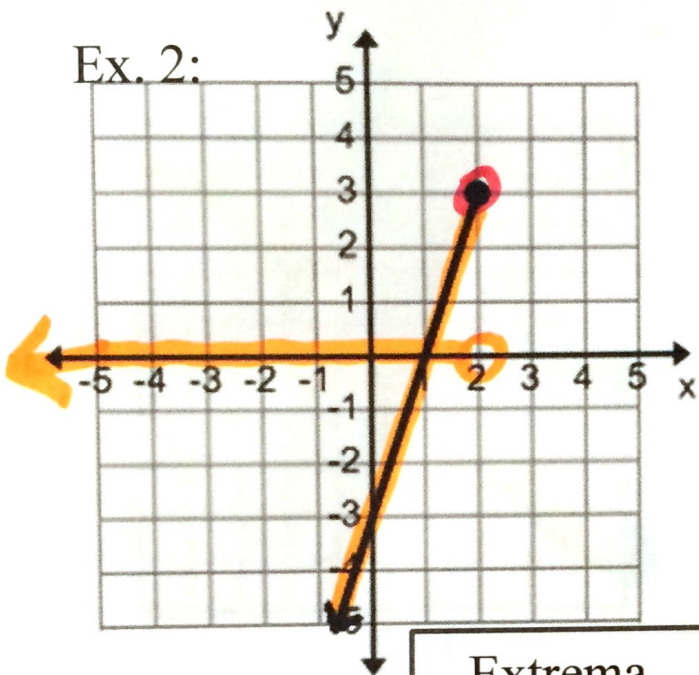
approaches

Minimum:  $f(4) = -2$

Maximum:  $f(-5) = 3$

Identify the indicated characteristics for each graph using set builder and interval notation.

Ex. 2:

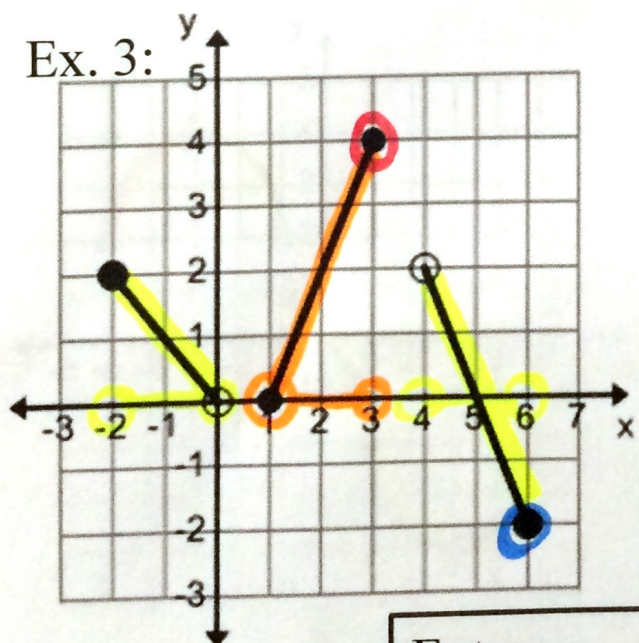
IncreasingSet Builder:  $x < 2$ Interval:  $(-\infty, 2)$ Decreasing

Set Builder: NA

Interval: NA

ExtremaMinimum: None      Maximum:  $f(2) = 3$ 

Ex. 3:

Increasing

Set Builder:

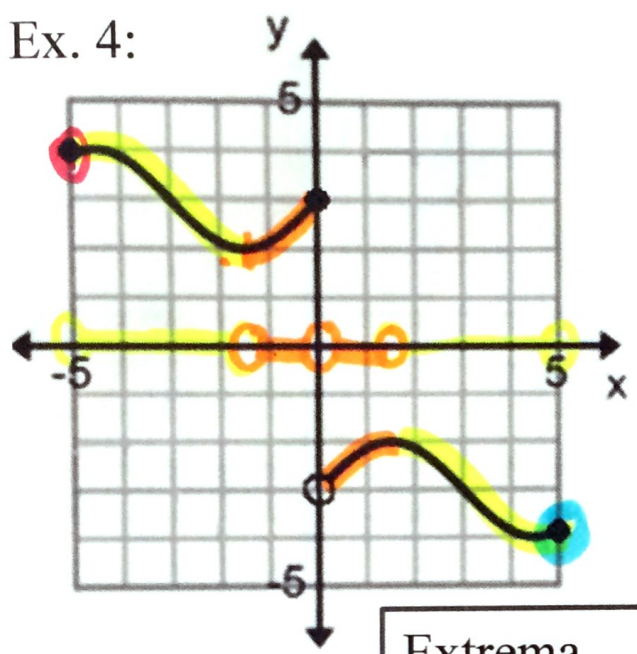
Interval:  $1 < x < 3$ Decreasing

Set Builder:

Interval:  $-2 < x < 0$   
 $4 < x < 6$ ExtremaMinimum:  $f(6) = -2$       Maximum:  $f(3) = 4$

Identify the indicated characteristics for each graph using set builder and interval notation.

Ex. 4:

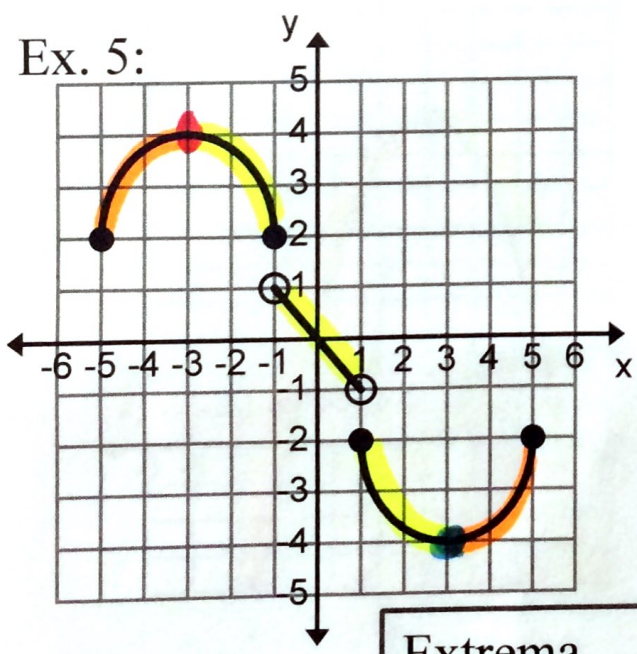


Increasing  
 $-1.5 < x < 0$   
 Set Builder:  $0 < x < 1.5$   
 Interval:  $(-1.5, 0)$   $(0, 1.5)$

Decreasing  
 Set Builder:  $-5 < x < -1.5$   
 $1.5 < x < 5$   
 Interval:  $(-5, -1.5)$   $(1.5, 5)$

Extrema  
 Minimum:  $f(5) = -4$  Maximum:  $f(-5) = 4$

Ex. 5:



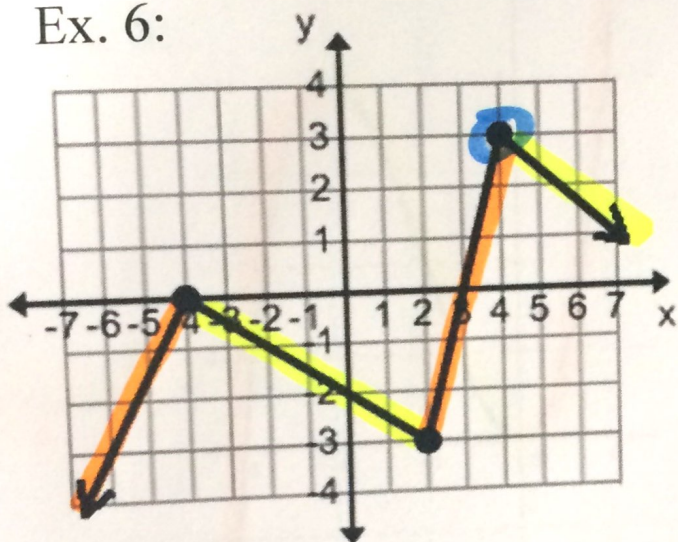
Increasing  
 Set Builder:  $-5 < x < -3$   
 $3 < x < 5$   
 Interval:  $(-5, -3)$   $(3, 5)$

Decreasing  
 Set Builder:  $-3 < x < -1$   
 $-1 < x < 1$   
 $1 < x < 3$   
 Interval:  $(-3, -1)$   $(-1, 1)$   $(1, 3)$

Extrema  
 Minimum:  $f(3) = -4$  Maximum:  $f(-3) = 4$

Identify the indicated characteristics for each graph using set builder and interval notation.

Ex. 6:

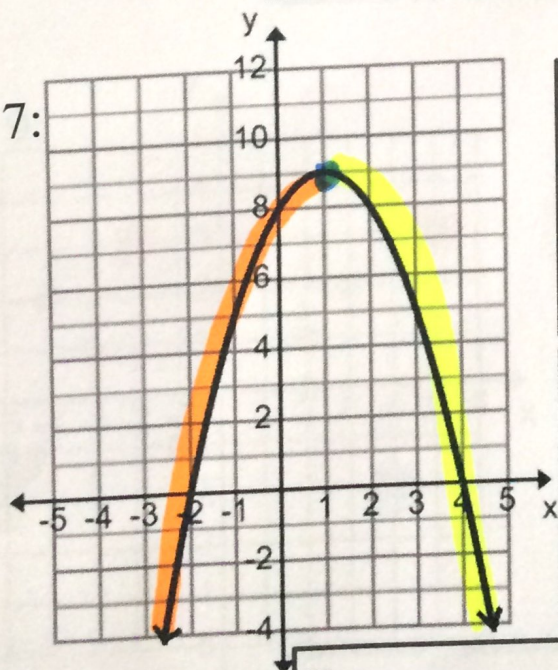


Increasing  
 Set Builder:  $x < -4$   
 $2 < x < 4$   
 Interval:  $(-\infty, -4)$   $(2, 4)$

Decreasing  
 Set Builder:  $-4 < x < 2$   
 $x > 4$   
 Interval:  $(-4, 2)$   $(4, \infty)$

Extrema  
 Minimum: ~~None~~ Maximum: ~~None~~  $f(4) = 3$

Ex. 7:



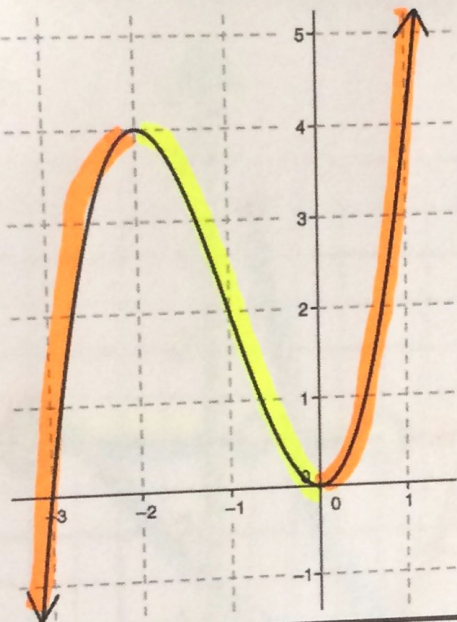
Increasing  
 Set Builder:  $x < 1$   
 Interval:  $(-\infty, 1)$

Decreasing  
 Set Builder:  $x > 1$   
 Interval:  $(1, \infty)$

Extrema  
 Minimum: None Maximum:  $f(1) = 9$

Identify the indicated characteristics for each graph using set builder and interval notation.

Ex. 8:



Increasing

Set Builder:  $x < -2$   
 $x > 0$

Interval:  $(-\infty, -2) \cup (0, \infty)$

Decreasing

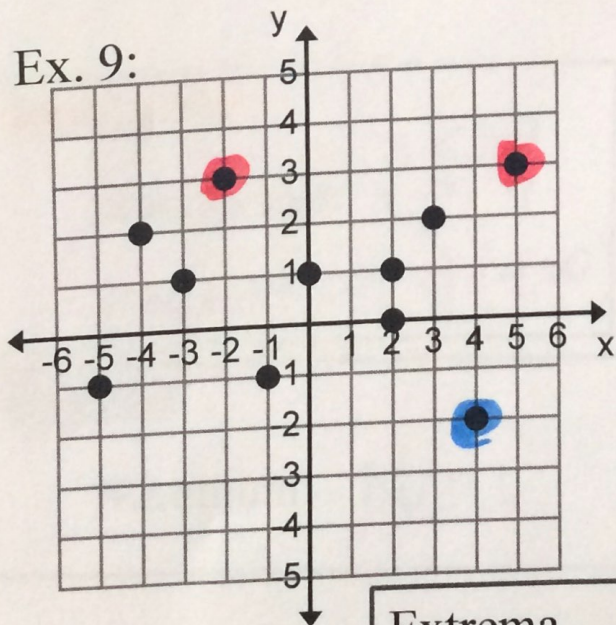
Set Builder:  $-2 < x < 0$

Interval:  $(-2, 0)$

Extrema

Minimum: None      Maximum: None

Ex. 9:



Increasing

Set Builder: NA

Interval: NA

Decreasing

Set Builder: NA

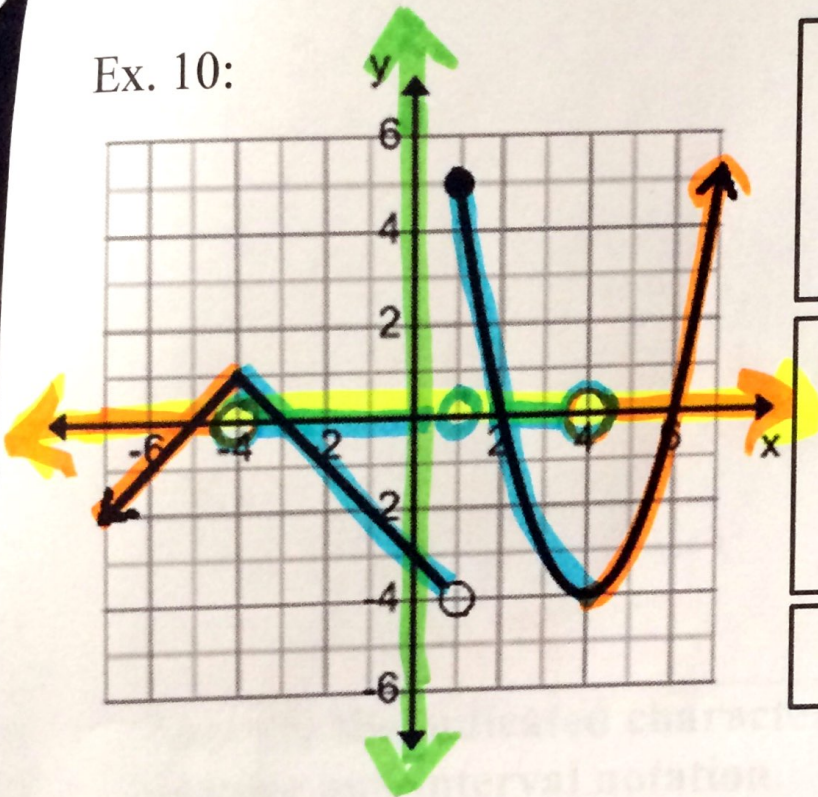
Interval: NA

Extrema

Minimum:  $f(4) = -2$       Maximum:  $f(-2) = 3$   
 $f(5) = 3$

Identify the indicated characteristics for each graph using set builder and interval notation.

Ex. 10:



Domain

Set Builder:  $\mathbb{R}$

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

Range

Set Builder:  $\mathbb{R}$

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

Continuity *Non-Continuous*

Increasing

Set Builder:  $x < -4$   
 $x > 4$

Interval:  $(-\infty, -4) \cup (4, \infty)$

Decreasing

Set Builder:  $-4 < x < 1$   
 $1 < x < 4$

Interval:  $(-4, 1) \cup (1, 4)$

Extrema

Minimum: *None*

Maximum: *None*