

HW 6.2 Answers

Warm-Up: Find the domain, range, increasing, decreasing, relative min & relative max for number 2 on the warm-up sheet.

1. D: $\{1, 0, 3, -4, 7\}$

R: $\{9, 8, 0, -7\}$

Yes

2. D: $\{11, -6, 7, 9\}$

R: $\{3, 5, -1, 7\}$

No

3. D: $\{-3, -1, 0, 1, 2, 3\}$

R: $\{-3, -2, 0, 1, 2\}$

Yes

4. D: $\{\text{blue, purple, red, green}\}$

R: $\{2, 1\}$

Yes

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Find the domain and range for each of the following. Determine if the relation is a function.

- $\{(1, 9), (0, 8), (3, 0), (-4, 9), (7, -7)\}$
 Domain: $\{1, 0, 3, -4, 7\}$
 Range: $\{9, 8, 0, -7\}$
 Function? yes
- $\{(11, 3), (-6, 5), (7, -1), (9, 7), (7, 3)\}$
 Domain: $\{11, -6, 7, 9\}$
 Range: $\{3, 5, -1, 7\}$
 Function? no
- Graph at below:

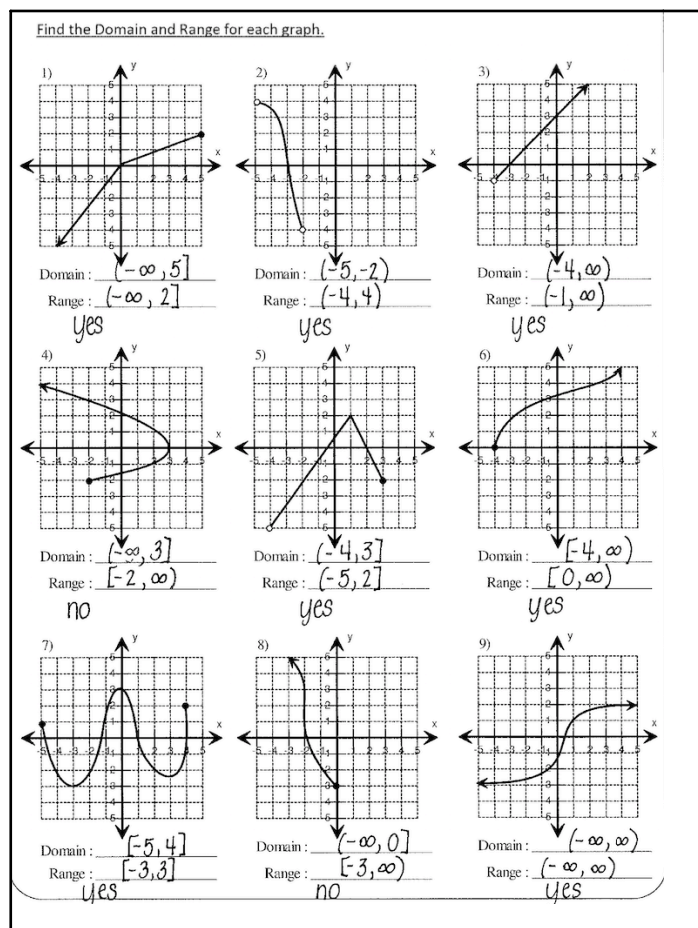
 Domain: $\{-3, -1, 0, 1, 2, 3\}$
 Range: $\{-3, -2, 0, 1, 2\}$
 Function? yes
- From the mapping below:

 Domain: $\{\text{blue, purple, red, green}\}$
 Range: $\{2, 1\}$
 Function? yes

Fill in the missing information:

Interval Notation	Set-Builder Notation	Number Line Graph
$(-1, 2]$	$\{x -1 < x \leq 2\}$	
$(-\infty, -3]$ or $(7, \infty)$	$\{x x \leq -3 \text{ or } x > 7\}$	
$[3, 5]$	$\{x 3 \leq x \leq 5\}$	
$(-5, 9]$	$\{x -5 < x \leq 9\}$	

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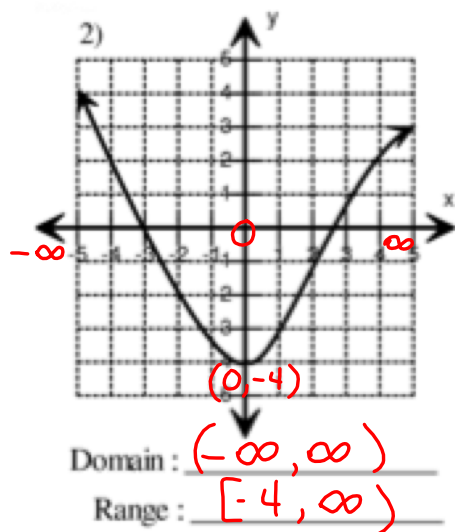
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Domain and Range

Algebraically

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Warm-Up: Find the domain, range, increasing, decreasing, relative min & relative max for number 2 on the warm-up sheet.



inc: $(0, \infty)$

dec: $(-\infty, 0)$

min: $(0, -4)$

max: none

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Algebraically - 3 problem types

1. Variable in the Denominator

To Solve: Set Denominator = 0

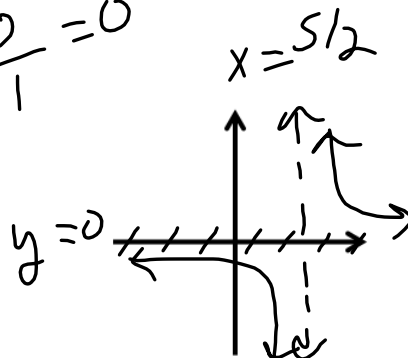
Domain Looks Like: $x \neq$ _____

Example: $y = \frac{3}{2x-5}$ $\text{denom} \neq 0$
 $2x-5 \neq 0$
 $2x \neq 5$

$\{x \mid x \neq 5/2\}$

$y = \frac{0}{1} = 0$

Sketch:



2. Variable Under a Radical

To Solve: Radical ≥ 0 *

Domain Looks Like: $x \geq$ _____ or $x \leq$ _____

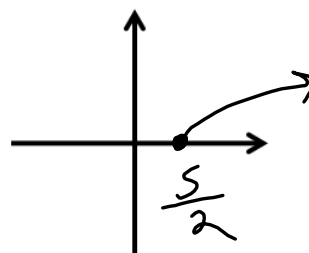
$\sqrt{\text{radicand}}$

Example: $y = \sqrt{2x-5}$
 $\text{radicand} \geq 0$
 $2x-5 \geq 0$

$2x \geq 5$

$x \geq \frac{5}{2} \rightarrow D: \{x \mid x \geq \frac{5}{2}\}$

Sketch:

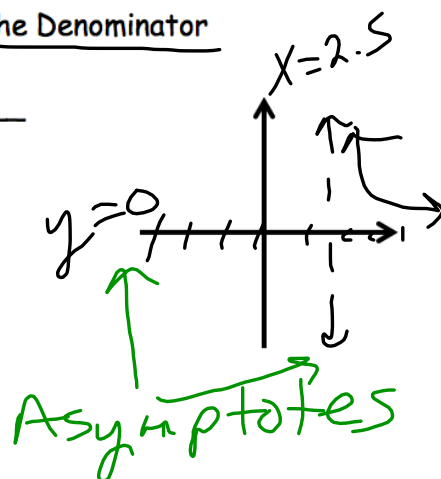


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3. "Double Trouble" → Variable Under a Radical in the DenominatorTo Solve: Radicand > 0 Domain Looks Like: $x > \underline{\hspace{1cm}}$ or $x < \underline{\hspace{1cm}}$

Example: $y = \frac{3}{\sqrt{2x-5}}$
radicand > 0
 $2x - 5 > 0$
 $2x > 5$
 $\{x \mid x > 5/2\}$

Sketch:

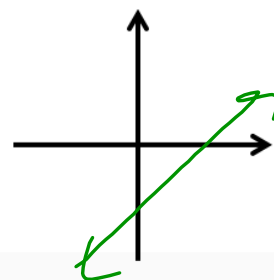
4. No Trouble → Nothing to Solve, No algebra.
Domain looks like $(-\infty, \infty)$ or $x \in \mathbb{R}$

Example: $y = 2x - 5$

$$\{x \mid x \in \mathbb{R}\}$$

or $(-\infty, \infty)$

Sketch:



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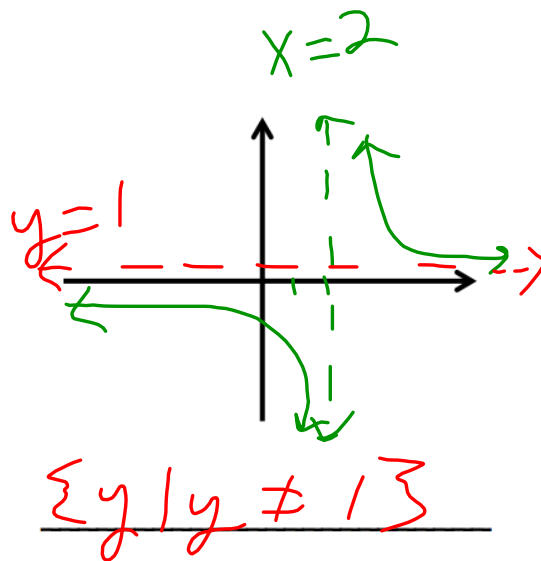
For each of the following,

- State the type of trouble.
- Find the domain algebraically.
- Sketch the graph.
- Use the graph to find the range.

1. $y = \frac{x}{x-2}$

a. variable in denominator
denom $\neq 0$
 $x - 2 \neq 0$
 $x \neq 2$

b. $\{x \mid x \neq 2\}$



d. $\{y \mid y \neq 1\}$

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2. $y = \sqrt{4-2x}$

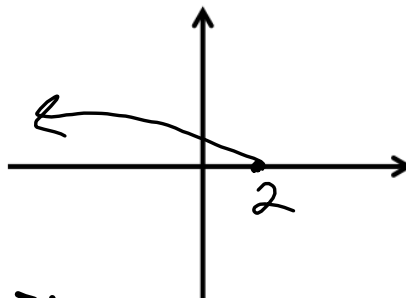
a. variable under
radicand ≥ 0

$$4-2x \geq 0$$

$$\frac{4}{2} \geq \frac{2x}{2} \rightarrow 2 \geq x \rightarrow x \leq 2$$

b. $\{x | x \leq 2\}$

c. $\{y | y \geq 0\}$



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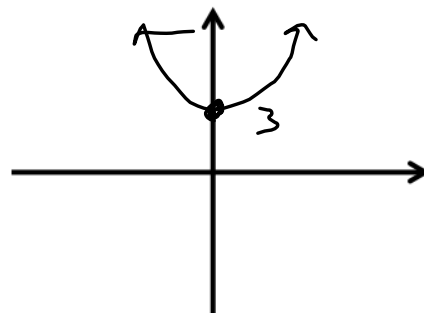
3. $y = x^2 + 3$

a. no troubleis an element
of

b. $\{x | x \in \mathbb{R}\}$

↓
real #
system

c.



d.

$\{y | y \geq 3\}$

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4. $y = \frac{2}{\sqrt{x-1}}$ *denom $\neq 0$ and radicand can't be neg*

a. Double Trouble
radicand > 0
 $x-1 > 0$
 $x > 1$

c. $y = 0$

b. $\{x | x > 1\}$

d. $\{y | y > 0\}$

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5. $y = \frac{x}{x^2 - 4}$

a. Var in denom
denom $\neq 0$
 $x^2 - 4 \neq 0$
 $x^2 \neq 4$
 $x \neq \pm 2$

c.

b. $\{x | x \neq \pm 2\}$

d. $\{y | y \in \mathbb{R}\}$

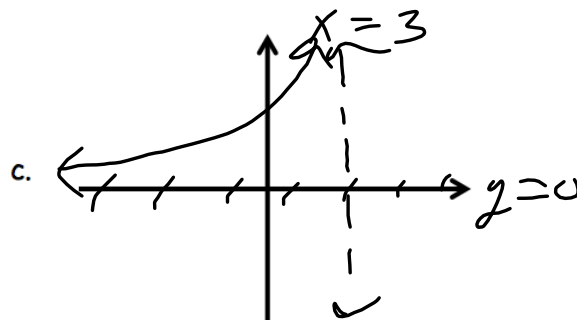
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6. $y = \frac{4}{\sqrt{3-x}}$

a. Domain Trouble

$$\begin{aligned} 3-x &> 0 \\ -x &> -3 \\ \underline{-1} \quad \underline{-1} \end{aligned}$$

b. $\{x \mid x < 3\}$



d. $\{y \mid y > 0\}$

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Dec 2-8:35 PM