

AM Objective #5: Domain & range, functions

1. Find the domain and range:  $y = \sqrt{x-6} + 8$

[A] domain:  $\{x | x \geq 6\}$ , range:  $\{y | y \geq 8\}$  [B] domain:  $\{x | x \geq 0\}$ , range:  $\{y | y \geq 8\}$

[C] domain:  $\{x | x \geq -6\}$ , range:  $\{y | y \geq -8\}$

[D] domain:  $\{x | x \geq 0\}$ , range:  $\{y | y \geq 0\}$

Domain

$\sqrt{x-6}$  must be  $\geq 0$   
 $x-6 \geq 0$   
 $+6 +6$   
 $x \geq 6$

Range

$\sqrt{x-6} \geq 0 + 8$   
 $\Rightarrow$  smallest  $y$ -value is 8  
 $\Rightarrow y \geq 8$

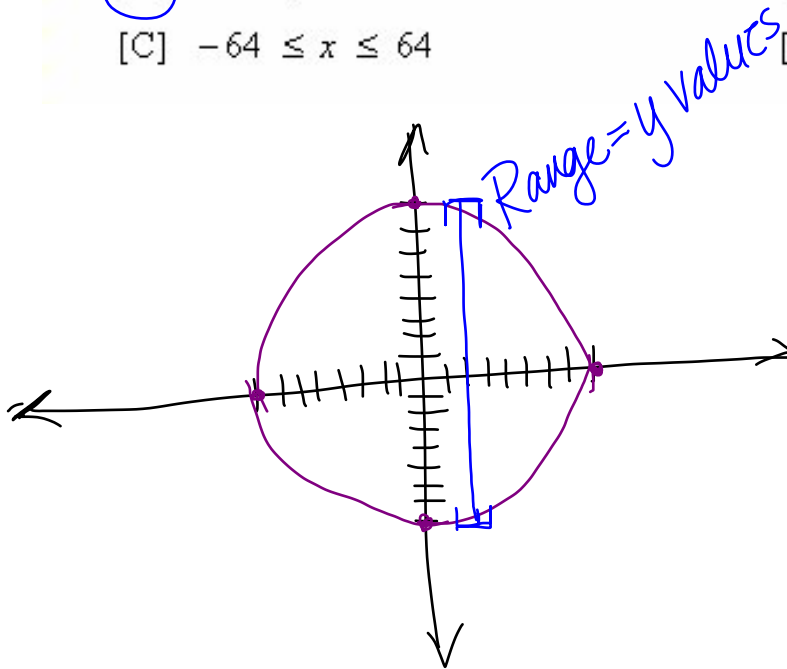
2. Find the range of the relation  $A = \{(x,y) | x^2 + y^2 = 64\}$ .

[A]  $-8 \leq y \leq 8$

[B]  $-64 \leq y \leq 64$

[C]  $-64 \leq x \leq 64$

[D]  $-8 \leq x \leq 8$



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3. Find the domain and range of the relation  $\{(x, y) \mid 2x < 12\}$ .

~~[A]~~ domain =  $\mathbf{R}$ ; range =  $\{y \mid y < 12\}$

[B] domain =  $\{x \mid x < 6\}$ ; range =  $\mathbf{R}$

~~[C]~~ domain =  $\{x \mid x < 12\}$ ; range =  $\{y \mid y < 6\}$

~~[D]~~ domain =  $\mathbf{R}$ ; range =  $\{y \mid y < 6\}$

*y does not impact this inequality, so it can be anything!*

$$\frac{2x < 12}{2 \quad 2}$$

$$x < 6$$

4. Determine the domain:  $h(x) = \frac{2x}{x(x^2 - 16)}$

[A]  $\{x \mid x \neq \pm 4, x \neq 0\}$

[B]  $\{x \mid x \neq \pm 4\}$

[C]  $\{x \mid x \neq \pm 16, x \neq 0\}$

[D]  $\{x \mid x \neq 4\}$

We can not divide by zero.  
This means the domain does not include #s that make  $x(x^2 - 16) = 0$

$$x(x^2 - 16) \neq 0$$

zero product property

$$x \neq 0 \text{ or } x^2 - 16 \neq 0$$

$$+16 \neq 16$$

$$\sqrt{x^2 \neq 16}$$

$$x \neq \pm 4$$

$$x \neq 0$$