

Set builder notation

In set builder notation we use curly brackets $\{ \}$ and variables to express the domain and range. We can compile sets of inequalities using inequality and other symbols.

the set of	$\{ \}$
less than	$<$
less than or equal to	\leq
greater than	$>$
greater than or equal to	\geq
is a member of the set of real numbers	$\in \mathbb{R}$

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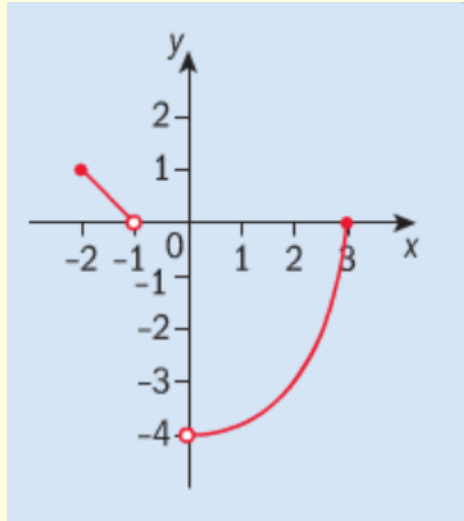
Interval notation	Description	Set builder notation
$(-2, +\infty)$	x is greater than -2	$\{x \in \mathbb{R} \mid -2 < x\}$
$(-\infty, 4]$	x is less than or equal to 4	$\{x \in \mathbb{R} \mid x \leq 4\}$
$[-3, 3)$	x lies between -3 and 3 including -3 but not 3	$\{x \in \mathbb{R} \mid -3 \leq x < 3\}$
$(-\infty, 5) \cup [6, +\infty)$	x is less than 5 <u>OR</u> greater than or equal to 6	$\{x \in \mathbb{R} \mid x < 5 \text{ or } 6 \leq x\}$
$(-\infty, \infty)$	x may be any real number	\mathbb{R}

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Domain:

$$[-2; 1) \cup (0, 3]$$

$$\{x \in \mathbb{R} \mid -2 \leq x < 1 \text{ or } 0 < x \leq 3\}$$

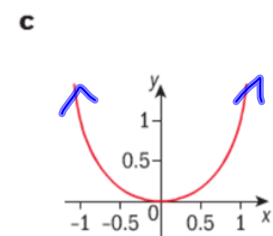
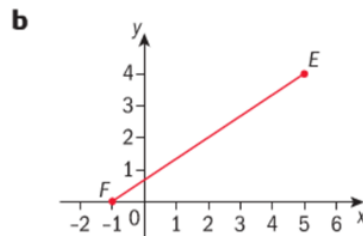
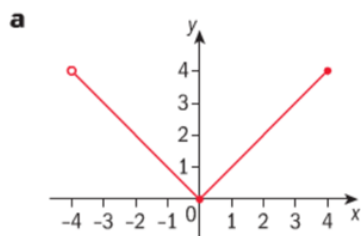


Range:

$$(-4, 1]$$

$$\{y \in \mathbb{R} \mid -4 < y \leq 1\}$$

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Domain

$$[-4, 4]$$

$$[-1, 5]$$

$$(-\infty, \infty)$$

Range

$$[0, 4]$$

$$[0, 4]$$

$$[0, \infty)$$

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d

e

f

Domain
 $(-\infty, -2] \cup (2, \infty)$

Range
 $\mathbb{R} - (3, 4)$
 $(-\infty, 3] \cup [4, \infty)$

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Function Notation:

EXAM-STYLE QUESTION

7 The velocity of a particle is given by $v(t) = t^2 - 9 \text{ ms}^{-1}$.

a Find the initial velocity.

$v(0) = 0^2 - 9 = -9$

b Find the velocity after 4 seconds.

$v(4) = 4^2 - 9 = 7$

c Find the velocity after 10 seconds.

d At what time does the particle come to rest?

$0 = t^2 - 9$
 $t = \pm 3$ 3 sec

8 Given $f(x) = \frac{f(x+h) - f(x)}{h}$ find

a $f(2+h)$

b $f(3+h)$

Do Now

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