# Results for Quadratic Functions Exam

100 : 5

96-99 : 6

80's : 1

70's : 3

60's : 2

↓ 60 : 2

MTH - 4109 Sets, Relations + Functions

Sets of Numbers:

$\mathbb{N}$ : natural numbers

: $\{0, 1, 2, 3, \ldots\}$

$\mathbb{Z}$ : integers

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

$\mathbb{Q}$ : rational numbers

: any number which has one or more number repeating into infinity $\infty$

e.g. $0.000\overline{0}$

$1.00000$

$1\frac{1}{3} = 1.33\overline{3}$

$\frac{3}{7} = 0.428571\overline{428571}$

$4.00\overline{0}$

$\frac{1}{2} = .500\overline{0}$

$\mathbb{Q}'$ = irrational numbers

→ numbers with random numbers going on into infinity. There is no number or numbers that ever repeat to $\infty$.

e.g. $\pi = 3.141592654\ldots$

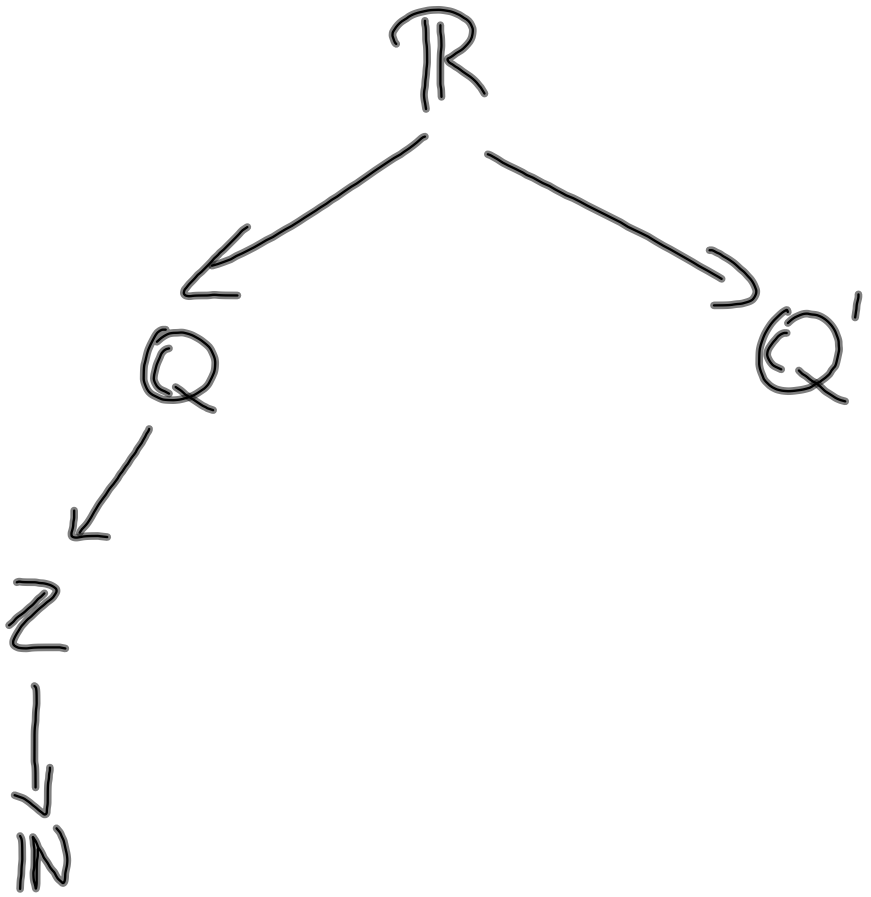
e.g.s → radicals

$\sqrt{2} = 1.4142135562\ldots$

$\sqrt{3} = 3.9482222039\ldots$

$\mathbb{R}$ : real numbers

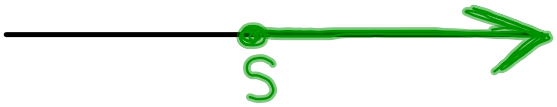
: includes all rational + irrational numbers.


R
Q
Q'
Z
N

$A = \{ x \in \mathbb{R} \mid x \geq 5 \}$

" belongs to "

" such that "

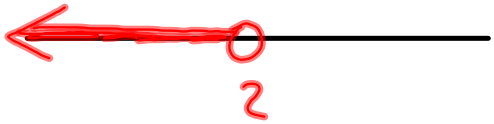



$[5, \infty$

$B = \{ x \in \mathbb{R} \mid x > 2 \}$

$]2, \infty$

$C = \{x \in \mathbb{R} \mid x < 2\}$




$]-\infty, 2[$

$D = \{x \in \mathbb{R} \mid x \leq 5\}$


$]-\infty, 5]$

$E = \{ x \in \mathbb{R} \mid -5 \leq x \leq 3 \}$


$[-5, 3]$

$F = \{ x \in \mathbb{R} \mid -4 < x < 2 \}$


$]-4, 2[$

$G = \{ x \in \mathbb{R} \mid -7 \leq x < 6 \}$

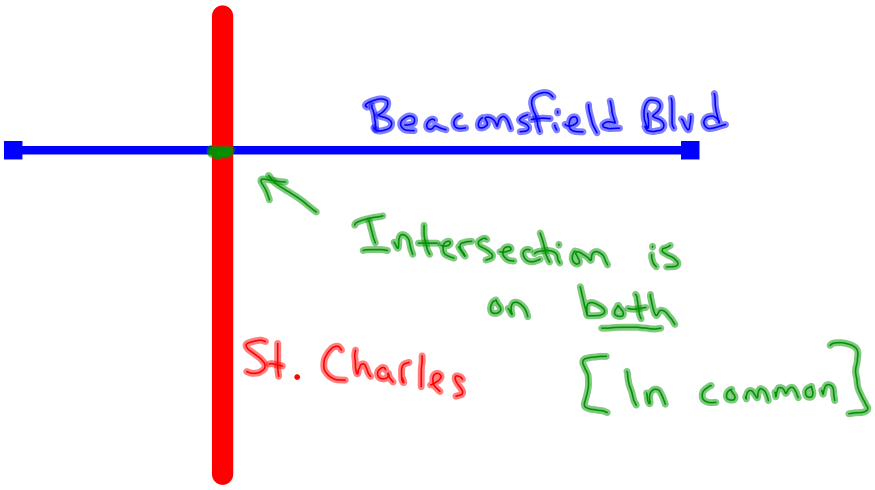

$[-7, 6[$

$H = \{ x \in \mathbb{R} \mid -8 < x \leq 6 \}$


$]-8, 6]$

# Set Operation

① $\cap$ : intersection

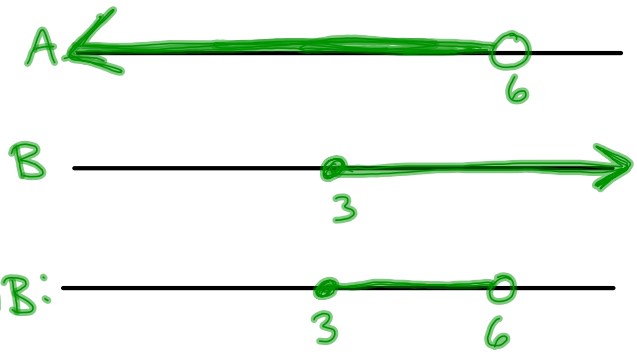



St. Charles $\cap$ Beaconsfield = ▭

$A = ]-\infty, 6[$

$B = [3, \infty[$

Find $A \cap B$



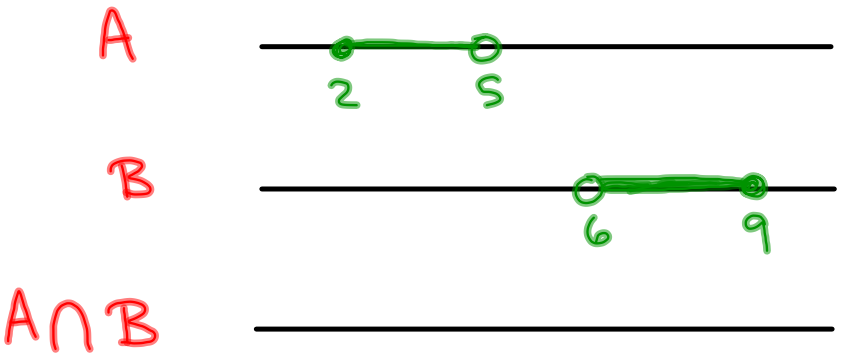

Set-builder:

$\{x \in \mathbb{R} \mid 3 \leq x < 6\}$

Interval notation: $[3, 6[$

$[2,5[ \cap ]6,9]$

A B




$\emptyset$ = empty set

C :


D :


$C \cap D$ :


Int : $]4,6[$

set-b : $\{x \in \mathbb{R} \mid 4 < x < 6\}$

$[3, \infty) \cap (6, \infty)$

$A$ $B$

$A$ :


$B$ :


$A \cap B$ :


set-b : $\{x \in \mathbb{R} \mid x > 6\}$

int. not : $(6, \infty)$

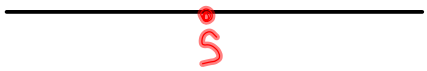
$(-\infty, 5] \cap [5, \infty)$

$A$ $B$

$A$ :


$B$ :


$A \cap B$ :




int. not : $[5]$

set-builder : $\{x \in \mathbb{R} \mid x = 5\}$

# 2nd Set Operation: $\cup$ : union

union = wedding

| Bride's Guest List | Groom's Guest List |
|---|---|
| Mary | Katie |
| Glen | Sam |
| Martin | Cindy |
| Angelica | Adam |
| Matt | Angelica |
| Russell | Rosie |
| Cathy | Shawn |
| | Russell |

wedding: $B \cup G$ (bride ∪ groom)

= Mary, Glen, Martin, Angelica, Matt, Russell, Cathy, Katie, Sam, Cindy, Adam, Rosie, Shawn

$A = \{ x \in \mathbb{R} \mid x \geq -2 \}$

$B = \{ x \in \mathbb{R} \mid x < 3 \}$

$A \cup B$

A :


B :


$A \cup B$ :

int. not $-\infty, \infty$

or $\mathbb{R}$

set-b : $\{ x \in \mathbb{R} \mid x = \mathbb{R} \}$

$A \cap B$ :

$]-3, 4]$ $\cup$ $[1, 6]$

A B

A :


B :


$A \cup B$ :


set-b : $\{x \in \mathbb{R} \mid -3 < x \leq 6\}$

int not : $]-3, 6]$

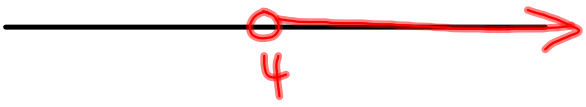
$A \cap B$ :

$C = \{ x \in \mathbb{R} \mid 3 \leq x < 5 \}$

$D = \{ x \in \mathbb{R} \mid x > 4 \}$

C :


D :




C ∪ D :


set-b: $\{ x \in \mathbb{R} \mid x \geq 3 \}$

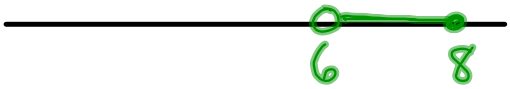
int. not. $[3, \infty$

$[2,4] \cup ]6,8]$

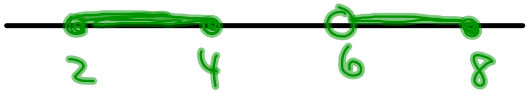
A B

A :


B :




A ∪ B :




interval not : $[2,4] \cup ]6,8]$

set-b : $\{x \in \mathbb{R} \mid 2 \leq x \leq 4 \vee 6 < x \leq 8\}$

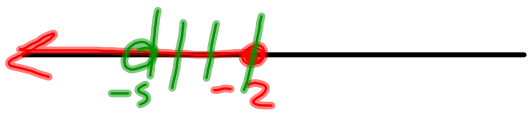
↑ OR

Third Set Operation: $\setminus$ = 'minus' or 'difference'

$(-\infty, -2] \setminus [-5, 0]$

A B

A :




B :


$A \setminus B$ :


set-b. $\{x \in \mathbb{R} \mid x < -5\}$

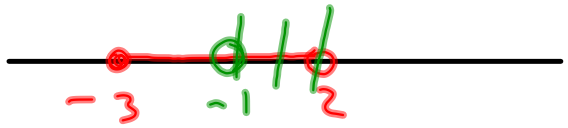
int. not. $]-\infty, -5[$

$A = [-3, 2[$

$B : [1, 4]$

Find $A \setminus B$ and $B \setminus A$

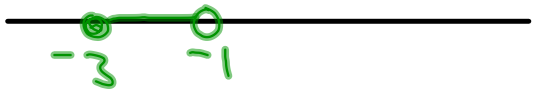
A :




B :

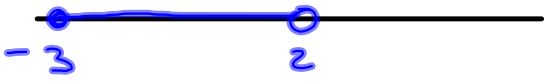

subtract the intersection from the first set. What's left?

$A \setminus B$ :




B :


A :




$B \setminus A$ :