

Final Review - Solutions

① $(x-1)(x+4) < 0$

Step 1: Set $(x-1)(x+4) = 0$

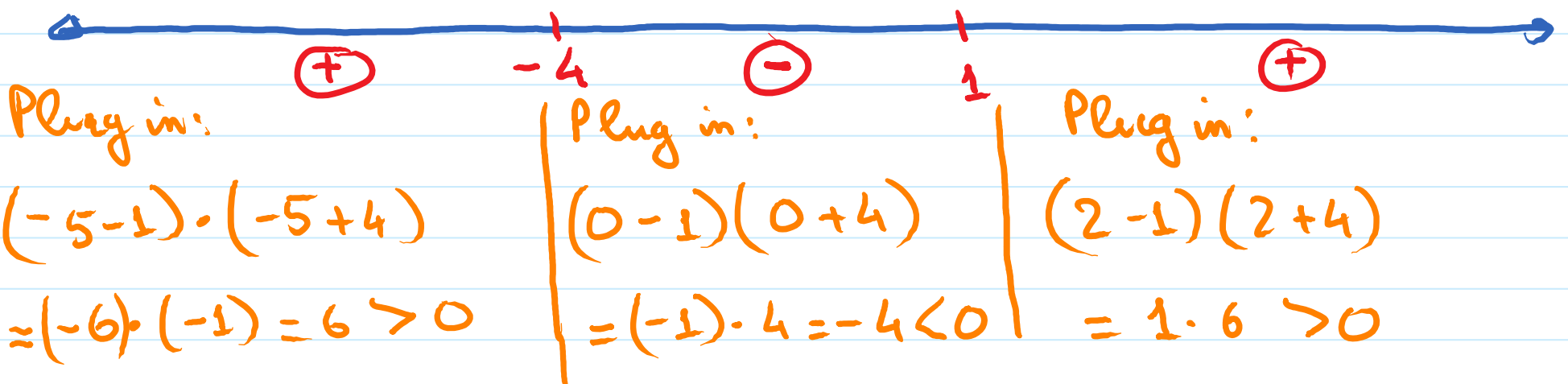
Solve: $x-1=0$ | $x+4=0$
 $x=1$ | $x=-4$

Step 2: Make a sign chart:

Test point: -5

Test point: 0

Test point: 2

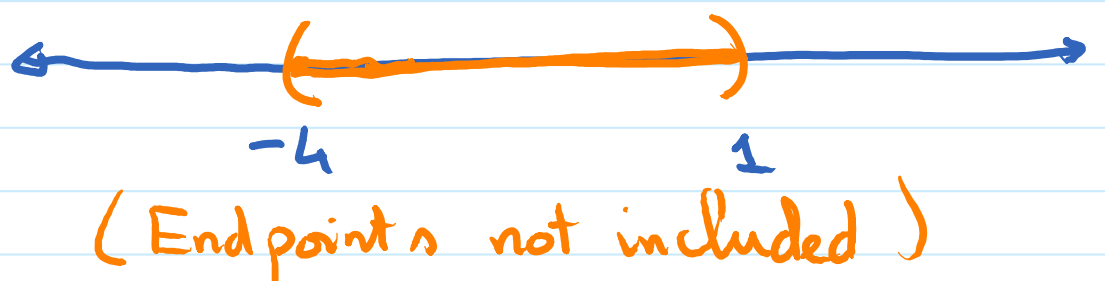


Summary in a table

Interval	Sign
$(-\infty, -4)$	$(+)$ (positive)
$(-4, 1)$	$(-)$ (negative)
$(1, \infty)$	$(+)$ (positive)

Since we want to solve: $(x-1)(x+4) < 0$, the solution set is: $(-4, 1)$

Draw on number line



② $(x-2)(x-4)(x-5) \geq 0$

Step 1: Set $(x-2)(x-4)(x-5) = 0$

$x-2=0$; $x-4=0$; $x-5=0$

$x=2$

$x=4$

$x=5$

Step 2: Make a sign chart.

Test point:

0

3

4.5

6



Plug in: -40

2

-0.625

8

Summary in a table

Interval	Sign
$(-\infty, 2)$	$(-)$ (Negative)
$(2, 4)$	$(+)$ (Positive)
$(4, 5)$	$(-)$ (Negative)
$(5, \infty)$	$(+)$ (Positive)

Positive on 0

Since we want to solve: $(x-2)(x-4)(x-5) \geq 0$, the solution set is: $[2, 4] \cup [5, \infty)$ (endpoints included)

Graph on a number line:

(endpoints included)



③ $\frac{x-2}{x-6} > 0$

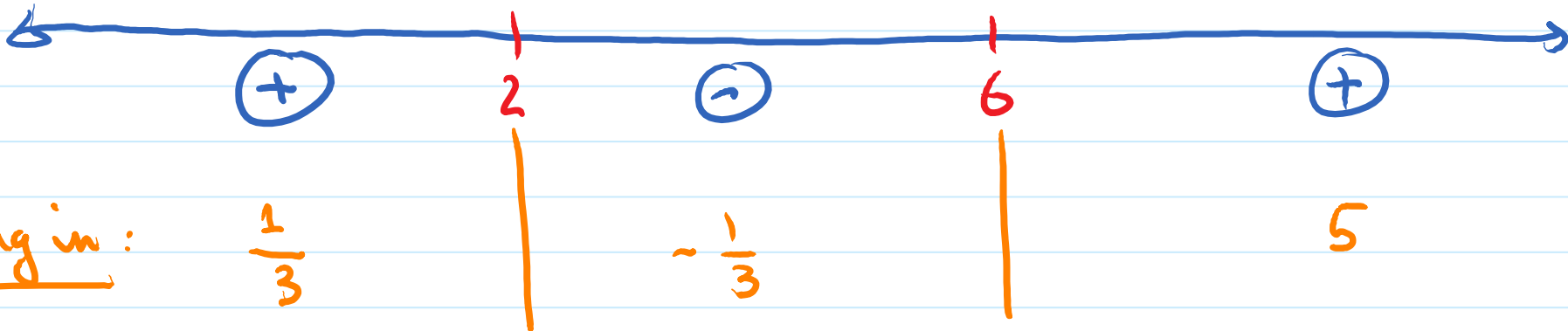
Step 1: Set top = 0 and bottom = 0:

$$x-2=0 \quad ; \quad x-6=0$$

$$x=2 \quad ; \quad x=6$$

Step 2: Make a number line:

Test point: 0 3 bottom=0
(undefined) 7



Plug in:

$$\frac{1}{3}$$

$$-\frac{1}{3}$$

$$5$$

Interval:

Sign

$$(-\infty, 2)$$

$$+$$

(positive)

$$(2, 6)$$

$$-$$

(negative)

$$(6, \infty)$$

$$+$$

(positive)

positive

Since we solve: $\frac{x-2}{x-6} > 0$, the solution set is

$$(-\infty, 2) \cup (6, \infty)$$

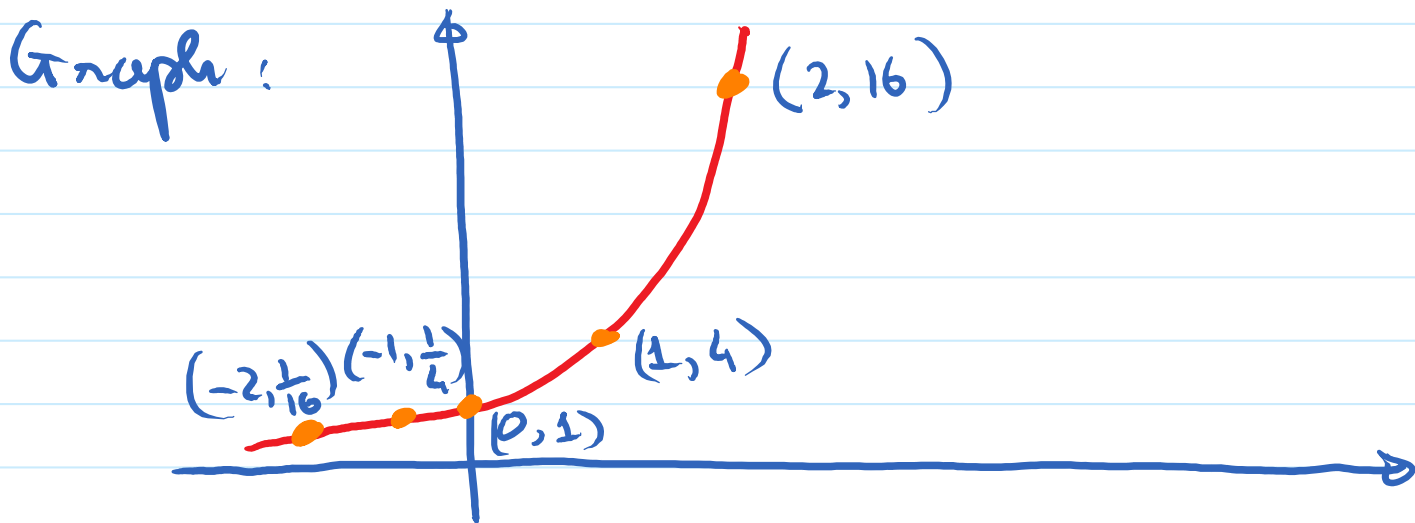
Draw on number line:



④ $f(x) = 4^x$

x	-2	-1	0	1	2
y	$4^{-2} = \frac{1}{16}$	$4^{-1} = \frac{1}{4}$	$4^0 = 1$	$4^1 = 4$	$4^2 = 16$

(Plug in calculator)



⑤ $f(x) = \left(\frac{1}{3}\right)^x$

Table (Plug in x, then plug in calculator)

x	-2	-1	0	1	2
y	9	3	1	$\frac{1}{3}$	$\frac{1}{9}$

