Ex2

$x^2 - 2x - 35 \le 0$

1. factor, zeros
2. number line ← intervals.
3. choose a number from each interval and try it → fill in signs.
4. choose the correct interval.

-35

-7 5

-2

Factored form $(x-7)(x+5) \le 0$

Zeros are 7 & -5

Common mistake ~~-7~~, ~~5~~ zeros

" "

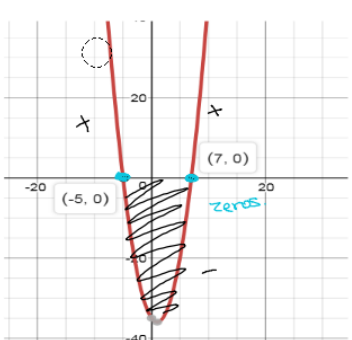
~~$x \le 7$~~ ~~$x \le -5$~~

$-\infty$ (+) (−) (+) $\infty$

-5 -4 7

| $(-\infty, -5]$ | $[-5, 7]$ | $[7, \infty)$ |
|---|---|---|
| (-7) | 0 | 8 |
| $(-7-7)(-7+5)$ | -2 $(-2-7)(-2+5)$ | $(8-7)(8+5)$ |
| $(-)\cdot(-)$ | $(-)(+)$ | $(+)(+)$ |
| + | − | + |
| | +2 $(2-7)(2+5)$ | |
| | $(-)(+)$ | |
| | − | |

The solution is $[-5, 7]$




$[-5, 7]$

$y$ $f(x) = x^2 - 2x - 35 \le 0$

$y \le 0$ → negative $y$ values below the x-axis

Ex3 $2x^2 + 3x \le 20$

$\quad -20 \quad -20$

$\underbrace{2x^2+3x-20}\le 0$ $\ominus$

$-5 \times 8$ ($-40$, $3$)

$\left(x+\frac{8}{2}\right)\left(x-\frac{5}{2}\right) \le 0$

$\boxed{(x+4)(2x-5) \le 0}$

$x - \frac{5}{2} = 0$

$\boxed{x = \frac{5}{2}}$

zeros $-4$ & $\frac{5}{2}$

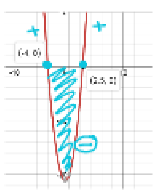
$-\infty$ $\oplus$ $-4$ $\ominus$ $5/2$ $\oplus$ $\infty$

| $(-\infty, -4]$ | $[-4, 5/2]$ | $[5/2, \infty)$ |
|---|---|---|
| $-5$ | $1$ | $3$ |
| $(-5+4)(-5-\frac{5}{2})$ | $(1+4)(1-5/2)$ | $(3+4)(3-\frac{5}{2})$ |
| $(-)(-)$ | $(+)\ (-)$ | $(+)\ (+)$ |
| $\oplus$ | $\ominus$ | $\oplus$ |

The solution is $[-4, 5/2]$

On the calculator:

Graph $f(x) = 2x^2 + 3x - 20$




| Equation | Inequality |
|---|---|
| $2x^2+3x-20=0$ | $2x^2+3x-20 \le 0$ |
| Solutions: x-int = zeros | Solution |
| $-4$ & $5/2$ | $[-4, 5/2]$ |
| 2 specific points | range of values. |

what is the difference between solution(s) of an equation and solution of an inequality?

$y$ $f(x) = 2x^2+3x-20 \le 0$ −

negative y-values

parts of the parabola that are below the x-axis

the 2 patterns

$a>0$ $\quad$ $a<0$