

Quiz8, MAT1375 Professor Chiu

ID: _____

Name: _____

- This quiz consists of one question for a total of 10 points.
- You have 15 minutes to complete the quiz.
- Show all your work and justify your answer.
- Wishing you success.

1. Use the 3-step strategy to solve for x :

$$x^3 - 2x^2 - 5x + 6 \geq 0.$$

(Hint: you can find a root of $x^3 - 2x^2 - 5x + 6$ from $x = \pm 1, \pm 2, \pm 3, \pm 6$)

① $f(x) = x^3 - 2x^2 - 5x + 6$

solve $x^3 - 2x^2 - 5x + 6 = 0$

$f(1) = 1^3 - 2 \cdot 1^2 - 5 \cdot 1 + 6 = 0 \Rightarrow x=1$ is a root/zero/solution

$\Rightarrow (x-1)$ is a factor of $f(x)$

$$\begin{array}{r} x^2 - x - 6 \\ x-1 \overline{) x^3 - 2x^2 - 5x + 6} \\ \underline{-(x^3 - x^2)} \\ -x^2 - 5x \\ \underline{-(-x^2 + x)} \\ -6x + 6 \\ \underline{-(-6x + 6)} \\ 0 \end{array}$$

$\Rightarrow f(x) = (x-1)(x^2 - x - 6)$
 $= (x-1)(x+2)(x-3)$

$x^2 - x - 6$
 $x \quad \quad \quad +2$
 $x \quad \quad \quad -3$
 $\rightarrow 3x + 2x = 5x$

$\Rightarrow f(x) = 0$ implies

$(x-1)(x+2)(x-3) = 0$

$x-1=0$ or $x+2=0$ or $x-3=0$

$x=1$ or $x=-2$ or $x=3$

② Number line

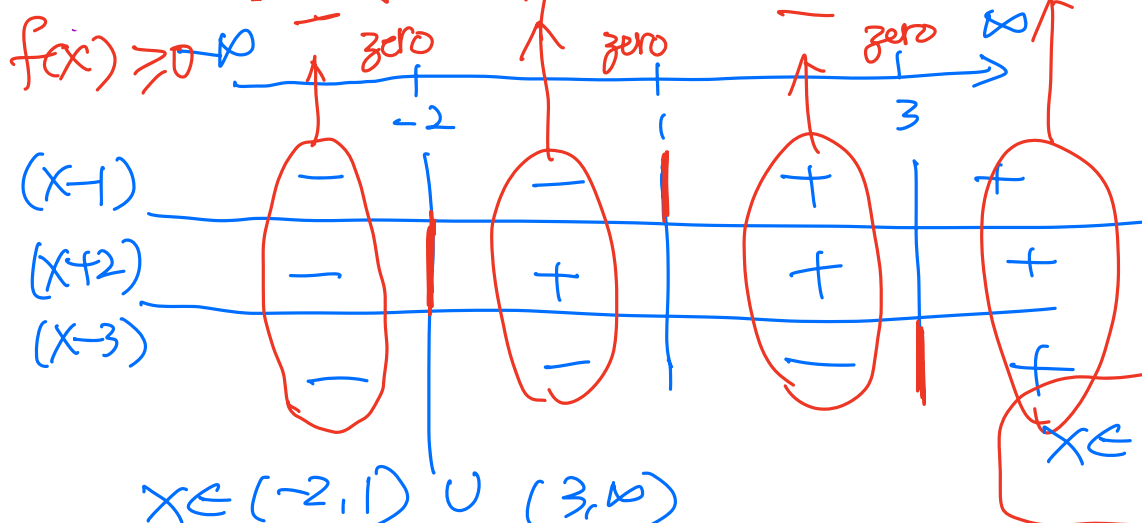
~~$x \in (-\infty, -2)$~~ ~~$x \in (-2, 1)$~~ ~~$x \in (1, 3)$~~ $x \in (3, \infty)$

③ check end point

$f(-2) = 0$ included

$f(1) = 0$ included

$f(3) = 0$ included



$x \in [-2, 1] \cup [3, \infty)$