

#35

$$x^3 + 7x^2 - x < 7$$

move ~~the~~ everything to the left side:

$$x^3 + 7x^2 - x - 7 < 0$$

find the boundary points:

$$x^3 + 7x^2 - x - 7 = 0$$

$$\text{GCF} = x^2 \quad \text{GCF} = -1$$

$$x^2(x+7) - 1(x+7) = 0$$

$$(x+7)(x^2-1) = 0$$

$$(x+7) = 0$$

$$\text{or } x^2 - 1 = 0$$

$$x = -7$$

$$x^2 = 1$$

$$x = \pm 1$$



boundary points will be excluded because of strict inequality <

pick test values : -8, -2, 0, and 2 :

$$\begin{aligned} \bullet f(-8) &= (-8)^3 + 7(-8)^2 - (-8) - 7 = \\ &= -512 + 56 + 8 - 7 < 0 \end{aligned}$$

$$\begin{aligned} \bullet f(-2) &= (-2)^3 + 7(-2)^2 - (-2) - 7 = \\ &= -8 + 28 + 2 - 7 > 0 \end{aligned}$$

$$\bullet f(0) = 0^3 + 7 \cdot 0^2 - 0 - 7 < 0$$

$$\bullet f(2) = 2^3 + 7 \cdot 2^2 - 2 - 7 = 8 + 28 - 2 - 7 > 0$$

Answer: $(-\infty, -7) \cup (-1, 1)$