

Homework 4.5: Fundamental Theorem

Name: _____

Math 3

Directions: For each, factor and solve for the intercepts. Then, state the end behavior and sketch the graph.

1. Equation: $f(x) = -x(x - 2)(x - 4)$

Intercepts:

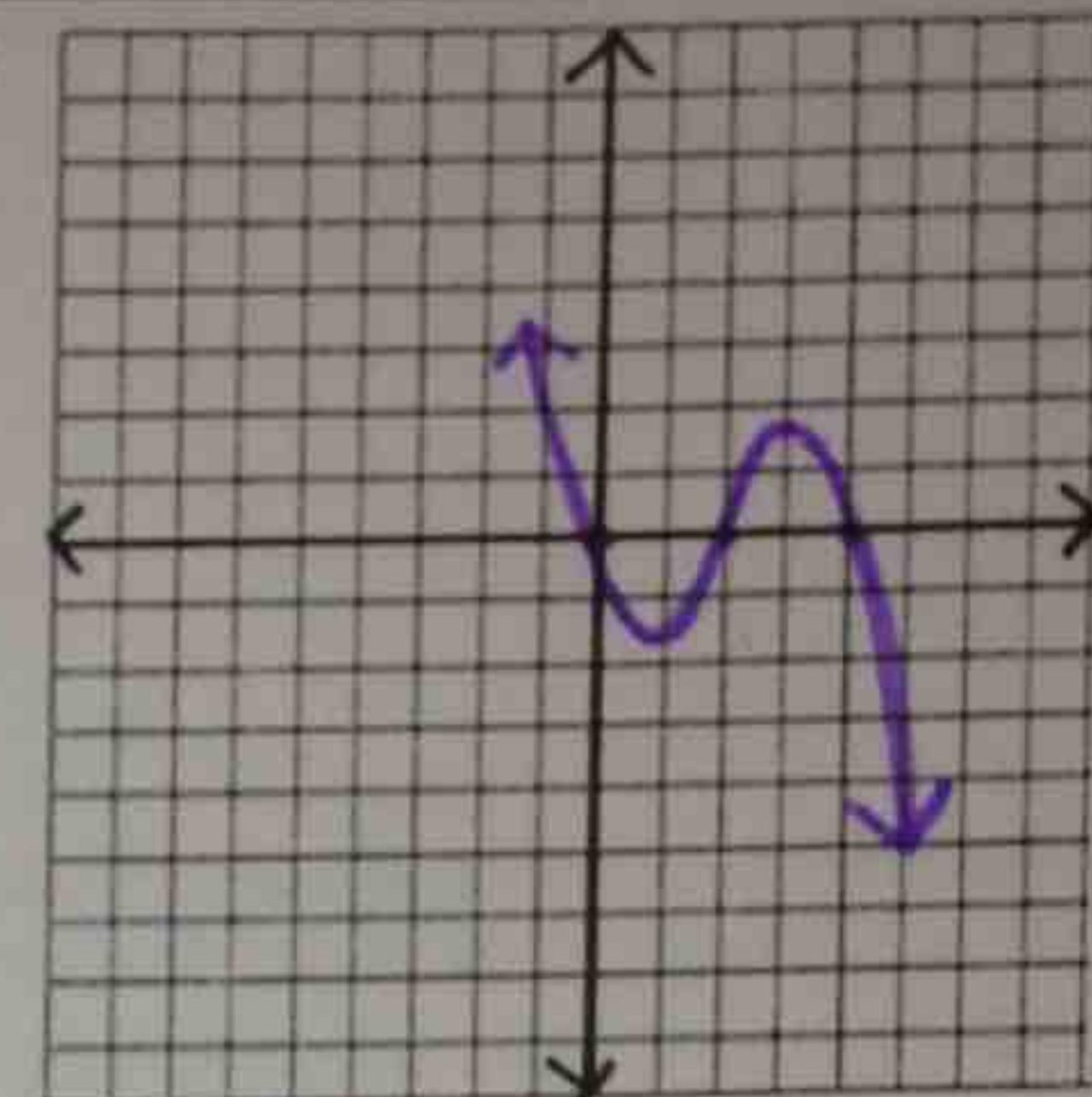
$$x=0 \quad x=2 \quad x=4$$

cubic ↗ ↘

End Behavior:

$$\begin{aligned} \text{as } x \rightarrow -\infty, \quad f(x) &\rightarrow \underline{\underline{\infty}} \\ \text{as } x \rightarrow \infty, \quad f(x) &\rightarrow \underline{-\infty} \end{aligned}$$

Graph:



2. Equation: $g(x) = x(x^2 + 4x + 4)$

Intercepts:

$$x(x+2)(x+2)$$

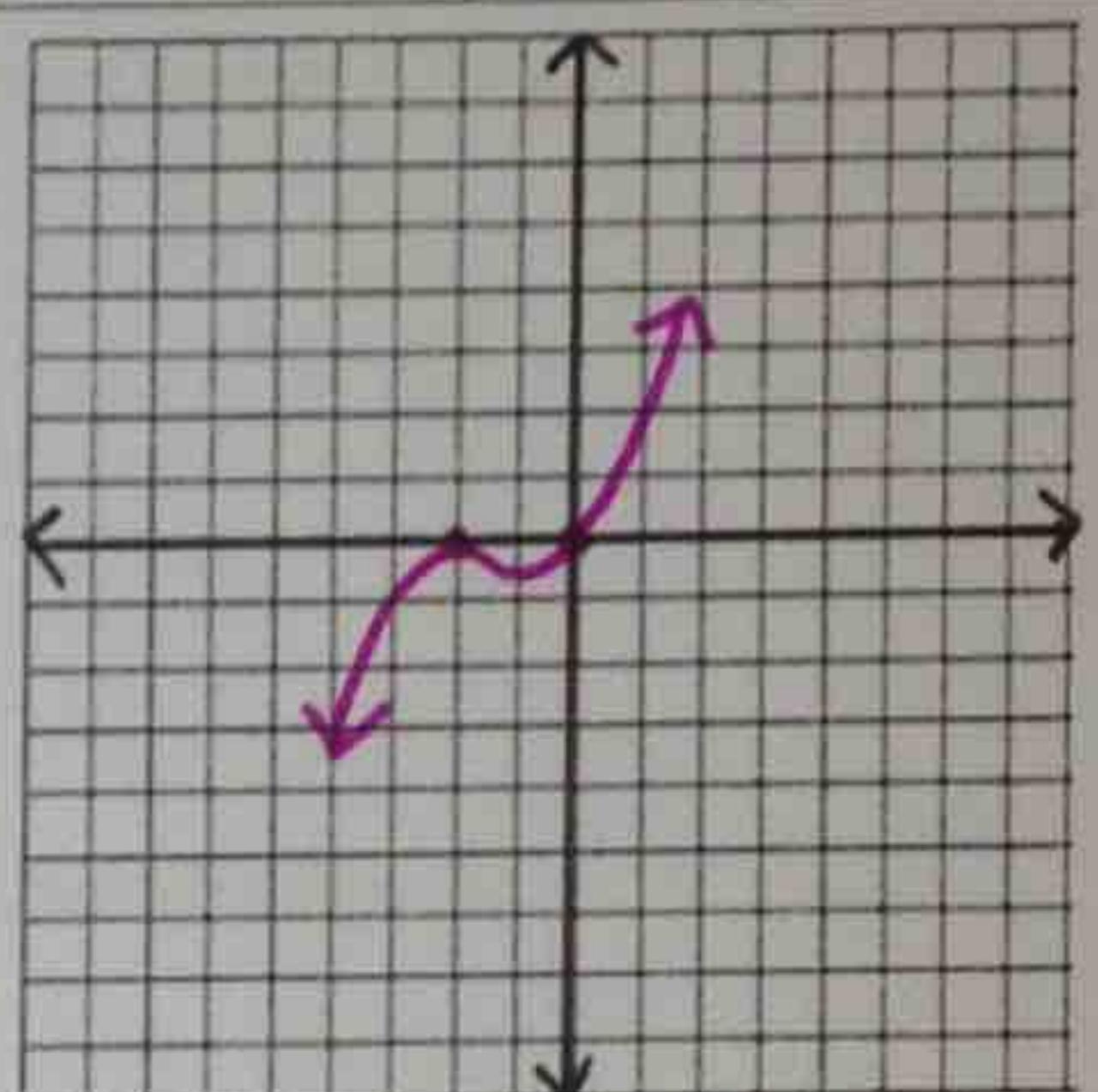
$$x=0 \quad x=-2 \quad (\text{M: } 2)$$

cubic ↗ ↘

End Behavior:

$$\begin{aligned} \text{as } x \rightarrow -\infty, \quad f(x) &\rightarrow \underline{-\infty} \\ \text{as } x \rightarrow \infty, \quad f(x) &\rightarrow \underline{\infty} \end{aligned}$$

Graph:



3. Equation: $y = x^3 - x^2$

Intercepts:

$$x^2(x-1)$$

$$x=0 \quad x=1$$

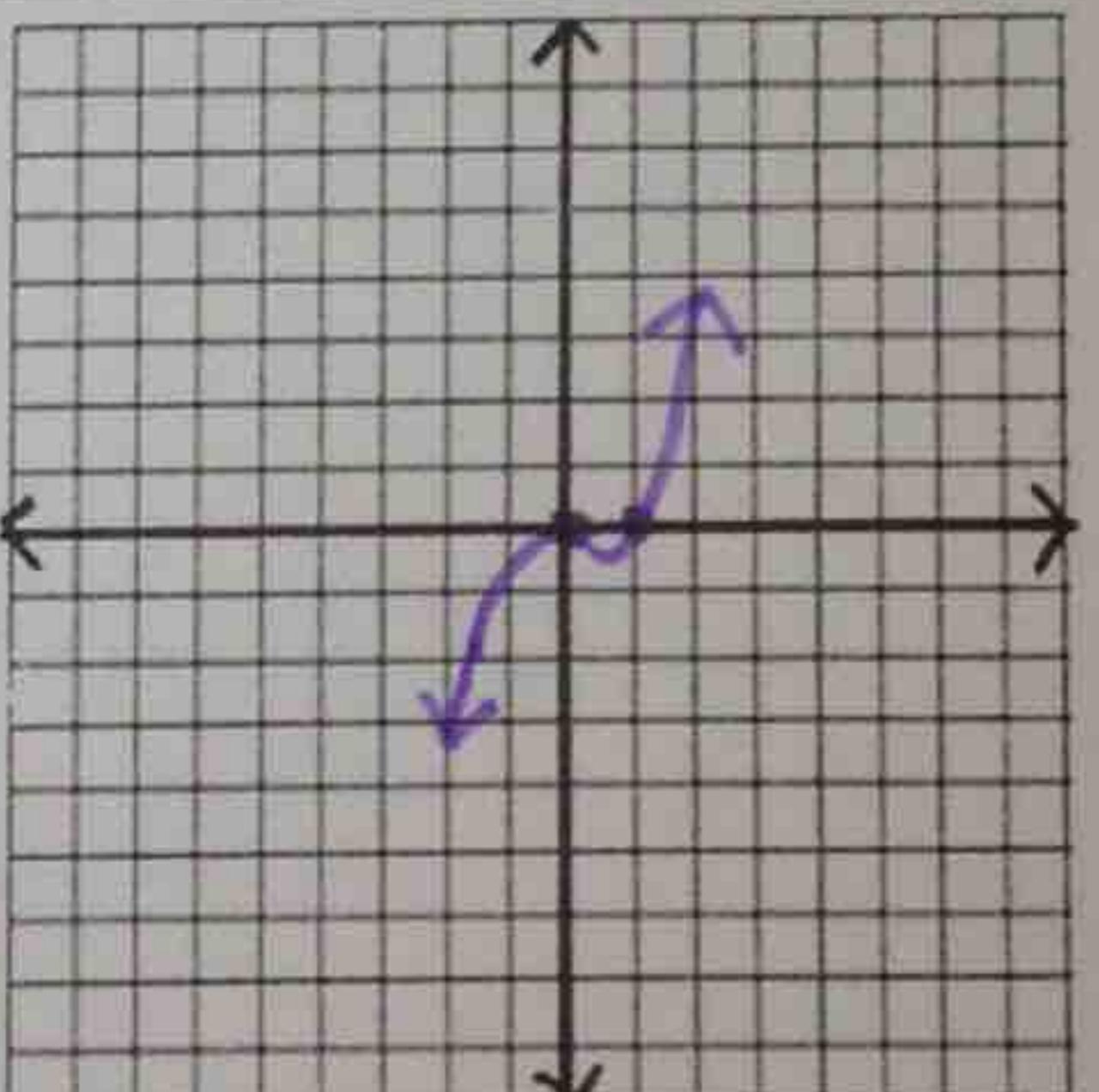
$$(\text{M: } 2)$$

cubic ↗ ↘

End Behavior:

$$\begin{aligned} \text{as } x \rightarrow -\infty, \quad f(x) &\rightarrow \underline{-\infty} \\ \text{as } x \rightarrow \infty, \quad f(x) &\rightarrow \underline{\infty} \end{aligned}$$

Graph:



4. Equation: $h(x) = x^3 - 2x^2 - 3x$

Intercepts:

$$x(x^2 - 2x - 3)$$

$$x(x-3)(x+1)$$

$$x=0 \quad x=3 \quad x=-1$$

cubic ↗ ↘

End Behavior:

$$\begin{aligned} \text{as } x \rightarrow -\infty, \quad f(x) &\rightarrow \underline{-\infty} \\ \text{as } x \rightarrow \infty, \quad f(x) &\rightarrow \underline{\infty} \end{aligned}$$

Graph:

