Assignment-5

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1

$$
\begin{aligned}
f(x) &= -5x^2 + 5x \\
f^*(y) &= \sup_{x\in\mathbb{R}} (yx - f(x)) \\
&= \sup_{x\in\mathbb{R}} (yx + 5x^2 - 5x) \\
&= +\infty,\ (x \to +\infty)
\end{aligned}
$$

Can't plot.

2

$$
\begin{aligned}
\because \frac{b-x}{b-a} + \frac{x-a}{b-a} &= 1,\ f \text{ is convex} \\
\therefore f(x) &\le \frac{b-x}{b-a} f(a) + \frac{x-a}{b-a} f(b),\ \text{(by definition)}
\end{aligned}
$$

3

4