

## Homework #12

1. A function  $f$  is said to be convex if  $f''(x) \geq 0$  for all  $x$  in its domain. Which of the following functions are convex?
- $f(x) = x^2$
  - $f(x) = x^3$
  - $f(x) = \ln(x)$
  - $f(x) = e^x$

2. The function  $f(x) = x^3 - 3x^2 + 2x$  has a local minimum at  $x = 1$  and a local maximum at  $x = 2$ .

- True
- False

3. A function  $f$  is said to be concave if  $f''(x) \leq 0$  for all  $x$  in its domain. Which of the following functions are concave?

4. The function  $f(x) = x^3 - 3x^2 + 2x$  has a local minimum at  $x = 1$  and a local maximum at  $x = 2$ .

5. A function  $f$  is said to be convex if  $f''(x) \geq 0$  for all  $x$  in its domain. Which of the following functions are convex?

- $f(x) = x^2$
- $f(x) = x^3$
- $f(x) = \ln(x)$
- $f(x) = e^x$

6. The function  $f(x) = x^3 - 3x^2 + 2x$  has a local minimum at  $x = 1$  and a local maximum at  $x = 2$ . Which of the following functions are convex?