Objective: Use the derivative of f(x) to sketch the extrema of f(x).

- *PROBLEM 1 :* Do detailed graphing for $f(x) = x^3 - 3x^2$.

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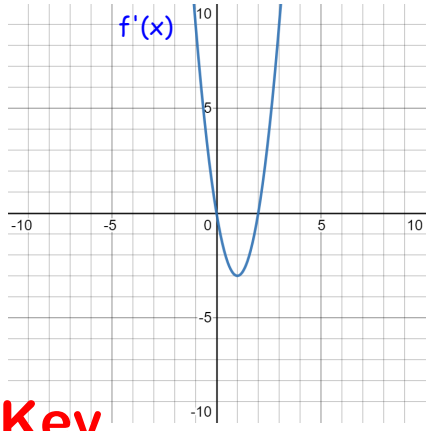
Key Key

- *PROBLEM 1 :* Do detailed graphing for $f(x) = x^3 - 3x^2$.



f'(x) = $3x^2 - 6x$

f'(x) = 0 @ x = 0 and x = 2

x = 0 is a maximum, because the derivative function is positive on the left and negative on the right.

x = 2 is a minimum, because the derivative function is negative on the left and positive on the right.

Key Key

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Objective: Use the derivative of f(x) to sketch the extrema of f(x).

- *PROBLEM 2 :* Do detailed graphing for $f(x) = x^4 - 4x^3$.

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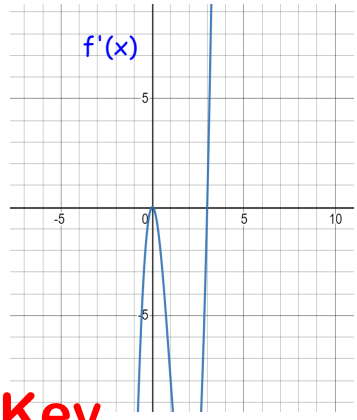
Key Key

- *PROBLEM 2 :* Do detailed graphing for $f(x) = x^4 - 4x^3$.



Key

$f'(x) = 4x^3 - 12x^2$

$f'(x) = 0$ @ $x = 0$ and $x = 3$

$x = 0$ is a plateau, because the derivative function is negative on both sides of the root.

$x = 3$ is a minimum, because the derivative function is negative on the left and positive on the right.

Key

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Objective: Use the derivative of f(x) to sketch the extrema of f(x).

- *PROBLEM 3 :* Do detailed graphing for $f(x) = x^3 (x-2)^2$.

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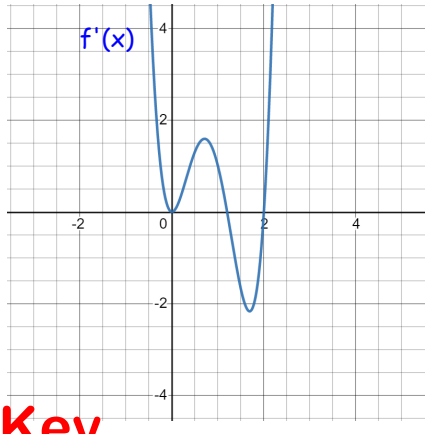
Key Key

- *PROBLEM 3 :* Do detailed graphing for $f(x) = x^3 (x-2)^2$.



Key

$f'(x) = 5x^4 - 16x^3 + 12x^2$

$f'(x) = 0$ @ $x = 0$ and $x = 6/5$ and $x = 2$

$x = 0$ is a plateau, because the derivative function is negative on both sides of the root.

$x = 6/5$ is a maximum, because the derivative function is positive on the left and negative on the right.

$x = 2$ is a minimum, because the derivative function is negative on the left and positive on the right.

Key

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Objective: Use the derivative of f(x) to sketch the extrema of f(x).

$f(x) = x^3-3x^2-13x+15$

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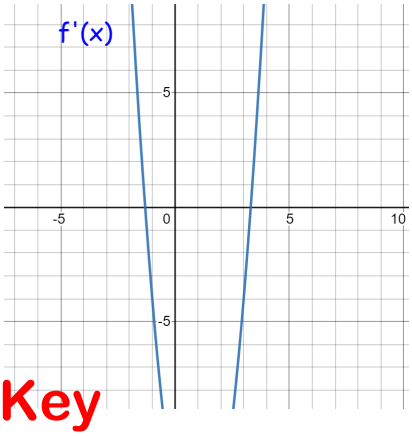
Key Key

$f(x) = x^3-3x^2-13x+15$



Key

$f'(x) = 3x^2 - 6x$

$f'(x) = 0$ @ $x \approx -1.309$ and $x \approx 3.309$

$x = -1.309$ is a maximum, because the derivative function is positive on the left and negative on the right.

$x = 3.309$ is a minimum, because the derivative function is negative on the left and positive on the right.

Key

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