Name: Richard

QUIZ 7

MATH 200
September 12, 2024

1. Consider the functions $f(x) = e^x + \frac{x^3}{3}$ and $g(x) = e^x + x$. Find all x for which the tangent line to the graph of $y=f(x)$ at $(x, f(x))$ is parallel to the tangent line to the graph of $y=g(x)$ at $(x, g(x))$.

Solve $f'(x) = g'(x)$

$$e^x + x^2 = e^x + 1$$

$$x^2 = 1$$

$$x^2 - 1 = 0$$

$$(x-1)(x+1) = 0$$

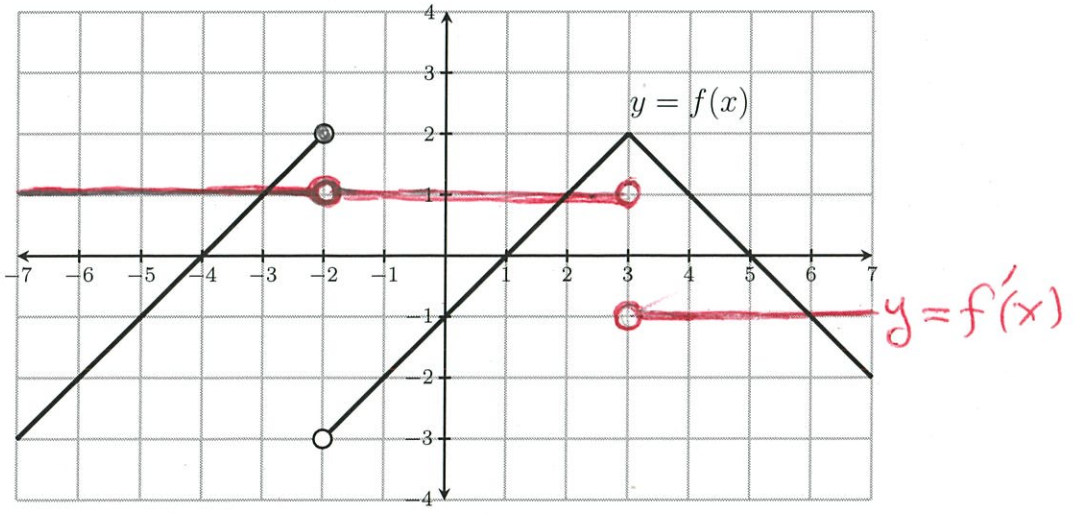
$x = -1$ $\quad$ $x = 1$

Tangents are parallel at $x = 1$ and $x = -1$.

2. The graph of a function $f(x)$ is shown below.

(a) Using the same coordinate axis, sketch the graph of its derivative $f'(x)$

(b) At which x values is $f(x)$ **not** differentiable? At $x = -2$ and 3



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QUIZ 7

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1. Consider the functions $f(x) = e^x + x^2$ and $g(x) = e^x + x$. Find all x for which the tangent line to the graph of $y=f(x)$ at $(x, f(x))$ is parallel to the tangent line to the graph of $y=g(x)$ at $(x, g(x))$.

Solve $f'(x) = g'(x)$

$$e^x + 2x = e^x + 1$$

$$2x = 1$$

$$x = \frac{1}{2}$$

Tangents are parallel at $x = 1/2$.

2. The graph of a function $f(x)$ is shown below.

(a) Using the same coordinate axis, sketch the graph of its derivative $f'(x)$

(b) At which x values is $f(x)$ **not** differentiable? At $x=-3$ and $x=2$