

10/12

4. The two parts of this problem are not related to each other.

(a) (6 points) Let $h(x) = x^3 - 3x^2 - 6x + 4$.

At what x -value(s) does the graph of $h(x)$ have a tangent line parallel to $y = 3x - 5$?

der = $3x^2 - 3(2x) - 6$
 $= 3x^2 - 6x - 6$ } power rule

tan line
Slope = 3

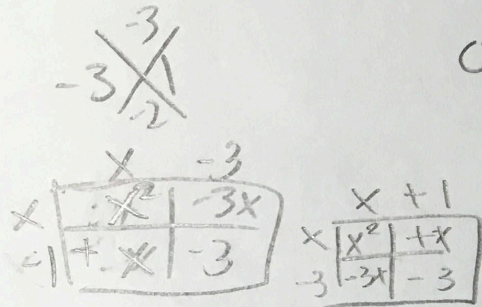
$3 = 3x^2 - 6x - 6$

$0 = 3x^2 - 6x - 9$

$0 = 3(x^2 - 2x - 3)$

$0 = 3(x+1)(x-3)$

$x = 3$ or -1



(b) (6 points) Let $g(x) = 3x^{3/2} + \frac{16}{\sqrt{x}} - 5$. $\rightarrow 3x^{3/2} + 16x^{-1/2} - 5$

Find an equation for the tangent line to the graph of $g(x)$ at $x = 4$.

① find der.

$3(\frac{3}{2}x^{\frac{3}{2}-\frac{2}{2}}) + 16(-\frac{1}{2}x^{-\frac{1}{2}-\frac{2}{2}}) - 0$
 $= \frac{9}{2}x^{\frac{1}{2}} - 8x^{-\frac{3}{2}}$ ✓
Slope of tangent line

③ $g(x) = ?$

4/6

$3\sqrt[3]{4}$

② Slope @ 4 = $\frac{9}{2} \cdot \frac{1}{\sqrt{4}} - 8 \cdot \frac{1}{\sqrt{4}^3}$

④ $y - y_1 = \frac{7}{4}(x - 4)$

$\Rightarrow (3 \cdot \frac{1}{2}) - 1$

$\frac{9}{2} \cdot \frac{1}{2} - 1$

$y - \frac{3}{2} = \frac{7}{4}x - 7$

$\Rightarrow \frac{3}{2} - 1$

$= \frac{9}{4} - \frac{2}{4}$

$y = \frac{7}{4}x - \frac{26}{4}$

$= \frac{6}{4} - \frac{4}{4}$

$= \frac{7}{4}$

$\frac{-28 + 2}{4} = \frac{-26}{4}$

$= \frac{2}{4}$

* not sure what $\frac{3}{2}$ power was \therefore
But I tried to show you my thought process!