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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 = $3x^2 - 3(2x^1) - 6$ } power rule

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

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 $-1$

-3 | 1 | -3 | 2

| | x | -3 |
|---|---|---|
| x | $x^2$ | -3x |
| +1 | +x | -3 |

| | x | +1 |
|---|---|---|
| x | $x^2$ | +x |
| -3 | -3x | -3 |

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

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

① find der.

$3\left(\frac{3}{2}x^{\frac{3}{2}-\frac{2}{2}}\right) + 16\left(-\frac{1}{2}x^{-\frac{1}{2}-\frac{2}{2}}\right) - 0$

$= \frac{9}{2}x^{\frac{1}{2}} - 8x^{-\frac{3}{2}}$

↳ slope of tan line

4 ↓

③ $g(x) = ?$

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$3\frac{1}{3\sqrt{4}}$

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

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

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

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

$= \frac{2}{4}$

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

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

$= \frac{7}{4}$

④ $y - y_1 = \frac{7}{4}(x - 4)$

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

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

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

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