


Week 5 Friday Homework (1322772)

Question 123456789101112131415161718

1. Question DetailsSCalcET6 3.1.AE.03. [1289578]

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EXAMPLE 3 Find the equations of the tangent line and normal line to the curve $f(x) = x^3 \cdot \sqrt[4]{x}$ at the point $(1, 1)$. Illustrate the curve and these lines.

SOLUTION The derivative of $f(x) = x^3 \cdot \sqrt[4]{x} = x^3 x^{1/4} = x^{\text{[]}}$ is

$$\begin{aligned} f'(x) &= \text{[]} x^{\text{[]} - 1} \\ &= \text{[]} x^{\text{[]}} \\ &= \text{[]} \sqrt[4]{\text{[]}} \end{aligned}$$

So the slope of the tangent line at $(1, 1)$ is $f'(1) = \text{[]}$. Therefore an equation of the tangent line is

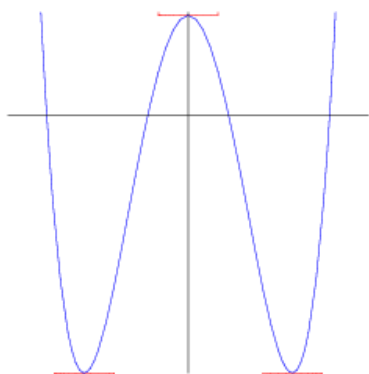
$$\begin{aligned} y - \text{[]} &= \text{[]} (x - \text{[]}) \text{ (point-slope form) or} \\ y &= \text{[]} x - \text{[]} \text{ (slope-intercept form)} \end{aligned}$$

The normal line is perpendicular to the tangent line, so its slope is the negative reciprocal of $^{13}/_4$, that is $^{-4}/_{13}$. Thus the equation of the normal line is

$$\begin{aligned} y - \text{[]} &= \text{[]} (x - \text{[]}) \text{ (point-slope form) or} \\ y &= \text{[]} x + \text{[]} \text{ (slope-intercept form)} \end{aligned}$$

We graph the curve and its tangent line and normal line in the figure to the left.

2. Question DetailsSCalcET6 3.1.AE.06. [1289608]



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EXAMPLE 6 Find the points on the curve $y = 2x^4 - 12x^2 + 5$ where the tangent line is horizontal.

SOLUTION Horizontal tangents occur where the derivative is zero. We have

$$\begin{aligned} \frac{dy}{dx} &= 2 \frac{d}{dx} (\text{[]}) - 12 \frac{d}{dx} (\text{[]}) + \frac{d}{dx} (\text{[]}) \\ &= \text{[]} x^3 - \text{[]} x \\ &= \text{[]} x(x^2 - \text{[]}) \end{aligned}$$

Thus $dy/dx = 0$ if $x = 0$ or $x^2 - 3 = 0$, that is, $x = \pm$

[] . So the given curve has horizontal tangents when $x = \text{[]}$,

[] , and [] (list in increasing order). The corresponding points

are $(\text{[]}, \text{[]})$, $(\text{[]}, \text{[]})$, and $(\text{[]}, \text{[]})$, and

$(\text{[]}, \text{[]})$, respectively. (See the figure to the left.)

3. Question DetailsSCalcET6 3.1.Tut.06. [657224]

4. Question DetailsSCalcET6 3.1.Tut.08. [656982]

5. Question DetailsSCalcET6 3.1.011. [1289755]
Differentiate the following function.

$$y = x^{-4/5}$$

$$y' = \boxed{}$$

6. Question DetailsSCalcET6 3.1.014. [1289107]
Differentiate the following function.

$$R(t) = 3t^{-2/3}$$

$$R'(t) = \boxed{}$$

7. Question DetailsSCalcET6 3.1.016. [1288597]
Differentiate the following function.

$$B(y) = cy^{-2}$$

$$B'(y) = \boxed{}$$

8. Question DetailsSCalcET6 3.1.017. [1289847]
Differentiate the function.

$$G(x) = 7\sqrt{x} - 8e^x$$

$$G'(x) = \boxed{}$$

9. Question DetailsSCalcET6 3.1.018. [1289598]
Differentiate the following function.

$$y = \sqrt[3]{x}$$

$$y' = \boxed{}$$

10. Question DetailsSCalcET6 3.1.020. [1289033]
Differentiate the following function.

$$f(t) = 6\sqrt{t} - \left(\frac{2}{\sqrt{t}}\right)$$

$$f'(t) = \boxed{}$$

11. Question DetailsSCalcET6 3.1.021. [1289386]
Differentiate the following function.

$$y = ax^2 + qx + r$$

$$y' = \boxed{}$$

12. Question DetailsSCalcET6 3.1.023.MI. [1387460]
Differentiate the following function.

$$y = \frac{2x^2 + 8x + 8}{\sqrt{x}}$$

$$y' = \boxed{} \quad \text{Tutorial}$$

13. Question DetailsSCalcET6 3.1.024. [1289737]
Differentiate the following function.

$$y = \frac{7x^2 + 4\sqrt{x}}{9x}$$

$$y' = \boxed{}$$

14. Question DetailsSCalcET6 3.1.025. [1289679]
Differentiate the following function.

$$f(x) = 3\pi^5$$

$$f'(x) = \boxed{}$$

15. Question DetailsSCalcET6 3.1.032. [1289524]

Differentiate the following function.

$$y = e^{x+3} + 3$$

$$y' = \boxed{}$$

16. Question DetailsSCalcET6 3.1.034. [1288857]

Find an equation of the tangent line to the curve at the given point.

$$3x^4 + 2x^2 - x, \quad (1, 4)$$

$$y = \boxed{}$$

17. Question DetailsSCalcET6 3.1.038.MI. [1387876]

Find the equation of the tangent line to the following curve at the given point P . Illustrate by graphing the curve and the tangent line on the same screen.

$$y = 5x - \sqrt{x}$$

$$P = (4, 18)$$

$$y = \boxed{} \quad \text{Tutorial}$$

18. Question DetailsSCalcET6 3.1.045. [1288571]

Find the first and second derivatives of the following function.

$$f(x) = 5x^4 - 7x^3 + 8x$$

$$f'(x) = \boxed{}$$

$$f''(x) = \boxed{}$$

Assignment Details

Name (AD): **Week 5 Friday Homework (1322772)**

Submissions Allowed: **5**

Category: **Homework**

Code:

Locked: **No**

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