

25.02.2010г.

**Закрепление темы
«Правила дифференцирования»**

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Проверка домашней работы

№ 210 а

$$y = \frac{1+2x}{3-5x},$$

$$y' = \frac{(1+2x)'(3-5x) - (1+2x)(3-5x)'}{(3-5x)^2} = \frac{2 \cdot (3-5x) - (1+2x) \cdot (-5)}{(3-5x)^2} = \frac{6-10x+5+10x}{(3-5x)^2} = \frac{11}{(3-5x)^2}$$

№ 211 а, б, в

$$6) y = \frac{x}{3} - \frac{4}{7} + \sqrt{x}$$

$$в) y = x^8 - 3x^4 - 4x^5 + 2x - 1,$$

$$y' = \left(\frac{x^8}{3} - 4x^4 + \sqrt{x} \right)' + \left(\frac{1}{3}x^8 - (4 \cdot 3x^4) \right)' + \left(\frac{1}{x^2} \right)' + \left(\frac{1}{7} \right)' - 48x^7 - 2 \cdot 4x^3 - x^{-\frac{1}{2}} = \frac{8x^7}{3} - 12x^3 - \frac{1}{2}x^{-\frac{3}{2}} = \frac{8x^7}{3} - 12x^3 - \frac{1}{2x^{\frac{3}{2}}}$$

$$y' = \left(x^7 - 4x^5 + 2x - 1 \right)' = \left(x^7 \right)' - \left(4x^5 \right)' + \left(2x \right)' - \left(1 \right)' =$$

$$= \frac{2x^3 \sqrt{x} + 48\sqrt{x} + 3x^3}{6x^3 \sqrt{x}} = \frac{2x^3 + 3x^2 \sqrt{x} + 48}{6x^3};$$

Решение упражнений

№ 213 в,г

№ 214 б,в

Самостоятельная работа

1 группа

$$1) y = x^2 + \sqrt[3]{x^2}$$

$$2) y = \frac{x^2 - 3x + 1}{x^2 + x + 1}$$

$$3) y = \left(x + \frac{1}{\sqrt{x}} \right) (x^2 - 3x - 8)$$

2 группа

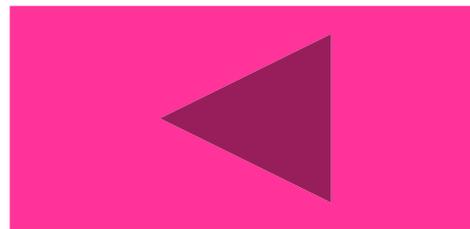
$$1) y = \frac{x + \sqrt{x}}{x - \sqrt{x}}$$

$$2) y = \left(x + \frac{1}{x} + \frac{1}{x^2} \right) (x^2 + x + 1)$$

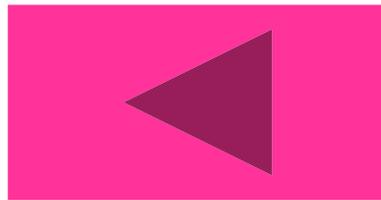
$$3) y = x^3 + \sqrt[3]{x^5}$$



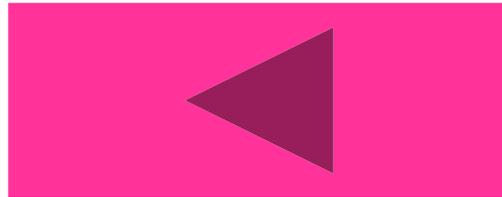
$$1) y' = \left(x^2 + \sqrt[3]{x^2} \right)' = 2x + \frac{2}{3} x^{-\frac{1}{3}} = 2x + \frac{2}{3\sqrt[3]{x}}$$



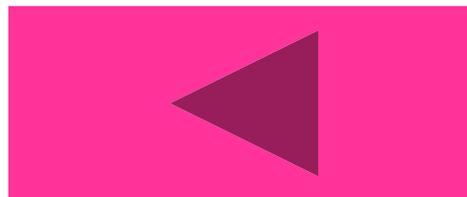
$$\begin{aligned} 2) y' &= \left(\frac{x^2 - 3x + 1}{x^2 + x + 1} \right)' = \frac{(x^2 - 3x + 1)'(x^2 + x + 1) - (x^2 - 3x + 1)(x^2 + x + 1)'}{(x^2 + x + 1)^2} = \\ &= \frac{(2x - 3)(x^2 + x + 1) - (x^2 - 3x + 1)(2x + 1)}{(x^2 + x + 1)^2} = \frac{2x^3 + 2x^2 + 2x - 3x^2 - 3x - 3 - 2x^3 - x^2 + 6x^2 + 3x - 2x - 1}{(x^2 + x + 1)^2} = \\ &= \frac{4x^2 - 4}{(x^2 + x + 1)^2} \end{aligned}$$



$$\begin{aligned} 3) y' &= \left(\left(x + \frac{1}{\sqrt{x}} \right) (x^2 - 3x - 8) \right)' = \left(x + \frac{1}{\sqrt{x}} \right)' (x^2 - 3x - 8) + \left(x + \frac{1}{\sqrt{x}} \right) (x^2 - 3x - 8)' = \\ &= \left(1 - \frac{1}{2x\sqrt{x}} \right) (x^2 - 3x - 8) + \left(x + \frac{1}{\sqrt{x}} \right) (2x - 3) = x^2 - 3x - 8 - \frac{1}{2} \sqrt{x} + \frac{3}{2\sqrt{x}} + \frac{4}{x\sqrt{x}} + 2x^2 - 3x + 2\sqrt{x} - \frac{3}{\sqrt{x}} = \\ &= 3x^2 - 6x - 8 + \frac{3\sqrt{x}}{2} - \frac{3}{2\sqrt{x}} + \frac{4}{x\sqrt{x}}. \end{aligned}$$



$$\begin{aligned} 1) y' &= \left(\frac{x + \sqrt{x}}{x - \sqrt{x}} \right)' = \frac{(x + \sqrt{x})'(x - \sqrt{x}) - (x + \sqrt{x})(x - \sqrt{x})'}{(x - \sqrt{x})^2} = \frac{\left(1 + \frac{1}{2\sqrt{x}}\right)(x - \sqrt{x}) - (x + \sqrt{x})\left(1 - \frac{1}{2\sqrt{x}}\right)}{(x - \sqrt{x})^2} = \\ &= \frac{x - \sqrt{x} + \frac{1}{2}\sqrt{x} - \frac{1}{2} - x - \frac{1}{2}\sqrt{x} - \sqrt{x} + \frac{1}{2}}{(x - \sqrt{x})^2} = \frac{-2\sqrt{x}}{(x - \sqrt{x})^2} = -\frac{2\sqrt{x}}{(x - \sqrt{x})^2} \end{aligned}$$



$$\begin{aligned}
2)y' &= \left(\left(x + \frac{1}{x} + \frac{1}{x^2} \right) (x^2 + x + 1) \right)' = \left(x + \frac{1}{x} + \frac{1}{x^2} \right)' (x^2 + x + 1) + \\
&+ \left(x + \frac{1}{x} + \frac{1}{x^2} \right) (x^2 + x + 1)' = \\
&= \left(1 - \frac{1}{x^2} - \frac{2}{x^3} \right) (x^2 + x + 1) + \left(x + \frac{1}{x} + \frac{1}{x^2} \right) (2x + 1) = \\
&= x^2 + x + 1 - 1 - \frac{1}{x} - \frac{1}{x^2} - \frac{2}{x} - \frac{2}{x^2} - \frac{2}{x^3} + 2x^2 + x + 2 + \frac{1}{x} + \frac{2}{x} + \frac{1}{x^2} = \\
&= 3x^2 + 2x + 2 - \frac{2}{x^2} - \frac{2}{x^3}.
\end{aligned}$$



$$3) y' = \left(x^3 + \sqrt[3]{x^5} \right)' = 3x^2 + \frac{5}{3\sqrt[3]{x^2}}$$



Дома

№ 213 а,б

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