**КЛЮЧИ:**

Вариант 1

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| **№1**1. *f `(x) = 3x2 ,*
2. *f `(x) = -2cos x ,*
3. *f `(x) = -35x6 ,*
4. *f `(x) = 2 ,*
5. *f `(x) = -*$ \frac{1}{sin^{2 }x}$ *,*
6. *f `(x) = -7x-8 .*
 | **№2**1. *f `(x) = 3x2 + 2x ,*
2. *f `(x) = 15x2 + 2x ,*
3. *f `(x) = - 4sin x - 6x ,*
4. *f `(x) = 3x2 + 4x -* $\frac{1}{x^{2}}$ *,*
5. *f `(x) = 12x5 -* $\frac{1}{2\sqrt{x}}$
 |

**№3**

1. *f `(x) = (5х-1)`(4x+1) + (5x -1)(4x + 1)`= 5(4x+1) + 4(5x -1) =*

*= 20x + 5 +20x -4 = 40x + 1*

1. *f `(x) = (х2)`(3x + x3) + х2( 3x + x3)`= 2x(3x + x3) + х2 (3 +3 x2)=*

*= 6x2 + 2x4 + 3x2 + 3x4 = 9x2 + 5x4*

1. *f `(x) = (*$\sqrt{x}$*)`(x2+1) +* $\sqrt{x}$ *(x2+1)`=* $ \frac{1}{2\sqrt{x}}$ *(x2+1) +* $\sqrt{x}$ *•2x =* $\frac{x^{2 }+ 1}{2\sqrt{x}}$ *+ 2x*$\sqrt{x}$*=*

 *=* $\frac{3x^{2 }+ 1}{2\sqrt{x}}$

**№ 4**

1. *f `(x) =* $\frac{(x^{2}- 1)`\left(x^{2}+1\right)-\left(x^{2}- 1\right)\left(x^{2}+1\right)` }{(x^{2}+1)^{2}}$*=* $\frac{2x\left(x^{2}+1\right)-2x\left(x^{2}- 1\right) }{(x^{2}+1)^{2}}$ *=*

*=* $\frac{2x^{3}+ 2x-2x^{3}+2x}{(x^{2}+1)^{2}}$ *=* $\frac{ 4x}{(x^{2}+1)^{2}}$

1. *f `(x) =* $\frac{(5-2x^{6})`(1-x^{3})-\left(5-2x^{6}\right)\left(1-x^{3}\right)` }{(1-x^{3})^{2}}$ *=*$\frac{-12x^{5}(1-x^{3})-\left(5-2x^{6}\right)\left(-3x^{2}\right) }{(1-x^{3})^{2}}$ *=*

= $\frac{-12x^{5}+ 12x^{8}+ 15x^{2 }-6x^{8} }{(1-x^{3})^{2}}$ *=* $\frac{6x^{8}-12x^{5}+ 15x^{2 }}{(1-x^{3})^{2}}$

**№5**

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| *f `(x) = 3x2 + 8x – 3**f `(x) = 0, если 3x2 + 8x – 3 = 0**D = 82 - 4•3•(-3) = 64+36 =100**x =*$\frac{-8\pm 10}{6}$ *;**x1 = -3, x2 =* $\frac{1}{3}$ *.**Ответ: -3;* $\frac{1}{3}$*,*  | *f `(x) =2х – 3**f `(x) > 0, если 2х – 3> 0,* *2х > 3,* *х >1,5.**Ответ: (1,5; +∞)* |

Вариант 2

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| **№1**1. *f `(x) = 4x3 ,*
2. *f `= - 3sin x ,*
3. *f `(x) = - 18x5 ,*
4. *f `(x) = -5 ,*
5. *f `(x) = -*$ \frac{1}{cos^{2 }x}$ *,*
6. *f `(x) = -6x-7*
 | **№2**1. *f `(x) = 2x - 4x3*
2. *f `(x) = 12x3 + 3x2*
3. *f `(x) = 2cos x + 15x2*
4. *f `(x) = 4x3 + 4 -* $\frac{1}{x^{2}}$
5. *f `(x) = 9x2 -* $\frac{1}{2\sqrt{x}}$
 |

**№3**

1. *f `(x) = (3х +2)`(4x - 1) + (3x + 2)(4x - 1)`= 3(4x - 1) + 4(3x + 2) =*

*= 12x – 3 +12x + 8 = 24x + 5*

1. *f `(x) = (2х)`(1 - x3) + 2x(1 - x3)`= 2(1 - x3) + 2x (-3 x2)= 2 – 2x3 – 6x3 =*

*= 2 – 8x3*

1. *f `(x) = (*$\sqrt{x}$*)`(*$ \sqrt{x}$*+ 3) +* $\sqrt{x}$ *(*$\sqrt{x} $*+ 3)`=* $ \frac{1}{2\sqrt{x}}$ *(*$\sqrt{x}$*+3) +* $\sqrt{x}$ *•* $\frac{1}{2\sqrt{x}}$ *=*

*=* $\frac{1}{2}$ *+* $\frac{3}{2\sqrt{x}}$ *+* $\frac{1}{2}$ *=* $\frac{3}{2\sqrt{x}}$ *+ 1*

**№ 4**

1. *f `(x) =* $\frac{(x^{2}+ 2)`\left(x^{2}- 1\right)-\left(x^{2}+2\right)\left(x^{2}- 1\right)` }{(x^{2} - 1)^{2}}$*=* $\frac{2x\left(x^{2}- 1\right)-2x\left(x^{2}+ 2\right) }{(x^{2}- 1)^{2}}$ *=*

*=* $\frac{2x^{3}- 2x-2x^{3}- 4x}{(x^{2}- 1)^{2}}$ *=* $\frac{-6x}{(x^{2}- 1)^{2}}$

1. *f `(x) =* $\frac{(4 -8x^{3})`(8x-1)-\left(4 -8x^{3}\right)\left(8x-1\right)` }{(8x-1)^{2}}$ *=*$\frac{-24x^{2}\left(8x-1\right)- 8\left(4 -8x^{3}\right) }{(8x-1)^{2}}$ *=*

= $\frac{-192x^{3}+ 24x^{2}- 32+ 64x^{3} }{(8x-1)^{2}}$ *=* $\frac{24x^{2}- 128x^{3}- 32 }{64x^{2}-16x+1 }$

**№5**

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| *f `(x) = 6x2 - 18x + 12**f `(x) = 0, если 6x2 - 18x + 12= 0,* *x2 - 3x + 2= 0.**D = 32 - 4•1•2 = 9 - 8 =1**x =*$\frac{3\pm 1}{2}$ *;**x1 = 1, x2 =* $2$ *.**Ответ: 1; 2.*  | *f `(x) =2х +3**f `(x) > 0, если 2х +3> 0,* *2х > -3,* *х >-1,5.**Ответ: (- 1,5; +∞)* |