Basic Derivative Rules Competition

One Point Questions:

1. $y = \sqrt[5]{x^2}$, find y'

2. $y = x^4 - 3x^3 + 10x - 7$, find y''

3. Find the equation of the tangent line to the function $f(x) = x^2 - 7x$ at x = 1

4. $f(x) = \sqrt{x} - \frac{1}{\sqrt{x}}$ Find $f'(x)$

5. $f(x) = (x-3)(5x^2+6)$ Find $f'(x)$

6. $f(x) = \frac{2x-1}{3x+2}$ Find $f'(x)$ (simplify)

7. $f(x) = 10x^2 - 20x^{-3}$ Find $f'(x)$

8. Given $f(2) = 5$, $f'(2) = -4$, $g(2) = 3$, $g'(2) = -1$

If $h(x) = f(x) \bullet g(x)$, find $h'(2)$.

Two Point Questions:

9. $y = (x^3 - 5x^2 + 3)(3x^2 - 5)$

Find $\frac{dy}{dx}$ in simplified form

10. $f(x) = 8x^2 - \frac{5}{x}$

Find $f''(x)$ (the second derivative of $f(x)$)

11. $y = \frac{2x}{x^2 - 3x + 5}$, find y'

12. Given $f(3) = 1$, $f'(3) = 2$, $g(3) = -4$, $g'(3) = -1$

If $h(x) = \frac{f(x) + 2x}{g(x)}$, find $h'(3)$.

Answers:

1. $y' = \frac{2}{5} x^{\frac{-3}{5}}$

2. $y'' = 12x^2 - 18x$

3. $y + 6 = -5(x-1)$ or $y = -5x - 1$

4. $f'(x) = \frac{1}{2} x^{\frac{-1}{2}} + \frac{1}{2} x^{\frac{-3}{2}}$ or $\frac{1}{2\sqrt{x}} + \frac{1}{2\sqrt{x^3}}$

5. $f'(x) = 15x^2 - 30x + 6$

6. $f'(x) = \frac{7}{(3x+2)^2}$

7. $f'(x) = 20x + 60x^{-4}$

8. $h'(2) = -17$

9. $\frac{dy}{dx} = 15x^4 - 60x^3 - 15x^2 + 68x$

10. $f''(x) = 16 - 10x^{-3}$

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

12. $\frac{-9}{16}$

13. $y = \dfrac{2x^3 - 5x^2 + 3x - 7}{x^2}$, find y'

14. $f(x) = (x^2)(x^3 - 6x^2 + 8x - 5)$
Find $f'(x)$

<u>Three Point Questions:</u>

15. $f(x) = x^2 - \sqrt[3]{x}$ Find $f'(8)$

16. $f(x) = \dfrac{x^2}{x^3 + 4x + 1}$

Find $f'(x)$ in simplified form

17. Find the equation of the tangent line to the function

$f(x) = 4\sqrt{x} - 3x$ at x = 4

13. $y' = 2 - 3x^{-2} + 14x^{-3}$
or $y' = 2 - \dfrac{3}{x^2} + \dfrac{14}{x^3}$

14. $f'(x) = 5x^4 - 24x^3 + 24x^2 - 10x$

15. $16 - \dfrac{1}{12}$ or $\dfrac{191}{12}$ or 15.917

16. $f'(x) = \dfrac{-x^4 + 4x^2 + 2x}{(x^3 + 4x + 1)^2}$

17. $y + 4 = -2(x - 4)$