

1. (1) $y' = 1$
(2) $y' = 16x + 7$
(3) $y' = 8x + \frac{25}{x^6}$
(4) $y' = -7 \cos x + \sin x$
(5) $y' = 6e^x$
(6) $y' = \frac{3}{2\sqrt{x}} + 3e^x - 56x^6$
(7) Q1 $f'(x) = -3x^2 + 6x + 45$
Q2 $x = -3$ or 5
Q3 $f''(x) = -6x + 6$
Q4 $f'(-5) = -60$
2. (1) $y' = 0$
(2) $y' = 12x$
(3) $y' = \frac{18}{x^4} + 18x^5 - 35x^4$
(4) $y' = -2 \sin x + \cos x$
(5) $y' = \frac{4}{x} - 5e^x$
(6) $y' = \cos x$
(7) Q1 $f'(x) = -3x^2 + 6x + 45$
Q2 $x = -3$ or 5
Q3 $f''(x) = -6x + 6$
Q4 $f'(3) = 36$
3. (1) $y' = -3$
(2) $y' = 12x$
(3) $y' = -\frac{24}{x^5} + 28x^3 + \frac{24}{x^4}$
(4) $y' = 8 \sin x$
(5) $y' = -\frac{1}{x}$
(6) $y' = -2 \sin x$
(7) Q1 $f'(x) = -3x^2 - 12x$
Q2 $x = -4$ or 0
Q3 $f''(x) = -6x - 12$
Q4 $f'(6) = -180$
4. (1) $y' = 1$
(2) $y' = 10x + 5$
(3) $y' = -\frac{12}{x^4} + \frac{7}{x^8}$
(4) $y' = -2 \cos x$
(5) $y' = -\frac{6}{x}$

(6) $y' = \frac{3}{2\sqrt{x}} + \cos x$

(7) Q1 $f'(x) = 3x^2 + 12x - 15$

Q2 $x = 1$ or -5

Q3 $f''(x) = 6x + 12$

Q4 $f'(4) = 81$

5. (1) $y' = 5$

(2) $y' = 12x + 3$

(3) $y' = 49x^6 - 5x^4$

(4) $y' = -7 \sin x + 2 \cos x$

(5) $y' = -\frac{3}{x}$

(6) $y' = \frac{1}{x}$

(7) Q1 $f'(x) = -3x^2 + 6x + 9$

Q2 $x = -1$ or 3

Q3 $f''(x) = -6x + 6$

Q4 $f'(6) = -63$