Differentiate the following:

1. $y = x^2$
2. $y = x^3$
3. $y = 4x^3$
4. $y = 5x$
5. $y = 7$
6. $y = 3x^2 + 6x + 4$
7. $y = \frac{1}{x^2}$
8. $y = \sqrt{x}$
9. $y = \frac{1}{\sqrt{x}}$
10. $y = \frac{5}{\sqrt{x}}$

Answers:

1. $y' = 2x$
2. $y' = 3x^2$
3. $y' = 12x^2$
4. $y' = 5$
5. $y' = 0$

⑥ $y' = 6x + 6$

⑦ $y = \dfrac{1}{x^2} = x^{-2}$

$y' = -2x^{-3} = \dfrac{-2}{x^3}$

⑧ $y = \sqrt{x} = x^{\frac{1}{2}}$

$y' = \dfrac{1}{2} x^{-\frac{1}{2}}$

⑨ $y = \dfrac{1}{\sqrt{x}} = x^{-\frac{1}{2}}$

$y' = -\dfrac{1}{2} x^{-1.5} = \dfrac{-1}{2x^{1.5}}$

$= \dfrac{-1}{2 x^{\frac{3}{2}}}$

$= \dfrac{-1}{2\sqrt{x^3}}$

⑩ $y = \dfrac{5}{\sqrt{x}} = 5x^{-\frac{1}{2}}$

$y' = -\dfrac{5}{2} x^{-1.5} = \dfrac{-5}{2x^{1.5}}$

$= \dfrac{-5}{2 x^{\frac{3}{2}}} = \dfrac{-5}{2\sqrt{x^3}}$