

Short Questions

Write the short answers of the following:

- Q.1: If $y = \sqrt{x} - \frac{1}{\sqrt{x}}$, Then show that $2x \frac{dy}{dx} + y = 2\sqrt{x}$
- Q.2: Find $\frac{d}{dx} \left(\frac{1}{(ax+b)^m} \right)$
- Q.3: If $y = x - \sqrt{x^2 + 1}$ Then show that $(y-x) \frac{dy}{dx} = y$
- Q.4: if $y = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \frac{x^4}{4!} \dots$, Then show that $\frac{dy}{dx} = y$
- Q.5: Find $\frac{dy}{dx}$ if $\sqrt{x} + \sqrt{y} = 5$
- Q.6: Find $\frac{dy}{dx}$ if $y = x^3 + x^2 + 2x + 3$
- Q.7: If $y = (3x^2 + 2x + 9)^7$, Find $\frac{dy}{dx}$
- Q.8: If $y = 5x^3 - 7x^2 + 9 - \frac{8}{x} + \frac{7}{x^4}$, find $\frac{dy}{dx}$
- Q.9: If $y = (a^2 + x^2)(b^3 + 3x^3)$, then Find $\frac{dy}{dx}$
- Q.10: If $y = \frac{1}{(x-3)(x+2)}$, find $\frac{dy}{dx}$
- Q.11: Diff. $\frac{x}{x^2+1}$ w.r.t. x
- Q.12: If $y = \frac{1+x}{1-x}$, find $\frac{dy}{dx}$
- Q.13: If $y = \frac{x^2+1}{x-1}$ find $\frac{dy}{dx}$ at $x = 2$
- Q.14: If $y = u^n$ and $u = (3x^3 - 7x^2 + x + 1)$, find $\frac{dy}{dx}$
- Q.15: If $y = \sqrt{1+x^2}$, show that $y \frac{dy}{dx} = x$
- Q.16: If $x = \frac{2y-1}{y+3}$, Find $\frac{dy}{dx}$

Q.17: Find $\frac{dy}{dx}$ if $x^{2/3} + y^{2/3} = a^{2/3}$

Q.18: If $ax^2 + by^2 + 2hxy = 0$, find $\frac{dy}{dx}$

Q.19: Diff. $\frac{x^3}{1+x^3}$ w.r.t. x^3

Q.20: Differentiate $\frac{x^2}{1+x^2}$ W.r.t. x^2

Q.21: Find $\frac{dy}{dx}$ if $x = u + \frac{1}{u}$, $y = u - \frac{1}{u}$

Answers

Q2. $-\frac{am}{(ax+b)^{m+1}}$ Q5. $-\sqrt{\frac{y}{x}}$ Q6. $3x^2 + 2x + 2$

Q7. $7(6x+2)(3x^2+2x+9)^6$ Q8. $15x^2 - 14x + \frac{8}{x^2} - \frac{28}{x^5}$

Q9. $2b^3x + 9a^2x^2 + 15x^4$ Q10. $\frac{1-2x}{[(x-3)(x+2)]^2}$ Q11. $\frac{1-x^2}{(1+x^2)^2}$

Q12. $\frac{2}{(1-x)^2}$ Q13. -1 Q14. $n(3x^3 - 7x^2 + x + 1)^{n-1}(9x^2 - 14x + 1)$

Q16. $\frac{(y+3)^2}{7}$ Q17. $-\left(\frac{y}{x}\right)^{1/3}$ Q18. $-\frac{(ax+hy)}{(by+hx)}$

Q19. $\frac{1}{(1+x^3)^2}$ Q20. $\frac{1}{(1+x^2)^2}$ Q21. $\frac{u^2+1}{u^2-1}$