

Worksheet on Derivatives

Find the derivative

1. $y = 5x - 1$

2. $y = -4x^{10}$

3. $y = \frac{4}{3}\pi r^3$

4. $y = \left(\frac{s}{2}\right)^5$

5. $y = 5t^{-\frac{3}{5}}$

6. $y = \sqrt{x} - \frac{1}{\sqrt{x}}$

7. $y = x^2 + \frac{1}{x^2}$

8. $y = (x^3 - x + 1)(x^{-2} + 2x^{-3})$

9. $y = \sqrt[3]{x}(x+2)$

10. $y = \frac{x+2}{x-1}$

11. $y = \frac{x^2 + 4x + 3}{\sqrt{x}}$

12. $y = \frac{1}{x^4 + x^2 + 1}$

13. $y = x\sqrt{x} + \frac{1}{x^2\sqrt{x}}$

14. $y = \frac{3x-7}{x^2+5x-4}$

15. $y = x - 3\sin x$

16. $y = \sin x + \cos x$

17. $y = x^3 \cos x$

18. $y = \theta \csc \theta - \cot \theta$

19. $y = \frac{\tan x}{x}$

20. $y = \frac{x}{\sin x + \cos x}$

21. $y = \frac{\sin x}{x^2}$

22. $y = \csc x \cot x$

23. $y = (x^2 + 4x + 6)^5$

24. $y = \tan(3x)$

25. $y = \cos(\tan x)$

26. $y = \sqrt[3]{1+x^3}$

27. $y = \sqrt{\sin x}$

28. $y = \sin(\sqrt{x})$

29. $y = \frac{1}{(x^2 - 2x - 5)^4}$

30. $y = 4 \sec 5x$

31. $y = \left(\frac{x-6}{x+7} \right)^2$

32. $y = \sec^2 2x - \tan^2 2x$

33. Find the equation of the tangent line to $y = 5x^2 - 4x + 7$ at the point (1,8)

34. Find the equation of the tangent line to $y = x + \cos x$ at the point $(0, 1)$

35. A particle moves according to a law of motion $s = f(t) = t^3 - 12t^2 + 36t$ for $t \geq 0$, where t is measured in seconds and s is in feet.

- Find the velocity at time t
- What is the velocity after 3 sec?
- When is the particle at rest?
- When is the particle moving in the positive direction?
- Find the total distance traveled in the first 8 secs.

36. Sketch the derivatives of the following 9 functions.



