

Worksheet 7
[Derivatives and applications]

1. Determine the points on the curve $y = 2x^3 - 9x^2 - 24x + 4$ where the tangent line to the curve is parallel to the x-axis. Write down the equations of the tangent lines at these points.
2. In each case, determine $f'(x)$ given $f(x)$.
 - i. $f(x) = \sin(x^4 + x^3)$
 - ii. $f(x) = \tan(\sqrt{4 - x^3})$
 - iii. $f(x) = \sec(x^{2/3} - x)$
 - iv. $f(x) = \csc(\sqrt{x^4 + 1})$
 - v. $f(x) = \cos(\cos(\cos x))$
 - vi. $f(x) = \cot(\sin(x^3 + 1))$
 - vii. $f(x) = \sqrt{\sqrt{x^2 + \sqrt{x^2 + \sqrt{x^2 + 1}}}}$
3. Determine all points on each graph of the function given where the tangent line is parallel to the x-axis.
 - a. $y = x^4 - x^2 + 1$
 - b. $y = \sin 2x - 2 \sin x$
 - c. $y = \tan x + \cot x$
4. Determine whether or not the given curve has a tangent line which is parallel to the x-axis: Justify your answer.
 - a. $y = 2x^3 + 3x^2 + 6x + 12$
 - b. $y = 2x^3 - x^2 + 2x - 1$