

Graphing one variable function

1. State the domain and range of $g(x) = (1 + x)^{\frac{1}{x}}$.
2. Sketch the graph of the polynomial function. On what intervals is function increasing and convex?
 - a. $f(x) = x^3 - x$
 - b. $g(x) = \frac{1}{10}x^2(x - 2)(x + 3)$
3. On what interval is $f(x) = \frac{e^x}{x^2}$ increasing. Find equations of tangent line and normal line.
4. On what interval is $f(x) = \frac{x^2}{e^{2x}}$ decreasing. State the domain, range and all points of inflection.
5. State the domain, range and horizontal asymptote of $g(x) = \left(1 + \frac{1}{x}\right)^x$.
6. State the domain, range and asymptotes of $f(x) = \frac{x^2+1}{x+1}$.
7. Find the tangent line to the graph $f(x) = e^{2x+1}$ with direction vector $u = (1, 2)$
T = (-0,5,1)
8. Find the tangent line to the graph $y = \text{tg}(2x+1)$ parallel to line $x + 2y = 0$.
T = (-0.5,0), tangent y = 2x + 1
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9. On what interval is function $f(x) = x^3 - 2x^2 + 1$ decreasing. Find all turning and inflection points.
Decreasing (0,1.33)
10. Determine maximal error of Taylor quadratic approximation of the function
 $f(x) = \sin(x), x \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$