Math 220 - Calculus f. Business and Management - Worksheets 23 - 25

Worksheets 23-25 - Graphing Functions

This worksheet covers lessons 23-25. Given are several functions which you are asked to graph. You will do so in three stages, as the graphing of all features requires that you are familiar with the material of all three lessons.

Class 23: Using the function

Stage 1: *You determine the features which do not involve first or second derivatives: domain, x-intercept, y-intercept (if not too difficult), horizontal asymptotes, points of discontinuity (vertical asymptotes, jump discontinuities, "holes").*

Class 24: Using first and second derivatives

Stage 2a: *You use the first derivative to compute the critical points and you determine whether it is positive or negative between two adjacent CP's. This lets you determine whether $f(x)$ increases or decreases on such intervals.*

Stage 2b: *You then use the second derivative to compute the points x for which $f''(x) = 0$ or $f''(x)$ DNE. and you determine whether it is positive or negative between two adjacent such points. This lets you determine whether $f(x)$ is concave up (curves to the left as x moves in positive direction) or concave down (curves to the right as x moves in positive direction) on such intervals.*

Class 25: Sketching the graphs

Stage 3: *You use what you have found out in the previous stages to graph the function.*

Exercise 1: *Graph the function* $f(x) = 3x^3 - 2x + 7$

Exercise 2: *Graph the function* $f(x) = e^{x^5 + 4x}$. *Do NOT attempt to find the zeroes of $f''(x)$. It takes more skills than required for this course to figure out that there are none.*

Exercise 3: *Graph the function* $f(x) = \sqrt{x - 2}$

Exercise 4: *Graph the function* $f(x) = \dfrac{x^2 + 2x - 3}{x + 3}$

Exercise 5: *Graph the function* $f(x) = \ln(x + 5)$

Exercise 6: *Graph the function* $f(x) = \dfrac{x^2 + 6x + 5}{x - 1}$

Exercise 7: *Graph the function* $f(x) = \dfrac{2x^2 - 6}{x^2 + 8}$

Exercise 8: *Graph the function* $f(x) = \dfrac{3x + 1}{x - 2}$

Exercise 9: *Graph the function* $f(x) = -2x^3 - 9x^2 + 108x - 10$

Exercise 10: *Graph the function* $f(x) = \dfrac{4}{x^2 + 5}$. *The first and second derivative have already been computed for you:*

$$f'(x) = \frac{-8x}{(x^2 + 5)^2} \qquad f''(x) = \frac{24x^2 - 40}{(x^2 + 5)^3}$$

Exercise 11: Graph the function $f(x) = \dfrac{x^2}{x+6}$. The first and second derivative have already been computed for you:

$$f'(x) = \frac{x^2 + 12x}{(x+6)^2} \qquad f''(x) = \frac{72}{(x+6)^3}$$