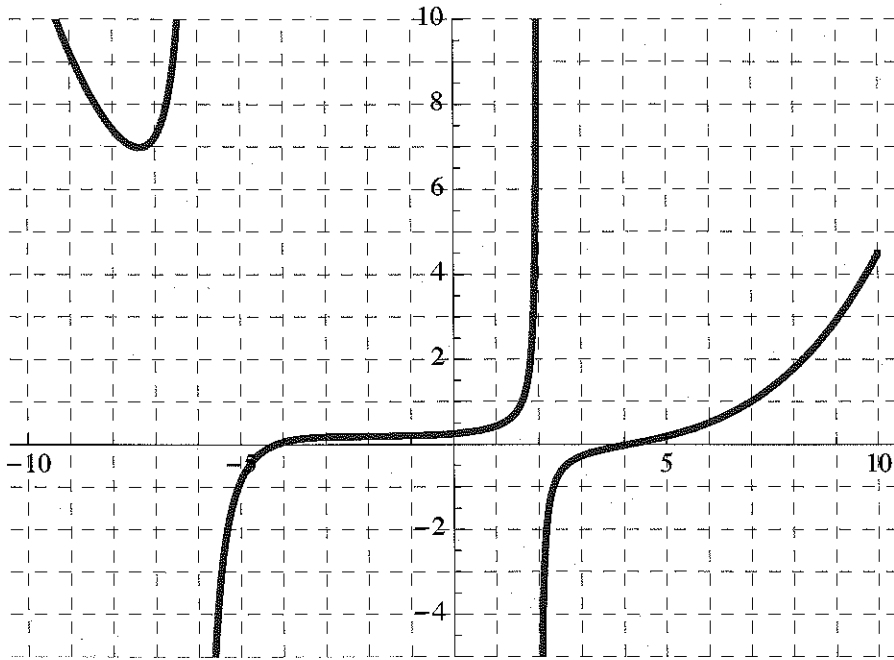


1. Let $p(x)$ be a polynomial function of degree n . Answer True or False to the following questions. Justify your answer. If your answer is 'False', provide a counter example.

- (a) $p(x)$ has an x -intercept.
- (b) $p(x)$ has a y -intercept.
- (c) If n is odd, $p(x)$ has at least 1 x -intercept.
- (d) If $n = 2$, $p(x)$ is concave up.
- (e) If $n = 5$, it is possible that $p(x) \geq 4$ for all x .

2. Let $f(x)$ be the function shown below. Note that $f(7) = 1$.



- (a) Use the graph to estimate the value of $f'(7)$. Show your work (including any graphical work).

Problem 2 continued.

(b) Note that f has some funny behavior that is visible. If the formula for f is a rational function (i.e. f is a fraction with a polynomial for its top and a polynomial for its bottom), then where would you expect the denominator of f to be equal to 0? Why?

(c) Draw some tangent lines and use them to answer the following questions.

i. Where does $f'(x)$ appear to be positive? Why?

ii. Where does $f'(x)$ appear to be close to 0? Why?

iii. Where does $f'(x)$ appear to be negative? Why?