

6th lesson - Polynomials

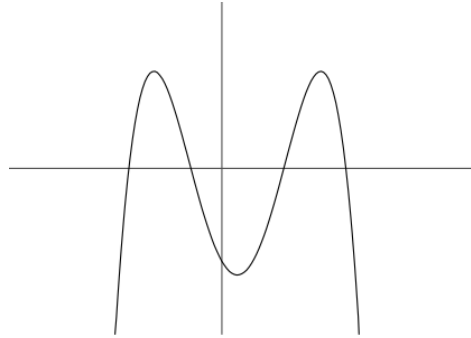
<https://www2.karlin.mff.cuni.cz/~kuncova/en/teaching.php>, kuncova@karlin.mff.cuni.cz

Exercises

Main source: <http://mathquest.carroll.edu/precalf.html>

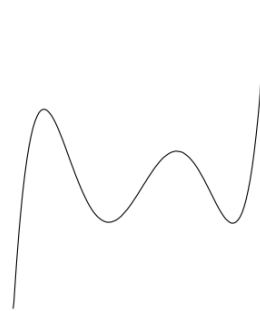
1. The sketched polynomial is of:

- (a) odd degree, lead coefficient negative
- (b) odd degree, lead coefficient positive
- (c) even degree, lead coefficient negative
- (d) even degree, lead coefficient positive



2. The sketched polynomial is of:

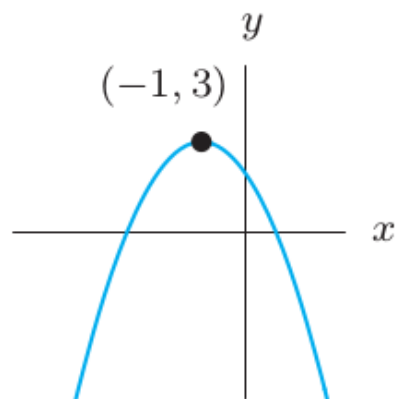
- (a) odd degree, lead coefficient negative
- (b) odd degree, lead coefficient positive
- (c) even degree, lead coefficient negative
- (d) even degree, lead coefficient positive



Source for 3, 7: *Calculus: Single and Multivariable, 6th Edition*, Deborah Hughes-Hallett, Andrew M. Gleason, William G. McCallum

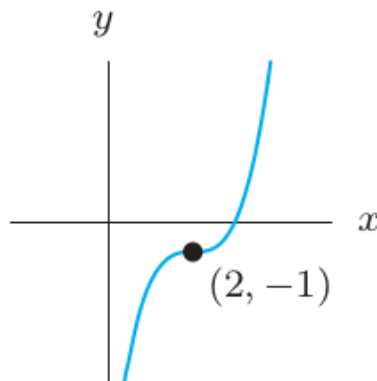
3. The sketched polynomial is:

- (a) $(x - 1)^2 + 3$
- (b) $-(x + 3)^2 - 1$
- (c) $(x - 3)^2 + 1$
- (d) $(x + 3)^2 - 1$
- (e) $-(x + 1)^2 + 3$



4. The sketched polynomial is:

- (a) $(x - 2)^3 - 1$
- (b) $(x + 2)^3 - 1$
- (c) $(x + 2)^3 + 1$
- (d) $(x - 2)^3 + 1$
- (e) $-(2 - x)^3 - 1$

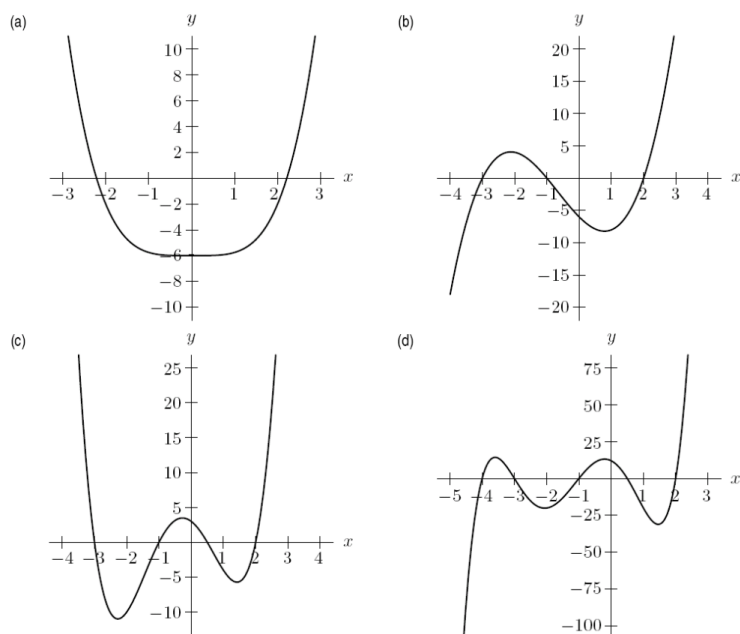


5. What is the degree of the polynomial $y = x(2x + 1)^3(x - 4)^2(5 - x)^5$?

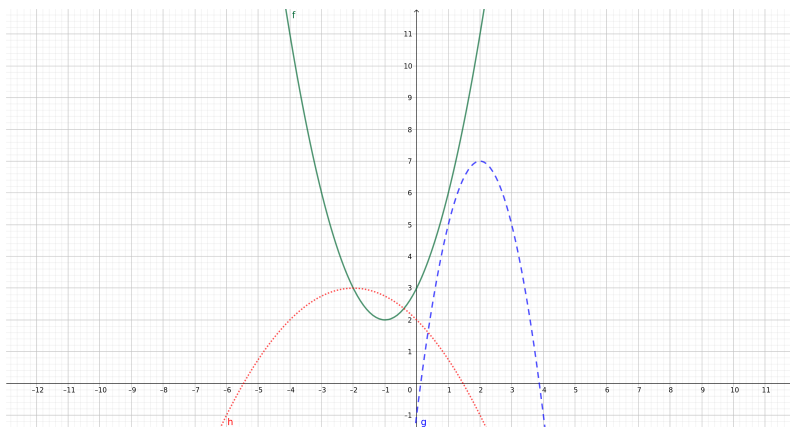
6. Find the polynomial with the smallest possible degree, with zeros at $x = 1$, $x = 2$ and $x = 3$ such that $f(5) = 8$.

- | | |
|------------------------------------|---|
| (a) $(x - 1)(x - 2)(x - 3)$ | (d) $8(x - 1)(x - 2)(x - 3)(x - 5)$ |
| (b) $(x - 1)(x - 2)(x - 3)(x - 5)$ | (e) $\frac{1}{3}(x - 1)(x - 2)(x - 3)$ |
| (c) $8(x - 1)(x - 2)(x - 3)$ | (f) $\frac{1}{42}(x - 1)(x - 2)(x - 3)$ |

7. Find the graph of the function $y = x^3 + 2x^2 - 5x - 6$



8. Find the formula for the quadratic functions:



9. Decide

TRUE - FALSE If $f(x)$ is a polynomial such that $f(c) = 0$ for $c \in \mathbb{R}$, then $f(x)$ can be written as $(x - c)g(x)$ for some polynomial $g(x)$.

TRUE - FALSE A polynomial function may have a horizontal asymptote.

TRUE - FALSE A polynomial function may have a vertical asymptote.

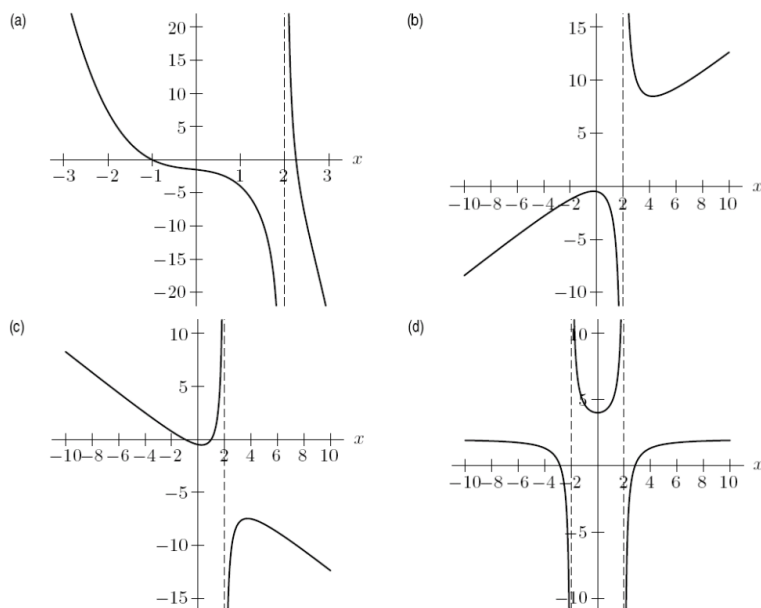
TRUE - FALSE For $x \in \mathbb{R}$ we have: $x \leq x^2$.

TRUE - FALSE Every polynomial of even degree is an odd function and every polynomial of odd degree is even function.

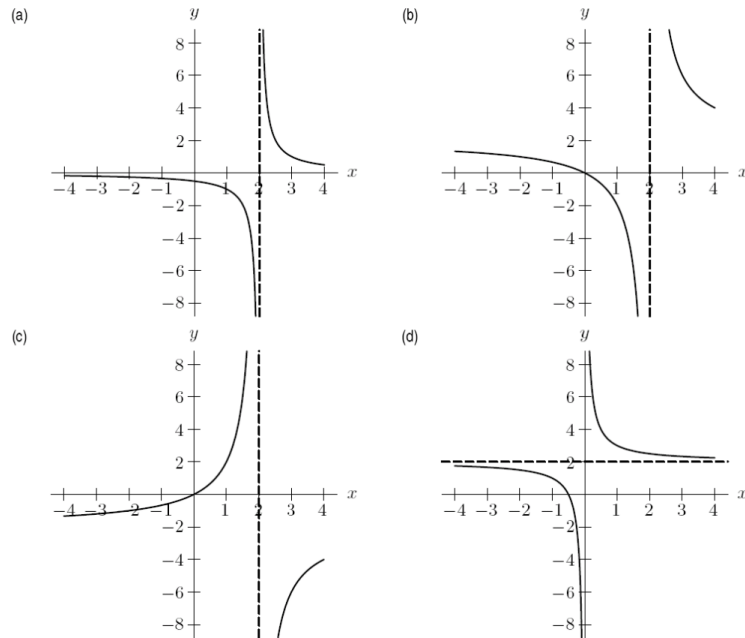
TRUE - FALSE Every polynomial of even degree is an even function and every polynomial of odd degree is odd function.

TRUE - FALSE Let $f(x) = \frac{x^2-1}{x+1}$, $g(x) = x - 1$. Then $f(x) = g(x)$.

10. Find the graph of the function $y = \frac{1-x^2}{x-2}$



11. Find the graph of the function $y = \frac{2x}{x-2}$



Source: <http://www.opentextbookstore.com/precalc/2/Precalc3-7.pdf>

12. Find the possible formulas for graphed functions.

