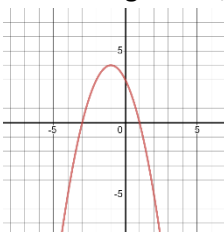


Math 110 – Chapter 3 – Worksheet 1 – Version A

Quadratic Functions; Polynomial Functions; Dividing Polynomials; Real Zeros of a Polynomial.

Section 3.1 Quadratic Functions

1. Find the standard form of the quadratic function with vertex $(1, -5)$ and passes through $(3, 7)$. Does this function have a maximum or minimum value?
2. Graph the quadratic function $f(x) = -2(x + 1)^2 + 3$. Find its vertex, maximum or minimum value and all intercepts.
3. Graph the quadratic function $f(x) = 3x^2 - 3x - 6$. Find its vertex, maximum or minimum value and all intercepts.
4. Use the graph of the function $f(x) = 3x^2 - 6x - 1$ to solve the inequality $3x^2 - 6x - 1 \leq 0$
5. Find the signs of a , b and c from the graph of $y = ax^2 + bx + c$. State which (if any) are zeros.



6. A children's center receives a donation of 1000 feet of fence to enclose a rectangular playground. What is the maximum area that can be enclosed? What are the dimensions of the playground?

Section 3.2 Polynomial Functions

7. State which functions are polynomial functions. For each polynomial function, find its degree, the leading term and the leading coefficient.
 - a) $f(x) = 5x^4 - 2x + 7$
 - b) $G(x) = 7x^2 - x + 1, 1 \leq x \leq 3$
 - c) $H(x) = \frac{x^2 + 1}{x - 1}$
8. Let $P(x) = 4x^3 + 2x^2 + 5x - 17$. Show that $P(x) \approx 4x^3$ when $|x|$ is very large.
9. Determine the end behavior of $f(x) = -2x^4 + 5x^2 + 3$.
10. Find all real zeros of the polynomial $f(x) = 2x^3 - 3x^2 + 4x - 6$.
11. Show that $f(x) = 2x^3 - 3x - 6$ has a real zero between 1 and 2.
12. Find distinct real zeros of $f(x) = (x + 1)^2(x - 3)(x + 5)$
13. Find all zeros and the multiplicity of each zero $f(x) = (x - 1)^2(x + 3)(x + 5)$.
14. Find the number of turning points of the graph of $f(x) = -x^4 + 3x^2 - 2$.
15. Graph $f(x) = -x^4 + 5x^2 - 4$.

Section 3.3 Dividing Polynomials

16. Find the quotient and remainder when $3x^3 + 4x^2 + x + 7$ is divided by $x^2 + 1$.
17. Divide: $x^4 + 5x^2 + 2x + 6$ by $x^2 - x + 3$.
18. Divide: $2x^3 - 7x^2 + 5$ by $x - 3$.
19. Use synthetic division to divide $2x^3 + x^2 - 18x + 2$ by $x + 3$.

20. Use the Remainder Theorem to find the remainder when $F(x) = x^{110} - 2x^{57} + 5$ is divided by $x - 1$.
21. Use synthetic division to find $f(-2)$, where $f(x) = x^4 + 10x^2 + 2x - 20$.
22. Solve the equation $3x^3 - x^2 - 20x - 12 = 0$ given that one solution is -2 .
23. The value of $C(x) = 0.23x^3 - 4.255x^2 + 0.345x + 41.05$ is 10 when $x = 3$. Find another positive number x such that $C(x) = 10$.

Section 3.4 The Real Zeros of a Polynomial Function

24. Find all rational zeros of $F(x) = 2x^3 + 3x^2 - 6x - 8$.
25. Solve $2x^3 - 9x^2 + 6x - 1 = 0$.
26. Find the possible number of positive and negative zeros of $f(x) = 2x^5 + 3x^2 + 5x - 1$.
27. Find the best integer upper bound and lower bound of the zeros of $f(x) = 2x^3 + 5x^2 + x - 2$.
28. Find the real zeros of $f(x) = 3x^4 - 11x^3 + 22x - 12$.
29. Sketch the graph of $f(x) = 2x^3 - x^2 - 9x + 3$.