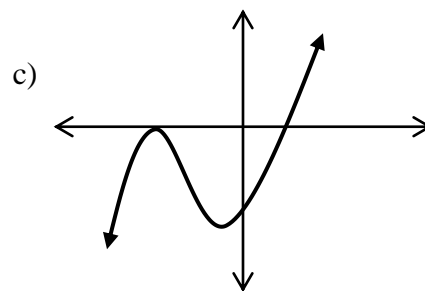
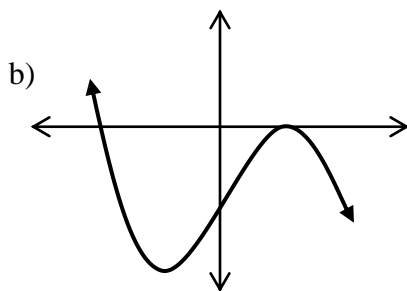
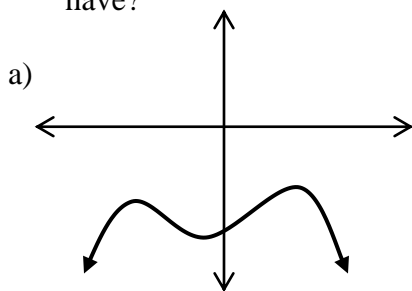


Polynomial Functions Review

1. Find a polynomial equation having roots -2 and $3 + i$.
2. Given $g(x) = x^4 - 3x^3 - 12x + 16$. Find $g(3i)$.
3. Find all zeros for $p(x) = 2x^4 + 3x^3 + 6x^2 + 12x - 8$
4. One root of $2x^3 - 10x^2 + 9x - 4 = 0$ is 4 . Find the other roots.
5. If $3 + 2i$ is a zero of a polynomial, what has to be another zero?
6. Find m so that $(x + 1)$ will be a factor of $x^{97} + mx - 5$.
7. What is the least positive integral upper bound for $2x^3 - x^2 - 4x + 3 = 0$?
8. Does $f(x) = x^3 - 2x^2 + x + 1$ have a zero between 0 and -1 ? Explain without a calculator.
9. Describe the end behavior of each: (a) $f(x) = x^5 - x^3 - x^2 + x + 2$; (b) $h(x) = -x^4 - 9x^2$
10. Approximate to the nearest tenth the real zeros of $f(x) = x^3 - 6x^2 + 8x - 2$. (Use a calculator.)
11. To the nearest tenth, find a relative maximum for $f(x) = x^3 - 3x - 3$.
12. For $y = x(x + 3)(x - 1)^2$, determine the zeros and their multiplicity.
13. Write a polynomial function with zeros 1 and 2 (of multiplicity 3).
14. Determine if the degree of the functions graphed below is even or odd. How many real zeros does each have?



15. Use synthetic division to find $f(-3)$ if $f(x) = 4x^5 + 10x^4 - 11x^3 - 12x^2 + 20x - 50$.
16. Factor: $2x^3 + 15x^2 - 14x - 48$ if $(x - 2)$ is a factor.
17. Determine k so that $(x - 3)$ is a factor of $x^4 - 3kx^3 + x - 3k$.

18. Given $f(x) = -\frac{1}{3}x^2 - 2x + 4$

- a) Write in standard form
- b) Find the x and y intercepts
- c) Find the vertex and axis of symmetry
- d) Evaluate $f(-2)$
- e) Sketch the graph

19. What is the remainder when $x^4 + 3x^3 + 1$ is divided by $x^2 + 1$? What is the quotient?

20. Simplify to a + bi form.

a) $(1 + i)(2 - i)i$ b) $\frac{1}{i(4 + 5i)}$ c) $\frac{2 + 3i}{i}$

State the domain, discontinuities (holes), vertical asymptote (s), horizontal asymptote, slant asymptote. Write “**none**” if the aspect does not exist. **Show all your work.**

21) $f(x) = \frac{1}{x-3}$

22) $f(x) = \frac{x^3}{x^2-1}$

D:
Hole:
V.A.:
H.A.:
S.A.:

D:
Hole:
V.A.:
H.A.:
S.A.:

23) $f(x) = \frac{x^2-4}{x+2}$

24) $f(x) = \frac{3x^2+1}{x^2+x+9}$

D:
Hole:
V.A.:
H.A.:
S.A.:

D:
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KEY:

- 1) $x^3 - 4x^2 - 2x + 20 = 0$ 2) $97 + 45i$ 3) $\{ \frac{1}{2}, -2, \pm 2i \}$ 4) $\{ \frac{1}{2} \pm \frac{1}{2}i \}$ 5) $3 - 2i$
 6) $m = -6$ 7) 2 8) yes; $p(0) = 1, p(-1) = -3$ 9) (a) $f(x) \rightarrow -\infty, \text{ as } x \rightarrow -\infty; f(x) \rightarrow \infty, \text{ as } x \rightarrow \infty$
 (b) $f(x) \rightarrow -\infty, \text{ as } x \rightarrow -\infty; f(x) \rightarrow -\infty, \text{ as } x \rightarrow \infty$
 10) $0.3, 1.5, 4.2$ 11) -1 12) $\{0, -3, 1 \text{ (DR)}\}$ 13) $y = (x - 1)(x - 2)^3$ 14) (a) even, none (b) odd, 3
 (c) odd, 3 15) $f(-3) = -83$ 16) $(x - 2)(2x + 3)(x + 8)$ 17) $k = 1$
 18. $y = -\frac{1}{3}(x + 3)^2 + 7$, x-int $(1.5825, 0)(-7.5825, 0)$, y-int $(0, 4)$, vertex $(-3, 7)$ A.O.S $x = -3, 6.6666$
 19. $-3x + 2, x^2 + 3x - 1$ 20. a) $-1 + 3i$ b) $-5/41 - 4/41i$ c) $3 - 2i$