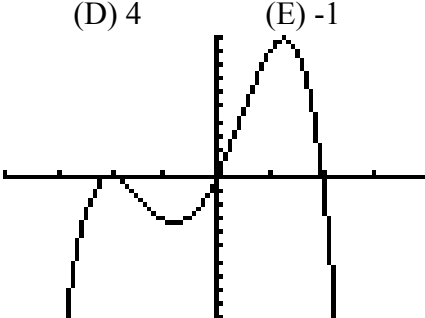


PreAP Precalculus
TEST Chapter 2.1-2.5, Form A

Part I: Multiple Choice

Put your CAPITAL LETTER answer choice in the blank to the left of the number.

- _____ 1. Let $R, S, T,$ and V be the roots of $x^4 - 4x^3 - 7x^2 + 22x + 24$. Find the product $RSTV$.
 (A) 24 (B) -24 (C) 22 (D) 4 (E) -4
- _____ 2. Simplify: $i^{357} =$
 (A) i (B) -1 (C) 1 (D) $-i$ (E) 0
- _____ 3. Which of the following MUST be true about a polynomial function of odd degree?
 (A) It has origin symmetry (B) It has no real solutions (C) It has an even number of complex roots
 (D) It has a real solution (E) It has an odd number of relative extrema
- _____ 4. A linear factor of $x^3 + 3x^2 - x - 3$ is $(x+1)$ and what other possible factor?
 (A) $x+2$ (B) $x+3$ (C) $x-2$ (D) $x-3$ (E) $x-1$
- _____ 5. The value of k that will make $x-5$ a factor of $kx^3 - 17x^2 - 4kx + 5$ is:
 (A) 2 (B) -2 (C) -5 (D) 4 (E) -1
- _____ 6. Which of the specified functions might have the given graph?
 (A) $f(x) = x(x+2)^2(x-2)$ (B) $f(x) = x(x+2)^2(2-x)$
 (C) $f(x) = x^2(x+2)(x-2)$ (D) $f(x) = x(x+2)(x-2)^2$
 (E) $f(x) = -x(x+2)(x-2)^2$
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- _____ 7. If a function of degree 4 has roots of $-1, 2,$ and $i+1$, the other root must be:
 (A) 1 (B) -2 (C) $i-1$ (D) $-i+1$ (E) $-i-1$
- _____ 8. What is the remainder when $f(x) = 2(x-1)^3 + 5$ is divided by x ?
 (A) 7 (B) 5 (C) 3 (D) 2 (E) 1
- _____ 9. When $(2x^3 + 3x^2 + 4) \div (x+3)$, the remainder is:
 (A) 0 (B) -13 (C) 23 (D) 13 (E) -23
- _____ 10. The leading coefficient in $f(x) = -3x^5 + 4x^3 - 6x^6 + 7x - 1$ is
 (A) -3 (B) 4 (C) -6 (D) 7 (E) -1
- _____ 11. Let $f(x) = 2x^{-1/2}$. What is the value of $f(32)$?
 (A) 1 (B) -1 (C) $2\sqrt{2}$ (D) $\frac{1}{2\sqrt{2}}$ (E) 4

_____ 12. The domain of $g(x) = \frac{\sqrt{x-2}}{x^2-x}$ is
(A) $\{x|x \neq 0,1\}$ (B) $\{x|x \leq 2, x \neq 0,1\}$ (C) $\{x|x \leq 2\}$ (D) $\{x|x \geq 2\}$ (E) $\{x|x > 2\}$

_____ 13. If $f(x) = x^3 - 3x^2 - 2x + 5$ and $g(x) = 2$, then $g(f(x)) =$
(A) $2x^3 - 6x^2 - 4x + 10$ (B) $2x^2 - 6x + 1$ (C) -6 (D) -3 (E) 2

_____ 14. The number of possible distinct rational solutions of $f(x) = -2x^3 + 7x^2 - 8x - 6$ is
(A) 8 (B) 6 (C) 16 (D) 12 (E) 3

_____ 15. An equation of a polynomial of the form $y = Af(x)$ of lowest degree with the following characteristics $f(2) = 30$, $f(1) = 0$, $f(i) = 0$, and $f(\sqrt{2}) = 0$ has a vertical dilation value of $A =$
(A) 1 (B) $\frac{2}{3}$ (C) 3 (D) -1 (E) 2

_____ 16. An equation of a 6th degree polynomial whose only roots are $x = -2(m2)$, $x = 1(m3)$, and $x = 3(m1)$ has how many relative extrema?
(A) 6 (B) 5 (C) 4 (D) 3 (E) 2

Part II: Free Response

Show all work and proper notation in the space provided below each problem. Be sure to label your work corresponding to each part a), b), c), etc.

17. For $h(x) = x^7 - 5x^6 + 15x^5 - 3x^4 - 37x^3 + 41x^2 - 51x + 39$

a) Find the domain of $h(x)$

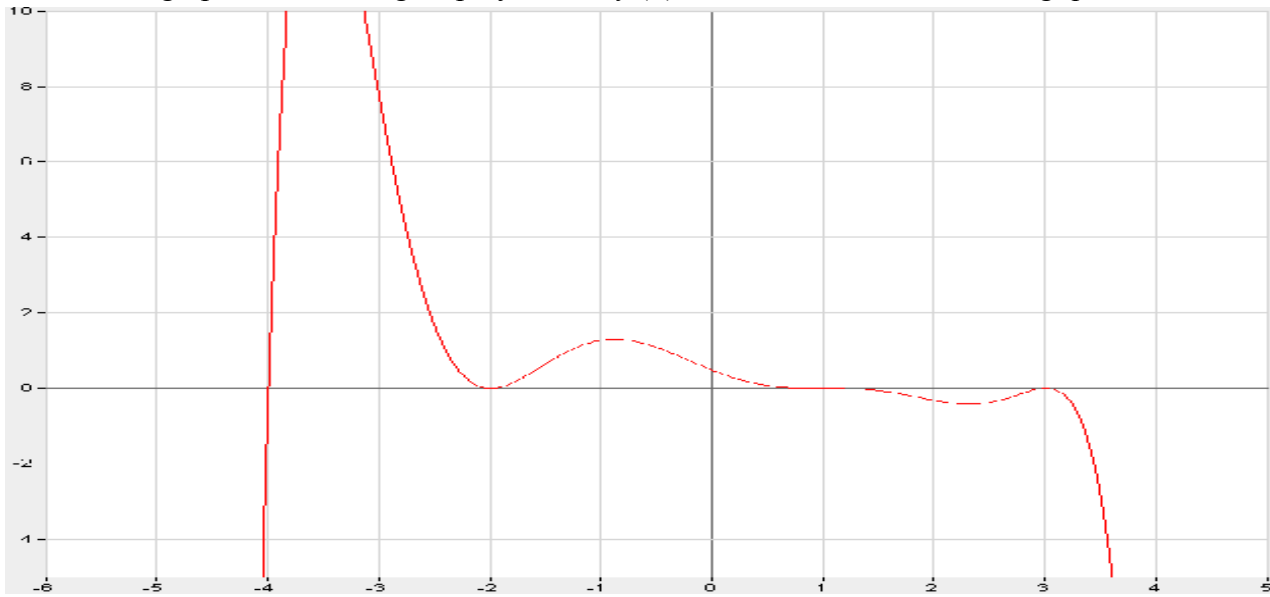
b) What is the coordinate of the y -intercept of $h(x)$?

c) List the possible rational roots

d) T or F (if false explain why): $h(x)$ can have only 4 real roots (including multiplicities).

e) Given that $x = i$, $x = \sqrt{3}$, and $x = 1$ are all roots of $h(x)$, use (and show) synthetic division to find all the exact values of the other complex roots. List all your final roots at the ends as $x =$

18. For the graph of the 8th degree polynomial $f(x)$ below, answer the following questions.



- (a) What is the sign of the leading coefficient? Explain why?
- (b) Write an equation of $f(x)$ in factored form.
- (c) If $f(-1) = \frac{32}{25}$, find the particular equation of the graph above.
- (d) Find $\lim_{x \rightarrow -\infty} f(x)$
- (e) Give the exact coordinate of a relative minimum (a turning point in a valley).
- (f) If the following transformation $f\left(\frac{1}{2}x\right)$ was performed on the graph of $f(x)$, what would the new x -intercepts be?
- (g) On the graph above, sketch the graph of $|f(|x|)|$.
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