1. If $g(x) = x^2 - 1$ and $f(x) = \sqrt{x-1}$, then the composition function $g \circ f$ and the domain D are given by: (Sec 4.1)

   (a) $(g \circ f)(x) = x - 2, \qquad D = (-\infty, \infty)$

   (b) $(g \circ f)(x) = x - 2, \qquad D = [1, \infty)$

   (c) $(g \circ f)(x) = x, \qquad D = (-\infty, \infty)$

   (d) $(g \circ f)(x) = \sqrt{x^2 - 2}, \qquad D = \left(-\infty, -\sqrt{2}\right] \cup \left[\sqrt{2}, \infty\right)$

   (e) $(g \circ f)(x) = \sqrt{x^2 - 2}, \qquad D = (-\infty, \infty)$

2. The remainder is zero when $P(x) = x^7 + 30x^2 + K$ is divided by $x + 2$, then K is equal to (Sec 3.1): 1)248 2)28 3)88 4)78 5)8

3. According to Descartes' rule of signs, the polynomial $P(x) = 4x^4 - 12x^3 - 3x^2 + 12x - 7$ has (Sec 3.3) 1)one or three negative real zeros 2)one negative real zero 3)four positive real zeros 4)no positive real zero 5)three negative real zeros

4. If $1 - i$ is a zero of $x^4 - 7x^3 + 18x^2 - 22x + A$, then A is equal to (Sec3.1): 1)12 2) -12 3) $\frac{1}{12}$ 4)0 5) $\frac{-1}{12}$

5. A polynomial of lowest degree with only real coefficients having $-2i$, i and 0 (multiplicity 2) as zeros is (Sec 3.4):08 1)$x^6 + 8x^4 + 4x^2$ 2)$x^6 + 7x^4 + 4x^2$ 3)$x^4 + 3x^2 + 4x^2$ 4)$x^6 + 5x^4 + 4x^2$ 5)$x^2(x^2 - 4)(x^2 - 1)$

6. If i is a zero of $f(x) = x^4 - x^3 - 5x^2 - x - 6$, then the sum of all its real zeros is (Sec 3.4): 1)0 2)5 3) -5 4) -1 5)1

7. Which one of the following functions does not have a horizontal asymptote? (Sec 3.5)1)$f(x) = \frac{x^2+2x}{2x-1}$ 2)$f(x) = \frac{2x-7}{x+3}$ 3)$f(x) = \frac{1}{(x-2)^2}$ 4)$f(x) = \frac{3x}{x^2-9}$ 5)$f(x) = \frac{(x-5)(x-2)}{x^3-8}$

8. The graph of the function $f(x) = \frac{x^3-4x^2+3x}{x^2-1}$ has (Sec 3.5) : 1) two vertical asymptote given by $x = -1$ and $x = 1$ 2) only one vertical asymptote given by $x = 1$ 3) only one vertical asymptote given by $x = -1$ 4)a slant asymptote given by $y = x$ 5) three x-intercepts

9. The polynomial $p(x) = -2x^3 + 5x^2 - 4x + 12$ has a real zero between (Sec 3.2) 1) 1 and 2 2)2 and 3 3)0 and 1 4) -1 and 0 5) -1 and -2

10. The graph of the polynomial function $f(x) = 5x^5 - 4x^3 + 17x^2 + 2$ goes (Sec 3.2): 1) down to left and up to right with at most 5 turning points 2)down to left and down to right with at most 1 turning point 3)up to left and down to right with at most 4 turning points 4)up to left and up to right with at most 2 turning points 5)down to left and up to right with at most 4 turning points

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11. The polynomial $p(x) = 5x^6 + 2x^2 + 4$ has (Sec 3.3): 1)two rational zeros and four nonreal complex zeros. 2)six rational zeros 3)two rational zeros and four irrational zeros 4)no rational zeros 5)four rational zeros and two irrational zeros.

12. The largest negative integer that is a lower bound for the real zeros of $f(x) = x^5 + 7x^2 - x + 3$ is (Sec 3.3) 1) -3 2) -5 3) -4 4) -2 5) -1

13. The lowest degree of a polynomial with real coefficients having the zeros "3 of multiplicity 2, -5, $4+i$, $7-i$, and $7+i$", is (Sec 3.4) 1)7 2)6 3)5 4)8 5)9

14. If $f(x) = \frac{2}{x^3+1}$, then $f^{-1}(\frac{1}{14})$ is equal to (Sec 4.1): 1) $\sqrt[3]{11}$ 2) $\sqrt[3]{19}$ 3)3 4)1 5)2

15. If $y = -3$ is a horizontal asymptote for the graph of $f(x) = \frac{Ax^2+x+2}{2x^2-x-1}$, then the vertical asymptote(s) will be (Sec 3.5): 1)$x = 1$ and $x = \frac{-1}{2}$ 2)$x = 1$ 3)$x = \frac{1}{2}$ 4)$x = -1$ 5)$x = -1$ and $x = \frac{-1}{2}$

16. The equation of the slant asymptote for $f(x) = \frac{2x^3+5x^2+1}{x^2+x+3}$ is (Sec 3.5): 1)$y = 2x + 10$ 2)$y = -9x - 8$ 3)$y = -2x + 3$ 4)$y = 2x + 3$ 5)$y = -2x + \$$

17. The largest integer that, by Bound Theorem is a lower bound for the real zeros of the polynomial $p(x) = 4x^4 - 12x^3 - 3x^2 + 12x - 7$ is (Sec 3.3): 1)0 2) -1 3) -2 4)2 5)3

18. The polynomial $h(x) = 3x^3+7x^2+3x+7$ has at least one real zero in the interval (Sec 3.2): 1) $[-2, -1]$ 2) $[-3, -2]$ 3) $[-1, 0]$ 4) $[0, 1]$ 5) $[1, 2]$

19. Given i as a zero of $p(x) = 8x^5 - 12x^4 + 14x^3 - 13x^2 + 6x - 1$, then the other zeros are (Sec 3.4): 1)" one nonreal", and " one rational zero of multiplicity 3" 2)" one nonreal", " one rational" and " two integer zeros" 3)" one nonreal", " one rational" and " two irrational zeros" 4)" one nonreal", and " three integer zeros" 5)" four nonreal zeros"

20. Let $f(x) = x^2 + 8x - 9$, $x \leq 4$. Then $f^{-1}(x)$, its domain D and its range R will be (Sec 4.1): $1) f^{-1}(x) = -9 - \sqrt{x - 25},\ D = (-25, -\infty), R = (-\infty, -4]$ $2) f^{-1}(x) = -\sqrt{x + 25}, D = (-25, -\infty), R = (-\infty, \infty)$ $3) f^{-1}(x) = \sqrt{x + 5},\ D = [-5, \infty), R = [0, \infty)$ $4) f^{-1}(x) = (x + 4)^2,\ D = R0 = (-\infty, \infty)$ $5) f^{-1}(x) = 4 - \sqrt{x + 25},\ D = [-25, \infty), R = (-\infty, -4]$

21. Which one of the following pairs of functions are inverse of each other? (Sec 4.1)

$1) f(x) = x^3 - 2; g(x) = \sqrt[3]{x + 2}$ $2) f(x) = x^2;\ g(x) = \sqrt{x}$ $3) f(x) = \frac{x}{x-1}; g(x) = \frac{x-1}{x}$ $4) f(x) = 2x-1; g(x) = \frac{1}{2}x-1$ $5) f(x) = |x|; g(x) = |x|$

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