Alg 2A Ch 5B Test Practice Test Solutions

Show work for full credit. Circle, box, or highlight your answers when answer lines are not given.

Each question's point value appears in < >.

Divide using long division. Write any remainder as a fraction of the divisor: <5 ea.>

1. $(x^3 + 5x^2 + 12x + 6) \div (x - 2)$

$x^2 + 7x + 26 + \frac{58}{x-2}$

$$x-2 \overline{)\, x^3 + 5x^2 + 12x + 6}$$
$$-x^3 + 2x^2$$
$$7x^2 + 12x$$
$$-7x^2 + 14x$$
$$26x + 6$$
$$-26x + 52$$
$$58$$

Divide using synthetic division. Write any remainder as a fraction of the divisor: <5 ea.>

2. $(7x^3 + 9x^2 - 42) \div (x - 3)$

$$\begin{array}{r|cccc} 3 & 7 & 9 & 0 & -42 \\ & & 21 & 90 & 270 \\ \hline & 7 & 30 & 90 & 228 \end{array}$$

$7x^2 + 30x + 90 + \frac{228}{x-3}$

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-more-

List the possible rational roots of P(x) given by the Rational Root (Locator) Theorem: *<5 ea.>*

3. $P(x) = 4x^3 - 2x^2 - 5x + 3$

$\frac{3}{4} : \frac{1, 3}{1, 2, 4} \Rightarrow \pm\{1, 1/2, 1/4, 3, 3/2, 3/4\}$

Write a polynomial function with the given roots: *<5 ea.>*

4. 2 and 8*i*

$-8i \rightarrow +: 0,\ x: 64 \rightarrow (x^2 + 64)$

$(x-2)$

$y = (x-2)(x^2 + 64)$

Use Descartes' Rule of Signs to determine the possible number of positive and negative real zeros: *<5 ea.>*

5. $P(x) = 9x^3 + 5x^2 + 1x - 3$

pos: + + + → −

neg: − + → − → −

1 pos real root

2 or 0 neg. real roots

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Find all the zeros for each function: *<5 ea.>*

6. $P(x) = 2x^4 + 3x^3 - 17x^2 - 27x - 9$ (hint: try –1)

$$\begin{array}{r|rrrrr} -1 & 2 & 3 & -17 & -27 & -9 \\ & & -2 & -1 & 18 & 9 \\ \hline & 2x^3 & +1x^2 & -18x & -9 & 0 \end{array}$$

$x^2(2x+1) - 9(2x+1) = 0$

$(2x+1)(x^2-9) = 0$

$(2x+1)(x+3)(x-3) = 0$

$x = -1 \quad x = -1/2 \quad x = \pm 3$

$x = \{-1, 3, -3, -1/2\}$

7. $P(x) = 2x^3 - 3x^2 - 18x - 8$

1: 2 −3 −18 −8 no

−1: −2 −3 +18 −8 no

2: 16 −12 −36 −8 no

−2: −16 −12 +36 −8 yes

$$\begin{array}{r|rrrr} -2 & 2 & -3 & -18 & -8 \\ & & -4 & 14 & 8 \\ \hline & 2 & -7 & -4 & 0 \end{array}$$

$2x^2 - 7x - 4 = 0$

$x^2 - 7x - 8 = 0$

$(x - \frac{8}{2})(x + \frac{1}{2}) = 0$

$(x-4)(2x+1) = 0$

$x = 4 \quad x = -1/2$

$x = \{-2, 4, -1/2\}$

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Factor each polynomial completely: *<5 ea.>*

8. $3x^3 + 7x^2 - 20x$

$x(3x^2 + 7x - 20)$

$x(x^2 + 7x - 60)$

$x(x + 12)(x - 5)$

$x(x+4)(3x-5)$

60

6 10

15 4

3 5 2 2

12 5 ✓

9. $8x^3 - 1$

$(2x-1)(4x^2 + 4x + 1)$

10. $x^4 - 3x^2 - 40$

$(x^2 - 8)(x^2 + 5)$

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-end-