2.7 Unit 2 Pre-Test Review – Factor Theorem and Inequalities

This document was composed and formatted by Annie Bernatchez.

The course material originated from www.jensenmath.ca

This review covers all of Unit 2: Factor Theorem and Inequalities, and is meant to be used to prepare for the unit test.

Section 1: 2.1 - Long and Synthetic Division / Remainder Theorem

1) What is the remainder when $x^4 - 4x^2 - 2x + 3$ is divided by $x + 1$? Do not divide. Support your answer with an explanation.

2) Is $x - 3$ a factor of the polynomial $3x^2 - 8x - 3$? Do not divide. Support your answer with an explanation.

3) Divide $\frac{f(x)}{g(x)}$ and state the answer in quotient form. Use synthetic division where possible.

a) $f(x) = x^4 - 4x^2 - 2x + 3$, $g(x) = x - 2$

b) $f(x) = x^5 - x^4 + 2x^3 + 3x - 2$, $g(x) = x^2 + 2$

4) Perform each division. Express the answer in quotient form and write the statement that could be used to check the division.

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a) $x^3 + 9x^2 - 5x + 3$ divided by $x - 2$

b) $12x^3 - 2x^2 + x - 11$ divided by $3x + 1$

c) $-8x^4 - 4x + 10x^3 - x^2 + 15$ divided by $2x - 1$

d) $x^3 + 4x^2 - 3$ divided by $x - 2$

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5) Determine the value of k such that when $f(x) = x^4 + kx^3 - 3x - 5$ is divided by $x - 3$, the remainder is -10.

Section 2: 2.2 - Factor Theorem

6) Suppose the cubic polynomial $8x^3 + mx^2 + nx - 6$ has both $2x + 3$ and $x - 1$ as factors. Find m and n. Do not divide.

7) Factor each of the following:

a) $x^3 - 4x^2 + x + 6$

b) $3x^3 - 5x^2 - 26x - 8$

c) $-4x^3 - 4x^2 + 16x + 16$

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d) $x^3 - 64$

Section 3: 2.3 & 2.6 - Factoring to Solve Equations and Inequalities

8) Determine the real roots of each equation.

a) $(5x^2 + 20)(3x^2 - 48) = 0$

b) $(2x^2 - x - 13)(x^2 + 1) = 0$

9) Solve the following polynomial equations.

a) $2x^3 + 1 = x^2 + 2x$

b) $x^3 + 6x^2 + 11x + 6 = 0$

c) $x^5 - 4x^3 - x^2 + 4 = 0$

d) $3x^3 + 2x^2 - 11x - 10 = 0$

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10) Solve the following polynomial inequalities. (Refer to #9 where you factored the polynomials)

a) $2x^3 + 1 < x^2 + 2x$

b) $x^3 + 6x^2 + 11x + 6 > 0$

11) Where is the polynomial $y = 8x^3 + 1$ positive? Justify your solution.

12) Solve $6x^3 + 13x^2 - 41x + 12 \leq 0$ using a sign chart.

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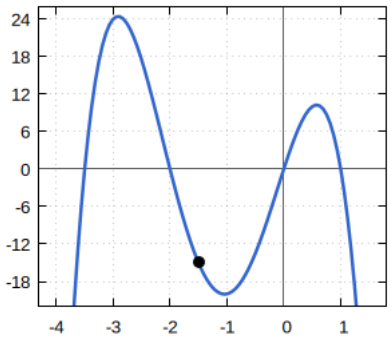
Section 4: 2.4 - Families of Polynomials

13) Find the equation for the family of quartic polynomials that have real roots of 3 (order 2) and $2 \pm \sqrt{2}$.

14) A family of cubic polynomials has roots of -2, -3 and -5. Find the member of this family that passes through the point $(2, -35)$. What is this polynomial's y-intercept?

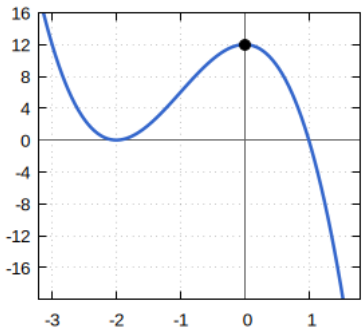
15) Find an equation for each of the following functions

a)



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b)



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