Pre-Calculus AB
Chapter 4.1-4.2, 4.4
Review

Name Key

CALCULATOR SECTION

All of the following are polynomials. For each find its degree, leading coefficient, and constant term:

1) $7x^3 - x^4 + 3x^5 + 5 - 2x$

Degree: ~~3rd~~ 5
Leading Coefficient: ~~7~~ 3
Constant Term: 5

Use synthetic division to solve:

2) $\dfrac{2x^3 + 2x^2 - 9x + 6}{x + 4}$

$2x^2 - 6x + 15 - \dfrac{54}{x+4}$

3) $(2x^4 - 4x^2 + 8x - 2) \div (x - 2)$

$2x^3 + 4x^2 + 4x + 16 + \dfrac{30}{x-2}$

Use long division to find the quotient and remainder:

4) $(3x^3 + 15x^2 - 2x - 10) \div (3x^2 - 2)$

$x + 5$ Remember to put "zero" in divisor

5) $(2x^4 - 4x^3 - 9x^2 + 5x - 1) \div (x^3 + x^2 - 1)$

$2x - 6 - \dfrac{3x^2 + 7x - 7}{x^3 + x^2 - 1}$

Use the Factor Theorem to determine whether: $h(x)$ is a factor of f(x).

6) $h(x) = x - 2;\ f(x) = x^3 + x^2 - 4x + 4$

$h(x)$ is a factor of f(x): yes or (no)

7) $h(x) = x + 11;\ f(x) = x^3 + 8x^2 - 29x + 44$

$h(x)$ is a factor of f(x): (yes) or no

Find the remainder when f(x) is divided by g(x) WITHOUT using division:

8) $f(x) = 3x^4 - 6x^3 + 2x - 1;\ \ g(x) = x + 1$

$R = 6$

9) $f(x) = x^5 - 3x^2 + 2x - 1;\ \ g(x) = x - 2$

$R = 23$

Find all the RATIONAL ZEROS of the polynomial. Use synthetic division to support your answer. Write your answers as a product of linear factors.

10) $f(x) = 2x^3 - 3x^2 - 7x - 6$

$\left\{3,\ \dfrac{-3 \pm i\sqrt{7}}{4}\right\}$

$P/q = \pm 1, \pm 2, \pm 3, \pm 6, \pm \frac{1}{2}, \pm \frac{3}{2}$

11) $f(x) = x^4 + x^3 - 19x^2 + 32x - 12$

$\left\{2\ DR,\ \dfrac{-5 \pm \sqrt{37}}{2}\right\}$

$P/q = \pm 1, \pm 2, \pm 3, \pm 4, \pm 6, \pm 12$

Find all REAL ZEROS of the polynomial by finding rational zeros FIRST, use synthetic division as many times as needed, and for irrational zeros use the quadratic formula or solve for x.

12) $6x^3 - 11x^2 + 6x - 1 = 0$

$\{1/3, 1/2, 1\}$

13) $x^5 + 3x^4 - 4x^3 - 11x^2 - 3x + 2 = 0$

Use algebraic symmetry to solve if it is even, odd, or neither.

14) $f(x) = x^3 + 3x$

ODD

15) $f(x) = -2x^4 - 3x^2$

EVEN

16) $f(x) = 2x^3 + 5$

Neither

NON-CALCULATOR SECTION

Find the domain of the function in INTERVAL NOTATION:

1) $g(x)=\dfrac{x^3-x^2-x-1}{x^2-16}$ $(-\infty,-4)\cup(-4,4)\cup(4,\infty)$

2) $f(x)=\dfrac{x^2-9}{x^2-5x+6}$ $(-\infty,-2)\cup(-2,3)\cup(3,\infty)$ ~~$(-\infty,2)\cup(-3,$~~

Find the vertical asymptotes/holes in the graph of each function:

3) $f(x)=\dfrac{x^2-4}{x^2+3x-10}$

Hole: $(2, 4/7)$

Vertical Asymptote: $x=-5$

4) $g(x)=\dfrac{2x+6}{x^2-9}$

Hole: $(-3, -1/3)$

Vertical Asymptote: $x=3$

Find the horizontal or slant asymptote of each function (Specify which asymptote you found)

5) $g(x)=\dfrac{8x^2-9x+1}{4x^2+8}$

Asymptote: $y=2$

Type: ~~Horizontal~~

6) $f(x)=\dfrac{5}{x+1}$

Asymptote: $y=0$

Type: ~~Horizontal~~

7) $p(x)=\dfrac{3x^2-4x+1}{x+1}$

Asymptote: $y=3x-7$

Type: ~~Slant~~

Graph each rational functions:

8) $f(x)=\dfrac{x^2-x-20}{x-4}$

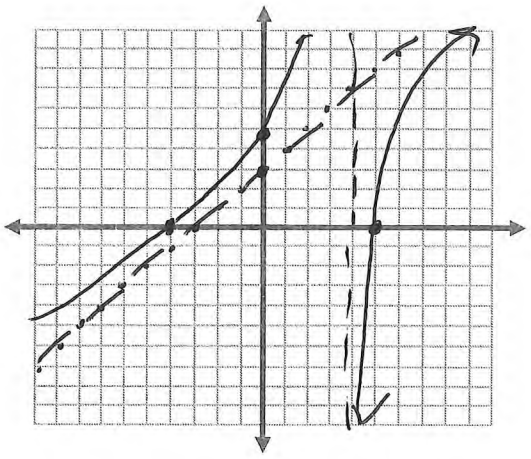
Hole: ~~$(4,9)$~~ None

y-intercept: $(0,5)$

x-intercept: $(-4,0),(5,0)$

Vertical Asymptote: $x=4$

Horizontal/Slant Asymptote: $y=x+3$



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9) $m(x)=$ ~~$\frac{1}{2}x-8$~~ $\dfrac{2x^2-5x+2}{x^2-4}$

Hole: ~~$(10,4\frac{1}{3})$~~ $(2, 3/4)$

y-intercept: $(0, -1/2)$

x-intercept: $(1/2, 0)$

Vertical Asymptote: $x=-2$

Horizontal/Slant Asymptote: $y=2$