Algebra 2 Ch. 5 Review

Test Mon. Ch.5

5-1 Operations with Polynomials

* Before Christmas

Simplify. Assume that no variable equals 0.

11. $\frac{14x^4y}{2x^3y^5}$

$\frac{2 \cdot 7 \times \times \times \times y}{2 \times \times \times y y y y y}$ $\frac{7x}{y^4}$

$7xy^{-4}$

$(m + p)(m^2 - 2mp + p^2)$ *

$m^2 - 2mp + p^2$

$m + p$

5-2 Dividing Polynomials

Simplify.

17. $\dfrac{12x^4y^5 + 8x^3y^7 - 16x^2y^6}{4xy^5}$

$\dfrac{12x^4y^5}{4x^1y^5} + \dfrac{8x^3y^5}{4x^1y^5} - \dfrac{16x^2y^5}{4x^1y^5}$

$3x^3y^{-4} \quad 2x^2y^{-4} \quad 4xy$

$\dfrac{3x^3}{y^4} + \dfrac{2x^2}{y^4} - 4xy$

19. $\dfrac{(a^4 + 5a^3 + 2a^2 - 6a + 4)(a + 2)^{-1}}{a + 2}$

$a + 2 = 0$
$-2 \quad -2$

$-2 \;\big|\; 1 \quad 5 \quad 2 \quad -6 \quad 4$
$\quad\quad \downarrow \quad -2 \quad -6 \quad 8 \quad -4$
$\quad\quad 1 \quad 3 \quad -4 \quad 2 \quad 3$

$a^3 + 3a^2 - 4a + 2 + \dfrac{3}{a+2}$

*

5-3 Polynomial Functions

State the degree and leading coefficient of each polynomial in one variable. If it is not a polynomial in one variable, explain why.

22. $5x^6 - 3x^4 + x^3 - 9x^2 + 1$

$d = 6$

$LC = 5$

Find $p(-2)$ and $p(x+h)$ for each function.

25. $p(x) = x^2 + 2x - 3$

$= (-2)^2 + 2(-2) - 3$

$= 4 + -4 - 3 = -3$

$= (x+h)^2 + 2(x+h) - 3$

$= x^2 + 2hx + h^2 + 2x + 2h - 3$

$x+h$
$x+h$
$hx \quad h^2$
$x^2 \quad hx$

Since Christmas

5-4 Analyzing Graphs of Polynomial Functions

Complete each of the following.

a. Graph each function by making a table of values.

b. Determine the consecutive integer values of x between which each real zero is located.

c. Estimate the x-coordinates at which the relative maxima and minima occur.

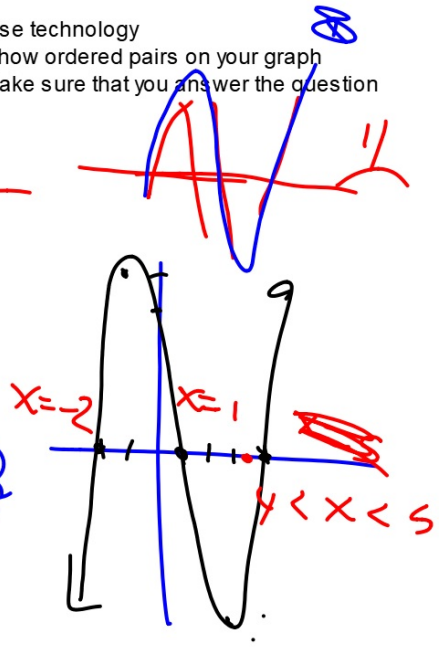
28. $h(x) = x^3 - 4x^2 - 7x + 10$

Use technology
Show ordered pairs on your graph
Make sure that you answer the question

x	y
-2	0
-1	12
0	10
1	0
2	-12
3	-20
4	-18
5	0

rel max $x \approx -1$

rel min $x = 3$



5-5 Solving Polynomial Equations

Factor completely. If the polynomial is not factorable, write *prime*.

34. $a^4 - 16$

$\rightarrow (a^2 - 4)(a^2 + 4)$

$(a+2)(a-2)(a^2+4)$

36. $\frac{54x^3y - 16y^4}{2y}$ $\frac{}{2y}$

$$2y(27x^3 - 8y^3)$$

$$2y(3x-2y)(9x^2+6xy+4y^2)$$

Solve each equation.

38. $x^3 + 2x^2 - 35x = 0$

$x(x^2 + 2x - 35) = 0$

$x(x+7)(x-5) = 0$

-35, 7, -5, 2

$x = 0$ $\quad x + 7 = 0$ $\quad -7 \; -7$ $\quad x - 5 = 0$ $\quad +5 \; +5$

$\rightarrow x = 0 \qquad x = -7 \qquad x = 5$

5-6 The Remainder and Factor Theorems

Use synthetic substitution to find $f(-2)$ and $f(4)$ for each function.

41. $f(x) = x^2 - 3$

$f(-2) = 1$

$f(4) = 9$

$$\begin{array}{r|rrr} -2 & 1 & 0 & -3 \\ & 1 & -2 & +4 \\ \hline & 1 & -2 & 1 \end{array}$$

$$\begin{array}{r|rrr} 4 & 1 & 0 & -3 \\ & 1 & 4 & 12 \\ \hline & 1 & 4 & 9 \end{array}$$

Given a polynomial and one of its factors, find the remaining factors of the polynomial.

45. $3x^3 + 20x^2 + 23x - 10$; $x + 5$

$x + 5 = 0$

$-5 \quad -5$

$-5 \mid 3 \quad 20 \quad 23 \quad -10$

$\downarrow \quad -15 \quad -25 \quad 10$

$3 \quad 5 \quad -2 \quad 0$

$3x^2 + 5x - 2$

-6

$-1 \quad +6$

$2 \quad 3$

$(3x^2 - x) + (6x - 2)$

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

$(x + 5)(x + 2)(3x - 1)$

5-7 Roots and Zeros

State the possible number of positive real zeros, negative real zeros, and imaginary zeros of each function.

48. $f(x) = -2x^3 + 11x^2 - 3x + 2$

⊕ 3, 1

⊖ no

i 0, 2

5-8 Rational Zero Theorem

Find all of the zeros of each function.

53. $f(x) = x^3 + 4x^2 + 3x - 2$

$\frac{1, 2}{1}$

$\pm 1 \quad \pm 2$

~~(+)~~ 1

~~(−)~~ 2, 0

(i) 0, 2

$-2 \;\big|\; 1 \quad 4 \quad 3 \quad -2$

$\quad\quad\;\; -2 \quad -4 \quad 2$

$\quad 1 \quad 2 \quad -1 \quad 0$

$x = -2$

$x = -1 + \sqrt{2}$

$x = -1 - \sqrt{2}$

8

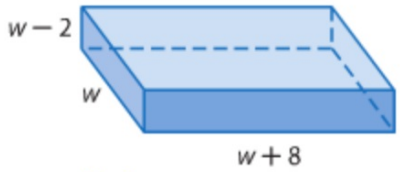
4 ^ 2

2 ^ 2

$x^2 + 2x - 1$

$x = \frac{-2 \pm \sqrt{4+4}}{2} = \frac{-2 \pm \sqrt{8}}{2} = \frac{-2}{2} \pm \frac{2\sqrt{2}}{2}$

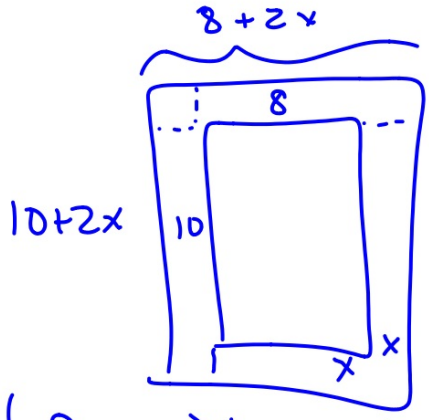
56. STORAGE Melissa is building a storage box that is shaped like a rectangular prism. It will have a volume of 96 cubic feet. Using the diagram below, find the dimensions of the box.



$w(w-2)(w+8) = 96$

(16)

PT



$(8+2x)(10+2x) = 168$

$= 168$

PT e.