

Chapter 5 Cumulative Test Review

10 matching vocab questions.

7 old short answer questions (ch 1,12,4)

9 new short answer questions(ch 5)

Chapter 5.1 Properties of Exponents

$$\frac{(6.3 \times 10^6)}{(\underline{2.7} \times 10^{\underline{3}})(\underline{1.8} \times 10^{\underline{-5}})}$$

$4.86 \times 10^{\underline{-2}}$

1.29×10^8

$$\frac{(2x^{-2}y)^3}{2xy}$$

$\frac{2^3 (x^{-2})^3 y^3}{2xy}$

$\frac{8x^{-6}y^3}{2xyx^6}$

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

Chapter 5.2 Direct/Synthetic substitution

$$3x^4 + 2x^2 - 5x - 1 \quad (x+2) \\ x=-2$$

Direct $3(-2)^4 + 2(-2)^2 - 5(-2) - 1$

Synthetic

-2	3	0	2	-5	-1
		-6	12	-20	66
3	-6	14	-33	65	

$F(-2) = 65$

Chapter 5.3 Operations

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

$$x-2 + x^2 + 3$$

$x^2 + x + 1$

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

$$2x^3 - 4x^2 + 2x + x^2 - 2x + 1$$

$2x^3 - 3x^2 + 1$

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

$$2x^2 - x - 2x - 2$$

$2x^2 - 3x - 2$

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

$(2x-3)(2x-3)$
 $4x^2 - 12x + 9$

Chapter 5.4 Factor Completely

GCF

$$x^3 + 125$$

Trinomial/Grouping

$$x^3 + 5^3$$

Special Cases

P's & Q's

$$(x+5)(x^2-5x+25)$$

(sum/dif cubes)

(dif squares)

$$(a \pm b)(a^2 \mp ab + b^2)$$

$$2x^3 - 7x^2 - 8x + 28$$

$$x^2(2x-7) - 4(2x-7)$$

$$(2x-7)(x^2-4)$$

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

Chapter 5.5 Long/synthetic division to factor

$$(2x^3 + 7x^2 - 33x - 18) \div (x+6)$$

-6	2	7	-33	-18
		-12	30	18
	$2x^2$	$-5x$	-3	0

$$(x+6) \left(\overset{b}{\underbrace{2x^2}_{2/1}} - 5x - \overset{b}{\underbrace{-3}_{3/1}} \right) \quad \begin{array}{r} b \\ \hline 6 \mid 1 \end{array}$$

$$(x+6)(2x+1)(x-3)$$

Chapter 5.6 Possible zeros and find the zeros.

P's + Q's

$$x^3 + 6x^2 + 5x - 12$$

$$\frac{P}{Q} = \frac{12}{1} = \frac{1, 2, 3, 4, 6, 12}{1} = \boxed{\pm 1, \pm 2, \pm 3, \pm 4, \pm 6, \pm 12}$$

1	1	6	5	-12
		1	7	12
				0

$1x^2 + 7x + 12$

$(x+4)(x+3)$

$x = 1, -3, -4$

Chapter 5.7 find a polynomial with roots

1, 2, -3 2, 4i, $-4i$ $x^2 - 16i^2$

$(x-1)(x-2)(x+3)$ $(x-2)(x-4i)(x+4i)$

$(x-1)(x^2+x-6)$ $(x-2)(x^2+16)$

$x^3+x^2-6x-x^2-x+6$ $x^3+16x-2x^2-32$ $\div 2 = -1$

x^3-7x+6 $x^3-2x^2+16x-32$

possible types of zeros (Descartes rule)

$2x^6 - 3x^2 - x + 1$

+ real $(2, 0)$ - real $(2, 0)$ imag (6) total (6)

$2(-x)^6 - 3(-x)^2 - (-x) + 1$

$2x^6 - 3x^2 + x + 1$

+ real	- real	imag	Total
2	2	2	6
2	0	4	6
0	2	4	6
0	0	6	6

Chapter 5.8

info from a graph using a calculator.

find x-int, local max/min

$$f(x) = x^4 + 3x^3 - x^2 - 8x + 2$$

End behaviors
 $x \rightarrow \infty \quad f(x) \rightarrow \infty$
 $x \rightarrow -\infty \quad f(x) \rightarrow \infty$

graph!

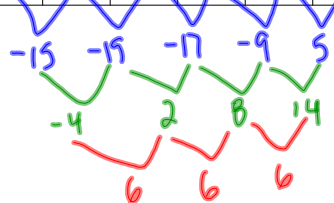


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CALCULATE
1: value
2: zero - x int
3: minimum
4: maximum } max/min
5: intersect
6: dy/dx
7: ∫ f(x) dx
    
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Chapter 5.9 Finite differences to polynomial

x	1	2	3	4	5	6
f(x)	-6	-21	-40	-57	-66	-61



f(x) = example $2x^3 + 5x^2 - 2x + 1$
 $f(10) = 2(10)^3 + 5(10)^2 - 2(10) + 1$

stat
edit
L1 → 1, 2, 3, 4, ...
L2 → 6, -21, -40, ...
stat
calc
Quad/Cubic reg

$$ax^3 + bx^2 + cx + d$$

a = #
b = #
c = #
d = #

Extras:

Solve: $-(x+3)^2 + 5 = 30$

$$\begin{aligned} -(x+3)^2 &= 25 \\ \sqrt{-(x+3)^2} &= \sqrt{25} \\ x+3 &= \pm 5i \end{aligned} \rightarrow \boxed{x = -3 \pm 5i}$$

Factor: $x^2 - 3x + 2 = (x-1)(x-2)$ $x^4 - 25 = (x^2+5)(x^2-5)$

solve/graph: $-2|2x+3-x|+1 > 7+x$

$$\begin{aligned} -2|x+3|+1 &> 7+x \\ -2|x+3| &> 6+x \\ \frac{-2|x+3|}{-2} &> \frac{6+x}{-2} \\ |x+3| &< -3 - \frac{1}{2}x \end{aligned}$$

$$\begin{aligned} x+3 &< -3 - \frac{1}{2}x & \text{and} & \quad -x-3 < -3 - \frac{1}{2}x \\ x &< -6 - \frac{1}{2}x & & \quad -x < -\frac{1}{2}x \\ \frac{3}{2}x &< -6 & & \quad +x < -\frac{1}{2}x \\ \frac{3}{2}x &< -6 & & \quad \frac{3}{2}x < -\frac{1}{2}x \\ \frac{3}{2}x &< -6 & & \quad \frac{3}{2}x < -\frac{1}{2}x \\ x &< -\frac{12}{3} = -4 & & \quad \boxed{0 < x} \\ (x < -4) & & & \end{aligned}$$

Extras:

graph: $y = -2(x+8)^2 - 3$ $(-8, -3)$

$(-8, -3)$ vertex, axis of symmetry, x/y-intercepts, max/min, three points

perform the operations $(2+i)(3-2i)$

$$\begin{aligned} &6 - 4i + 3i - 2i^2 \\ &6 - i + 2 \\ &\boxed{8 - i} \end{aligned}$$

first 5 terms:

$a_n = 2n + 1$

$a_1 = 1, a_n = 2a_{n-1} + 1$

n	1	2	3	4	5
a_n	3	5	7	9	11

n	1	2	3	4	5
a_n	1	3	7	15	31

