

Calc 4 Life

Section R.1

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Review Concepts:

Term

Coefficient*

Variable*

Exponent*

Like Terms — Var/Exp same

Order of Operations

PEMDAS

$$4x^2 + 3 = 7$$

$$4x^2 = 4$$

$$x^2 = 1$$

$$x = \pm 1$$

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Example:

Evaluate $[6(x+1)^2 + 3x - 22]^2$ when $x=2$.

$$[6(\underline{2+1})^2 + 3(2) - 22]^2$$

$$[6(3)^2 + 3(2) - 22]^2$$

$$[6 \cdot 9 + 3(2) - 22]^2$$

$$[54 + 6 - 22]^2$$

$$[38]^2$$

$$1444$$

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Adding and Subtracting Polynomials

Properties of Real Numbers

1) $a + b = b + a$; $ab = ba$; "Commutative"

2) $(a + b) + c = a + (b + c)$; $(ab)c = a(bc)$; "Associative" $54 - 22 + 6 = 38$

3) $a(b + c) = ab + ac$; "Distributive"

$$a = (x+1)$$

$$(x+1)(b+c)$$

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Use the properties to simplify:

a) $(8x^3 - 4x^2 + 6x) + (3x^3 + 5x^2 - 9x + 8) = 11x^3 + x^2 - 3x + 8$

b) $2(-4x^4 + 6x^3 - 9x^2 - 12) + 3(-3x^3 + 8x^2 - 11x + 7) = (-8x^4 + 12x^3 - 18x^2 - 24) + (-9x^3 + 24x^2 - 33x + 21)$

c) $(2x^2 - 11x + 8) - (7x^2 - 6x + 2)$

$$= -5x^2 - 5x + 6$$

$$= -8x^4 + 3x^3 + 6x^2 - 33x - 3$$

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Multiplying Polynomials

Examples:

$$8x(6x - 4) \longrightarrow 48x^2 - 32x$$

$$(3p - 2)(p^2 + 5p - 1)$$

$$3p^3 + 15p^2 - 3p - 2p^2 - 10p + 2 = 3p^3 + 13p^2 - 13p + 2$$

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Multiply the polynomial:

$$\begin{array}{l}
 (x+2)(x+3)(x-4) \qquad (2m-5)(m+4) \qquad (2k-5m)^3 \\
 \underbrace{(x^2+3x+2x+6)}_{(x^2+5x+6)} \cdot (x-4) \\
 \underbrace{x^3-4x^2+5x^2-20x+6x-24}_{x^3+x^2-14x-24} \\
 \end{array}$$

$$\begin{array}{l}
 (2k-5m)(2k-5m)(2k-5m) \\
 (4k^2-10km-10km+25m^2)(2k-5m) \\
 (4k^2-20km+25m^2)(2k-5m) \\
 \begin{array}{r}
 8k^3-20km^2-40km^2+100km^2+50km^2 \\
 \hline
 -125m^3 \\
 \hline
 8k^3-60km^2+150km^2-125m^3
 \end{array}
 \end{array}$$

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Calc 4 Life

Section R.2

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Factor out the greatest common factor.

a) $12p - 18q = 6(2p - 3q)$

b) $8x^3 - 9x^2 + 15x$

$$x(8x^2 - 9x + 15)$$

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Factoring a Trinomial

$$y^2 + 8y + 15$$

$$(y+3)(y+5)$$

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Special Factorizations

$$x^2 - y^2 = (x + y)(x - y) \quad \text{Difference of two squares}$$

$$x^2 + 2xy + y^2 = (x + y)^2 \quad \text{Perfect square trinomial}$$

$$x^3 - y^3 = (x - y)(x^2 + xy + y^2) \quad \text{Difference of two cubes}$$

$$x^3 + y^3 = (x + y)(x^2 - xy + y^2) \quad \text{Sum of two cubes}$$

$$8 - x^3 =$$

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

$$4 + 2x + x^2$$

$$x^2 + 2x + 4$$

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Factor (if possible):

$$a) 64p^2 - 42q^2 = 2(32p^2 - 21q^2)$$

$$b) x^2 + 36 \quad \text{not factorable}$$

$$c) x^2 + 16x + 64 = (x + 8)(x + 8) = (x + 8)^2$$

$$d) 9y^2 - 24yz + 16z^2 = (3y - 4z)^2$$

$$e) y^3 - 8 = y^3 - 2^3 = (y - 2)(y^2 + 2y + 4)$$

$$f) 2m^3 + 128 = 2(m^3 + 64) = 2(m + 4)(m^2 - 4m + 16)$$

$$g) 8k^3 - 27z^3 = (2k)^3 - (3z)^3 = (2k - 3z)(4k^2 + 6kz + 9z^2)$$

$$h) p^4 - 1 = (p^2)^2 - 1 = (p^2 + 1)(p^2 - 1) \\ (p^2 + 1)(p + 1)(p - 1)$$

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Homework:

page R-5; #1-15 odd

pages R-7 & R-8; #1-11 odd, 17-23 odd

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