

1-3 HWAnswer Key

Open House Wed, 9/18 6-8pm

1. $x^4 + 3x^3 - 4x^2 - 9x + 3$
2. $4x^2 - 5x - 2$
3. $x^2 + 2x + 4$
4. $x^3 + 2x^2 - 5x - 6$
5. $-x$
6. $2x^3 - x^2 - 3x + 14$
7. $x^2 + 7x - 2$
8. $-x^2 - 2x$
9. $2x^4 - 7x^3 + 9x^2 - 8x + 4$
10. $x^2 + 2x + 1$
11. $x^4 - 2x^3 - 74x^2 + 115x - 12$
12. $3x^3 - 5x^2 - x - 14$
13. $x^5 - 4x^4 + 4x^3 - 8x^2 + 32x - 32$
14. $x^2 - 4x + 3$
15. $2x^2 - 4x + 3$
16. $7x^2 + 8x - 25$
17. $4x^2 - 6x + 12$
18. $x^3 + 2x^2 - 6x - 7$
19. $12x^5 + 24x^4 - 34x^3 - 8x^2 + 10x$
20. $x^2 - 6x + 9$
21. $x^2 + 2x - 5 + \frac{6}{x-6}$

Aug 24-6:15 PM

Re-write each polynomial in standard form by applying the operations in the appropriate order. You have some completed from the in class activity.

$$\begin{aligned} 1) (x^2 - 3)(x^2 + 3x - 1) \\ = x^4 + 3x^3 - x^2 - 3x^2 - 9x + 3 \\ = x^4 + 3x^3 - 4x^2 - 9x + 3 \end{aligned}$$

$$\begin{aligned} 2) (5x^2 - 3x - 7) - (x^2 + 2x - 5) \\ = 5x^2 - 3x - 7 - x^2 - 2x + 5 \\ = 4x^2 - 5x - 2 \end{aligned}$$

$$\begin{aligned} 3) (x^3 - 8) \div (x - 2) \\ \begin{array}{r} x^2 + 2x + 4 \\ x-2 \overline{) x^3 + 0x^2 + 0x - 8} \\ \underline{-x^3 + 2x^2} \\ 2x^2 + 0x \\ \underline{-2x^2 + 4x} \\ 4x - 8 \\ \underline{-4x + 8} \\ 0 \end{array} \end{aligned}$$

$$\begin{aligned} 4) (x+1)(x-2)(x+3) \\ = (x^2 - x - 2)(x+3) = x(x^2 - x - 2) + 3(x^2 - x - 2) \\ = x^3 - x^2 - 2x + 3x^2 - 3x - 6 \\ = x^3 + 2x^2 - 5x - 6 \end{aligned}$$

$$\begin{aligned} 5) (x+1) - (x-2) - (x+3) \\ = x + 1 - x + 2 - x - 3 \\ = -x \end{aligned}$$

$$\begin{aligned} 6) (x+2)(2x^2 - 5x + 7) \\ = x(2x^2 - 5x + 7) + 2(2x^2 - 5x + 7) \\ = 2x^3 - 5x^2 + 7x + 4x^2 - 10x + 14 \\ = 2x^3 - x^2 - 3x + 14 \end{aligned}$$

$$\begin{aligned} 7) \frac{x^3 - 2x^2 - 65x + 18}{x-9} \\ \begin{array}{r} x^2 + 7x - 2 \\ x-9 \overline{) x^3 - 2x^2 - 65x + 18} \\ \underline{-x^3 + 9x^2} \\ 7x^2 - 65x \\ \underline{-7x^2 + 63x} \\ 2x + 18 \\ \underline{-2x + 18} \\ 0 \end{array} \end{aligned}$$

$$\begin{aligned} 8) (x^2 - 3x + 2) - (2 - x + 2x^2) \\ = x^2 - 3x + 2 - 2 + x - 2x^2 \\ = -x^2 - 2x \end{aligned}$$

$$\begin{aligned} 9) (x^2 - 3x + 2)(2 - x + 2x^2) \\ = x^2(2 - x + 2x^2) - 3x(2 - x + 2x^2) + 2(2 - x + 2x^2) \\ = 2x^2 - x^3 + 2x^4 - 6x + 3x^2 - 6x^3 + 4 - 2x + 4x^2 \\ = 2x^4 - 7x^3 + 9x^2 - 8x + 4 \end{aligned}$$

$$\begin{aligned} 10) \frac{x^3 - x^2 - 5x - 3}{x-3} \\ \begin{array}{r} x^2 + 2x + 1 \\ x-3 \overline{) x^3 - x^2 - 5x - 3} \\ \underline{-x^3 + 3x^2} \\ 2x^2 - 5x \\ \underline{-2x^2 + 6x} \\ x - 3 \\ \underline{-x + 3} \\ 0 \end{array} \end{aligned}$$

$$\begin{aligned} 11) (x^2 + 7x - 12)(x^2 - 9x + 1) \\ = x^2(x^2 - 9x + 1) + 7x(x^2 - 9x + 1) - 12(x^2 - 9x + 1) \\ = x^4 - 9x^3 + x^2 + 7x^3 - 63x^2 + 7x - 12x^2 + 108x - 12 \\ = x^4 - 2x^3 - 74x^2 + 115x - 12 \end{aligned}$$

Sep 1-4:14 PM

12) $(2x^3 - 6x^2 - 7x - 2) + (x^3 + x^2 + 6x - 12)$ $= 3x^3 - 5x^2 - x - 14$	13) $(x^3 - 8)(x^2 - 4x + 4)$ $= x^3(x^2 - 4x + 4) - 8(x^2 - 4x + 4)$ $= x^5 - 4x^4 + 4x^3 - 8x^2 + 32x - 32$
14) $(x^3 - 2x^2 - 5x + 6) \div (x + 2)$ $\begin{array}{r} x^2 - 4x + 3 \\ x+2 \overline{) x^3 - 2x^2 - 5x + 6} \\ \underline{x^3 + 2x^2 + 4x + 6} \\ -4x^2 - 9x + 0 \\ \underline{-4x^2 + 8x + 6} \\ -13x + 0 \end{array}$	15) $(x^3 + 2x^2 - 3x - 1) + (4 - x - x^3)$ $= 2x^2 - 4x + 3$
16) $(7x^2 + 5x - 10) + (3x - 15)$ $= 7x^2 + 8x - 25$	17) $(6x^2 - 2x + 7) - (2x^2 + 4x - 5)$ $= 6x^2 - 2x + 7 - 2x^2 - 4x + 5$ $= 4x^2 - 6x + 12$
18) $(x^2 - 4)(x + 3) - (x^2 + 2x - 5)$ $= (x^3 + 3x^2 - 4x - 12) - (x^2 + 2x - 5)$ $= x^3 + 3x^2 - 4x - 12 - x^2 - 2x + 5$ $= x^3 + 2x^2 - 6x - 7$	19) $(6x^3 - 2x)(2x^2 + 4x - 5)$ $= 6x^3(2x^2 + 4x - 5) - 2x(2x^2 + 4x - 5)$ $= 12x^5 + 24x^4 - 30x^3 - 4x^3 - 8x^2 + 10x$ $= 12x^5 + 24x^4 - 34x^3 - 8x^2 + 10x$
20) $\frac{(x-3)^3}{x-3}$ $= (x-3)(x-3)(x-3)$ $= (x-3)^2$ $= x^2 - 6x + 9$	21) $(x^3 - 4x^2 - 17x + 36) \div (x - 6)$ $\begin{array}{r} x^2 + 2x - 5 \\ x-6 \overline{) x^3 - 4x^2 - 17x + 36} \\ \underline{x^3 - 6x^2 + 36x - 36} \\ 2x^2 - 17x + 72 \\ \underline{2x^2 - 12x + 72} \\ -5x + 0 \end{array}$ $x^2 + 2x - 5 + \frac{6}{x-6}$ $6 = \text{Remainder}$

Sep 1-4:15 PM

QUIZ

Sep 10-4:48 PM

1-4: Factoring Review

Let's first review three types of factoring:

1. GCF- Greatest Common Factor
2. DOTS- Difference of Two Squares
3. Factor by Grouping

To factor a polynomial by Greatest Common Factor (GCF):

Step 1: Identify the GCF. Consider the coefficients and the variables.

Step 2: Divide the GCF out of each term of the polynomial.

Step 3: Re-write the expressions in factored form.

Examples: Factor each expression using GCF

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

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

$$2. x^2 - x$$

$$= x(x-1)$$

$$3. 2x^3 - 6x^2 + 10x$$

$$= 2x(x^2 - 3x + 5)$$

$$4. 6r^2s - 9rs^2 + 12r^2s^2$$

$$= 3s(2r - 3s + 4rs)$$

$$\frac{y \cdot y}{1/1} //$$

$$5. y^6 + y^4$$

$$= y^4(y^2 + 1)$$

$$\frac{y^6}{y^4} = y^{6-4} = y^2$$

$$6. y^{a+2} + y^a$$

$$= y^a y^2 + y^a$$

$$= y^a(y^2 + 1)$$

Aug 13-2:09 PM

To factor a polynomial by Difference Of Two Squares (DOTS):

Step 1: Take the square root of each term.

Step 2: The 1st square root is the 1st term of both parentheses.Step 3: The 2nd square root is the 2nd term of both parentheses.

Step 4: Re-write the expressions in factored form.

* Note: any even exponent is a perfect square.

$$\sqrt{x^2} = x$$

$$\sqrt{x^4} = x^2$$

Factor each binomial using DOTS.

$$1. a^2 - b^2$$

$$= (a+b)(a-b)$$

$$2. x^2 - 4$$

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

$$3. y^2 - 64$$

$$4. 9a^2 - 16$$

$$= (3a-4)(3a+4)$$

$$5. x^2y^2 - 9$$

$$= (xy+3)(xy-3)$$

$$6. 25 - 64x^2$$

$$= (5-8x)(5+8x)$$

$$(\cancel{8x+5})(\cancel{8x-5})$$

Aug 27-12:10 PM

Factor by Grouping:Example 1: Factor $x^3 + 3x^2 - 4x - 12$

Step 1: Write the polynomial in standard form.

$$\underline{x^3 + 3x^2 - 4x - 12}$$

$$\underline{x^2(x+3) - 4(x+3)}$$

Step 2: Group terms.

Step 3: Use GCF to factor common monomials from each group.

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

Step 4: Factor out the common binomial.

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

Step 5: Factor using DOTS if possible.

2. Factor $x^3 - 2x^2 - 9x + 18$

Aug 24-6:21 PM

3. Factor $2x^3 + x^2 + 8x + 4$

$$= x^2(\cancel{2x+1}) + 4(\cancel{2x+1})$$

$$= (2x+1)(x^2+4)$$

Sum is done. No DOTS

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

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

Factor Completely:

1. $36x^2 - 4y^2$

$$= 4(9x^2 - y^2)$$

$$= 4(3x-y)(3x+y)$$

2. $12x^2 - 27$

$$= 3(4x^2 - 9)$$

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

3. $2y^4 + 2y^3 + 4y^2 + 4y$ GCF

$$= 2y(\underline{y^3 + y^2} + \underline{2y + 2})$$

4. $81 - m^4$

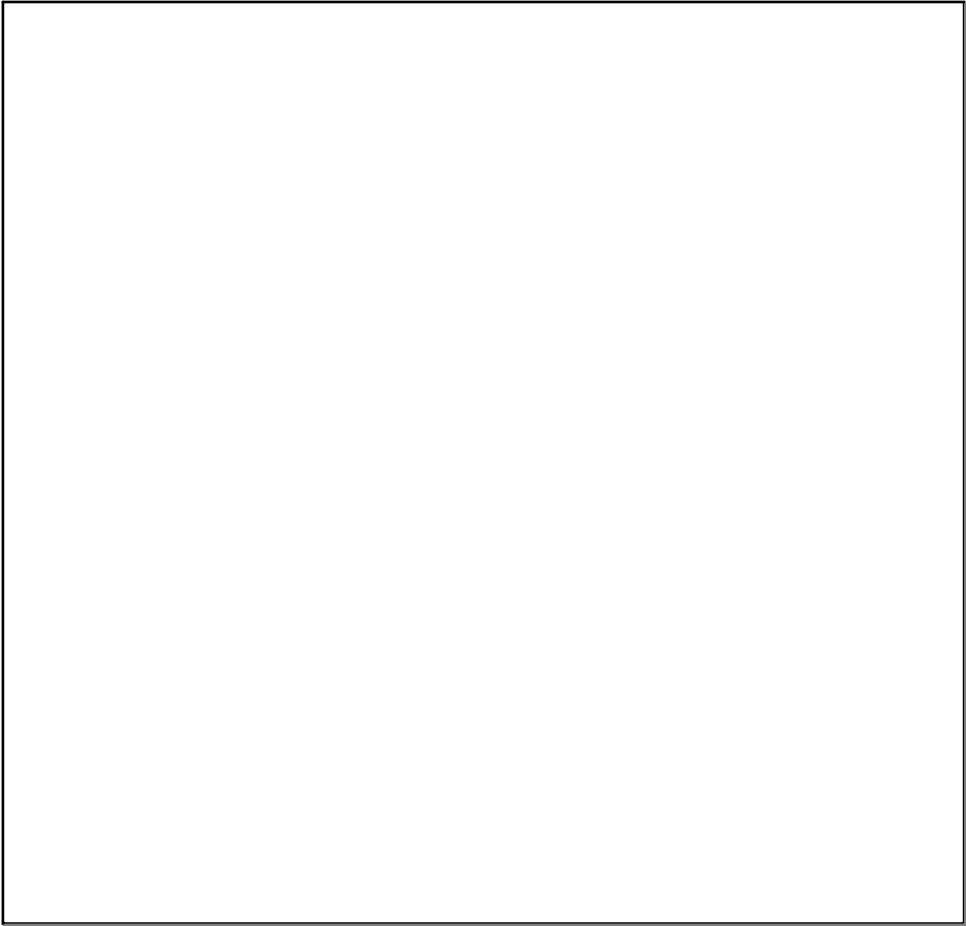
$$= (9 - m^2)(9 + m^2)$$

$$= (3-m)(3+m)(9+m^2)$$

YouTube video on RSA encryption (about 10 minutes)

<http://www.youtube.com/watch?v=M7kEpw1tn50>
<https://www.youtube.com/watch?v=M7kEpw1tn50>


Aug 24-6:21 PM



Sep 3-10:56 PM