

Name \_\_\_\_\_  
Date \_\_\_\_\_

Introduction to Technical Mathematics  
Class #09-A-2

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***Factoring - An Introduction***

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Quality - Accuracy - Transfer - 100%

**Section 1. The "Horseshoe Method" for Listing Factors of a Number**

1. List the Factors of 32: \_\_\_\_\_

32 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. List the factors of 42: \_\_\_\_\_

42 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Section 2. Additional Practice and Application - The "Horseshoe Method".**

3. Factors of 36

\_\_\_\_\_  
\_\_\_\_\_ a. Factors of 36 that add up to 12 \_\_\_\_\_  
\_\_\_\_\_ b. Factors of 36 that subtract to 9 \_\_\_\_\_  
\_\_\_\_\_ c. Factors of 36 that add to 13 \_\_\_\_\_  
\_\_\_\_\_ d. Factors of 36 that subtract to 16 \_\_\_\_\_

4. Factors of 60

\_\_\_\_\_  
\_\_\_\_\_ a. Factors of 60 that add up to 16 \_\_\_\_\_  
\_\_\_\_\_ b. Factors of 60 that subtract to 7 \_\_\_\_\_  
\_\_\_\_\_ c. Factors of 60 that add to 32 \_\_\_\_\_  
\_\_\_\_\_ d. Factors of 60 that subtract to 17 \_\_\_\_\_

5. Factors of 80

\_\_\_\_\_

\_\_\_\_\_ a. Factors of 80 that add up to 21 \_\_\_\_\_

\_\_\_\_\_ b. Factors of 80 that subtract to 2 \_\_\_\_\_

\_\_\_\_\_ c. Factors of 80 that add to 24 \_\_\_\_\_

\_\_\_\_\_ d. Factors of 80 that subtract to 38 \_\_\_\_\_

6. Factors of 100

\_\_\_\_\_

\_\_\_\_\_ a. Factors of 100 that add up to 25 \_\_\_\_\_

\_\_\_\_\_ b. Factors of 100 that subtract to 21 \_\_\_\_\_

\_\_\_\_\_ c. Factors of 100 that add to 20 \_\_\_\_\_

\_\_\_\_\_ d. Factors of 100 that subtract to 0 \_\_\_\_\_

**Section 3. Greatest Common Factor - NORM!! FORM**

**NORM FORM** is an algorithm (a mathematical process that can be repeated for success over and over again), that will yield the *Greatest Common Factor*, the *Least Common Multiple*, and *Reduce a Fraction* or any rational number to lowest terms. The drawback is that this method will work for two numbers at a time, only.

7. Find the *GCF*, the *LCM*, and Simplify the ratio between the numbers 28 and 42.

8. Find the *GCF*, the *LCM*, and Simplify the ratio between the numbers 108 and 144.

**Section 4. Greatest Common Factor between Two Variable Expressions:**

Characteristics of GCF: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**2. State the Greatest Common Factor between the Following Pairs of Monomials.**

- a.  $x^2, x^3y$  \_\_\_\_\_ b.  $a^3b^2, a^2b$  \_\_\_\_\_  
c.  $6ab; -12a^2b^3$  \_\_\_\_\_ d.  $8xy; 6xz$  \_\_\_\_\_  
e.  $7c^3d^3; -14c^2d$  \_\_\_\_\_ f.  $50m^3n^2; 75m^3n$  \_\_\_\_\_

**Section 5. Factoring Simple Expressions: Sums and Differences.**

In each case, it must be noted that you are changing a sum or difference, or multi-termed expressions (a polynomial) to a product, by virtue of the act of "factoring". This will always be the case.

3.  $2a + 2b$  \_\_\_\_\_ Check: \_\_\_\_\_  
4.  $bx - by$  \_\_\_\_\_ Check: \_\_\_\_\_  
5.  $15c - 10d$  \_\_\_\_\_ Check: \_\_\_\_\_  
6.  $p + prt$  \_\_\_\_\_ Check: \_\_\_\_\_  
7.  $\pi r^2 + \pi R^2$  \_\_\_\_\_ Check: \_\_\_\_\_  
8.  $10xy - 15x^2y^3$  \_\_\_\_\_ Check: \_\_\_\_\_  
9.  $28m^4n^3 + 70m^2n^4$  \_\_\_\_\_ Check: \_\_\_\_\_

**Definition - Prime Polynomial:** \_\_\_\_\_

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10. Identify the Following as Prime. If they are not prime, then factor the expression.

2.  $8m - 8n$  \_\_\_\_\_ Factor: \_\_\_\_\_

3.  $3c + d$  \_\_\_\_\_ Factor: \_\_\_\_\_

4.  $18a - 27b$  \_\_\_\_\_ Factor: \_\_\_\_\_

5.  $5y^2 - 21x^2$  \_\_\_\_\_ Factor: \_\_\_\_\_

6.  $\frac{1}{2}hb + \frac{1}{2}hc$  \_\_\_\_\_ Factor: \_\_\_\_\_

7.  $21r^3s^2 - 12r^2s$  \_\_\_\_\_ Factor: \_\_\_\_\_

8.  $15x^3y^3z^3 - 5xyz$  \_\_\_\_\_ Factor: \_\_\_\_\_

**Section 6. The Factoring by Grouping - "Looking for the Key".**

1.  $2x(x + 5) - 3(x + 5)$   
\_\_\_\_\_

2.  $3x(x - 2) - 4(x - 2)$   
\_\_\_\_\_

2.  $x(x - 5) + 2(x - 5)$   
\_\_\_\_\_

4.  $8x(2x - 1) + 3(2x - 1)$   
\_\_\_\_\_

5.  $x(x - 1) - 5(x - 1)$   
\_\_\_\_\_

6.  $3x(x + 1) + 2(x + 1)$   
\_\_\_\_\_

**Section 7. FINALLY - Factor the Following Polynomial Expressions by "Grouping".**

7.  $x^2 + 5x + 2x + 10$

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8.  $x^2 + 4x + 3x + 12$

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9.  $x^2 - 6x + 2x - 12$

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10.  $x^2 - 7x + 3x - 21$

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11.  $x^2 + 7x - 2x - 14$

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12.  $x^2 + 8x - 3x - 24$

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13.  $x^2 - 10x - 8x + 80$

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14.  $x^2 - 6x - 4x + 24$

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**Section 8. Reverse F.O.I.L.**

**Section 1. Multiply the Given Expressions.**

1.  $(x + 7)(x + 3)$

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2.  $(x - 5)(x - 4)$

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3.  $(x + 7)(x + 3)$

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4.  $(x + 7)(x + 3)$

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**Section 2. Preparing to Factor Trinomials – The Story that the Signs Tell.**

5. The General Form for Any 2<sup>nd</sup> Degree Trinomial.  $ax^2 + bx + c$
- |    |                 |       |                  |       |
|----|-----------------|-------|------------------|-------|
| a. | $ax^2 + bx + c$ | _____ | $x^2 + 5x + 6$   | _____ |
| b. | $ax^2 - bx + c$ | _____ | $x^2 - 7x + 10$  | _____ |
| c. | $ax^2 + bx - c$ | _____ | $x^2 + 8x - 9$   | _____ |
| d. | $ax^2 - bx - c$ | _____ | $x^2 - 10x - 24$ | _____ |

6. Factor the Following Expressions by “Reading Backward”.
- |    |                  |       |                  |       |
|----|------------------|-------|------------------|-------|
| a. | $x^2 + 15x + 26$ | _____ | $x^2 + 13x + 12$ | _____ |
| b. | $x^2 - 8x + 12$  | _____ | $x^2 - 10x + 9$  | _____ |
| c. | $x^2 + 8x - 20$  | _____ | $x^2 - 13x - 30$ | _____ |
| d. | $x^2 + 7x - 18$  | _____ | $x^2 - 13x - 48$ | _____ |
| e. | $x^2 - 15x + 36$ | _____ | $x^2 + 13x + 30$ | _____ |

**HW Section**

Page(s)	Section(s)	Problem(s)
275 → 276	8.1	1 → 55 E.O.O.*
278 → 279	8.2	1 → 33 Odd

\*E.O.O. - “Every Other Odd