Homework answers (Handouts)

#1 Functions: A, B, C, D, F, G, I, K, M, P, Q

#1 Non-Functions: E, H, J, L, N, O, R

#2 Functions: 2, 3, 5, 7, 8, 10

#2 Non-Functions: 1, 4, 6, 9

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Skill Builder: Factoring Polynomials

Recall:
- Factoring means changing a quadratic relation from standard form $f(x) = ax^2 + bx + c$ into factored form

$$f(x) = a(x-r)(x-s)$$

- Remember! ALWAYS look for **GREATEST COMMON FACTORS** first!

- <u>THEN</u> FACTOR whatever is INSIDE THE BRACKETS, if possible.

Example 1: Factor $x^2 - 14x + 45$ **Example 3:** Factor $3x^2 - 11x - 4$

M +45
A -14
X - 9
X - 5

$= (x-9)(x-5)$

M -12
A -11
X -12 → $\frac{3x}{-12}$ → $\frac{x}{-4}$
X +1 → $\frac{3x}{+1}$ → $\frac{3x}{+1}$

$= (x-4)(3x+1)$

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Example 4: Factor $9x^2 - 25$

DOS ← 2 terms
both √
minus

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

Example 7: Factor $4a^2 - 12x + 9$

$(2a-3)^2$

PST ← 3 terms
front & back
are √
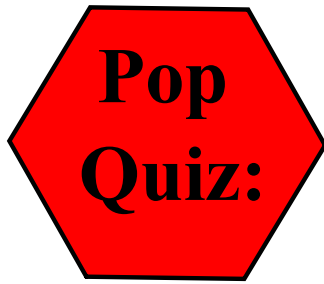2

$$\square^2 + 2\square\triangle + \triangle^2$$

$$(\square + \triangle)^2$$

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Do the rest on your own now.

2. (y-3)(y+5)

5. (4-t)(4+t)

6. 4(x-2)(x+2)

8. $(x+2)^2$

9. 2(3x-4)(3x+4)

10. (3x-4)(2x+3)

11. 2(3x-2)(x+1)

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Pop Quiz:

0:10:00

Factor the following **as much as possible**!

1) $x^2 - 14x + 45$ 2) $y^2 + 2y - 15$ 3) $3x^2 - 11x - 4$

4) $9x^2 - 25$ 5) $16 - t^2$ 6) $4x^2 - 16$

7) $4a^2 - 12a + 9$ 8) $x^2 + 4x + 4$ 9) $18x^2 - 32$

10) $6x^2 + x - 12$ 11) $6x^2 + 2x - 4$

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Recall: Distributive property

$$a(b + c) = ab + ac$$

RIP
FOIL

You distribute the **a** to the **b** and, then you distribute the **a** to the **c**.

Here is a different way to look at expanding It will help you understand factoring by grouping on the next page:

Expand $(x + 2)(y + z)$

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Factoring by Grouping (*should have 4 terms in polynomial*)

- Separate the four terms into two groups of two or three terms (you may have to rearrange the terms)

  o For groups of two terms
    - Factor each group so that each has the same common factor remaining
    - Factor this common factor into one bracket and the remaining terms into another bracket

  o For groups of three terms
    - Factor a trinomial into two identical brackets which can then be written as $()^2$.
    - This may result in a difference of squares which can then be factored into two large brackets.
    - Simplify the two large brackets as much as possible, eliminating any brackets within.

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Example – factor each expression by grouping

a) $xy + 6x + 5y + 30$

$$x(y+6) + 5(y+6)$$

$$(y+6)(x+5)$$

b) $2ab + 2a - 3b - 3$

$$2a(b+1) - 3(b+1)$$

$$(b+1)(2a-3)$$

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c) $x^3 + x^2 + x + 1$ PST   d) $y^2 - 4y + 4 - 16x^2$

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

$$\boxed{(x+1)(x^2+1)}$$

$(y-2)^2 - 16x^2$

DOS: $(y-2)^2 - (4x)^2$

$$\boxed{(y-2+4x)(y-2-4x)}$$

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e) $8x^4 - 18y^2 - 60y - 50$

$2(4x^4 - 9y^2 - 30y - 25)$

$2(4x^4 - (9y^2 + 30y + 25))$
           PST

$2(4x^4 - (3y+5)^2)$ DOS

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

$$\boxed{2(2x^2 + 3y + 5)(2x^2 - 3y - 5)}$$

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f) $2m^2 + 10m + 10n - 2n^2$

$2(m^2 + 5m + 5n - n^2)$

$2(m^2 - n^2 + 5m + 5n)$

$2[(m+n)(m-n) + 5(m+n)]$

$$\boxed{2(m+n)(m-n+5)}$$

HW:

1. p. 102 #2 (just factor, don't describe), 4-7, 9 challenge: 14

2. Study for the quiz tomorrow on the first 3 lessons