NAME: _____

ANSWERS -

Quiz 4

Calculators are not allowed. Write your answers on the dashed lines.

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Question 1: The standard expressions: Factor the following polynomials using one of the standard formulas discussed in the Algebra Worksheet. If the polynomial cannot be factored, say so (write "Cannot be factored")

NP [5] • $x^2 + 12x + 36$ $= (x+6)^2$

NP [5] • $x^2 - 2x + 1$ $= (x-1)^2$

(-2) for wrong sign [5] • $-x^2 + 3x - \frac{9}{4}$ $= -\left(x^2 - 3x + \frac{9}{4}\right) = -\left(x - \frac{3}{2}\right)^2$

NP [5] • $5x^2 - 20x + 20$ $= 5(x^2 - 4x + 4) = 5(x-2)^2$

NP [5] • $x^2 - 11$ $= (x - \sqrt{11})(x + \sqrt{11})$

(-2) if do not factor all the way [5] • $1 - x^4$ $= (1-x^2)(1+x^2) = (1-x)(1+x)(1+x^2)$

NP [5] • $x^3 + 1$ cannot be factored

(-2) for sign error [5] • $-2x^2 + 5$ $= (-\sqrt{2}x + \sqrt{5})(\sqrt{2}x + \sqrt{5}) = (\sqrt{5} - \sqrt{2}x)(\sqrt{5} + \sqrt{2}x)$ ← Both OK

NP [5] • $(3x+1)^2 + x^2$ cannot be factored

(-2) if forget the $\sqrt{2}$ in terms [5] • $(2x-1)^2 - 2x^2$ $= (2x - 1 - \sqrt{2}x)(2x - 1 + \sqrt{2}x)$ ← OK

$= ((2-\sqrt{2})x - 1)((2+\sqrt{2})x - 1)$

In all these questions, (-4) / algebra error.

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+5 extra credit for factoring last part correctly

Question 2: the common factor method: Factor these expressions using the "common factor" method.

[10] • $-2x^3 - 2x^2 + 4x$ $= 2x(-x^2 - x + 2)$

$= -2x(x^2 + x - 2) = -2x(x+2)(x-1)$ } all OK

Since $D = 1 - 4(1)(-2) = 1 + 8 = 9 \rightarrow \begin{cases} x_1 = \frac{-1-3}{2} = -2 \\ x_2 = \frac{-1+3}{2} = 1 \end{cases}$

$\rightarrow x^2 + x - 2 = (x+2)(x-1)$

[10] • $-x(x+1) + (x-2)(x+1) - 2(1+x)$

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

$= (x+1)(-4) = -4(x+1)$ ← [5] for finish.

↑ [5] for getting this far

[10] • $(4+x)(2-x) + 2x - 4$ $= (4+x)(2-x) + 2(x-2)$ ← [3]

$= (4+x)(2-x) - 2(2-x)$ ← [3]

$= (2-x)(4+x-2) = (2-x)(2+x)$

↑ [3] ↑ [1]

[10] • $x^4 - 1 + 6(x^2+1)$

$= (x^2-1)(x^2+1) + 6(x^2+1)$ ← [5] for getting this far.

$= (x^2+1)(x^2 - 1 + 6) = (x^2+1)(x^2+5)$ ← [5] for finishing

[10] **Question 3: Grouping:** Factor this polynomial using the grouping method.

• $2x^8 - 4x^2 - 6x^6 + 12$

[5] for grouping
[5] for finishing

$= 2x^8 - 6x^6 - 4x^2 + 12$

$= 2x^6(x^2 - 3) - (4x^2 - 12)$

$= 2x^6(x^2-3) - 4(x^2-3)$

$= (x^2-3)(2x^6 - 4) = (x - \sqrt{3})(x+\sqrt{3})\,2(x^6 - 2)$

ok ok

all ok

OR $= 2x^2(x^6 - 2) - 6(x^6 - 2)$

$= (2x^2 - 6)(x^6 - 2) = 2(x^2-3)(x^6-2)$ ← same thing.