

Name: _____
PC: Even More Factoring Practice

Date: _____
Ms. Loughran

Do Now:

Factor each completely.

1. $y^4(y+2)^3 + y^5(y+2)^4$

$$y^4(y+2)^3(1+y(y+2))$$
$$y^4(y+2)^3(y^2+2y+1)$$
$$y^4(y+2)^3(y+1)^2$$

3. $(a^2+2a)^2 - 2(a^2+2a) - 3$
 $m^2 - 2m - 3$

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

2. $x^2 - 7x + 10$
 $(a^2+1)^2 - 7(a^2+1) + 10$

$$(a^2+1-5)(a^2+1-2)$$
$$(a^2-4)(a^2-1)$$
$$(a-2)(a+2)(a-1)(a+1)$$

4. $(x-1)(x+2)^2 - (x-1)^2(x+2)$

$$(x-1)(x+2)(x+2 - (x-1))$$
$$3(x-1)(x+2)$$

Classwork

Factor each completely.

1. $5(4x^2 + 4x + 1)^4(8x + 4)$

$$5((2x+1)^2)^4 \cdot 4(2x+1)$$

$$5(2x+1)^8 \cdot 4(2x+1)$$

$$20(2x+1)^9$$

$$4x^2 + 4x + 1$$

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

2. $(x^2 + 3)^{\frac{1}{3}} - \frac{2}{3}x^2(x^2 + 3)^{-\frac{4}{3}}$

$$(x^2 + 3)^{-\frac{4}{3}} \left[(x^2 + 3) - \frac{2}{3}x^2 \right]$$

$$(x^2 + 3)^{-\frac{4}{3}} \left[\frac{1}{3}x^2 + 3 \right] = \frac{\frac{1}{3}x^2 + 3}{(x^2 + 3)^{\frac{4}{3}}} = \frac{x^2 + 9}{3(x^2 + 3)^{\frac{4}{3}}}$$

3. $3(x^4 - 2x^2 + 1)^2(4x^3 - 4x)$

$$3((x^2 - 1)^2)^2 \cdot 4x(x^2 - 1)$$

$$12x(x^2 - 1)^5$$

$$12x(x-1)^5(x+1)^5$$

4. $\frac{1}{2}x^{-\frac{1}{2}}(3x+4)^{\frac{1}{2}} - \frac{3}{2}x^{\frac{1}{2}}(3x+4)^{-\frac{1}{2}}$

$$\frac{1}{2}x^{-\frac{1}{2}}(3x+4)^{-\frac{1}{2}} \left[3x+4 - 3x \right]$$

$$\frac{1}{2}x^{-\frac{1}{2}}(3x+4)^{-\frac{1}{2}}(4)$$

$$\frac{2}{\sqrt{x} \sqrt{3x+4}}$$

$$x > 0$$

$$3x+4 > 0$$

$$x > -\frac{4}{3}$$

$$5. 3x^{\frac{3}{2}} - 9x^{\frac{1}{2}} + 6x^{-\frac{1}{2}}$$

$$3x^{-\frac{1}{2}}(x^2 - 3x + 2)$$

$$3x^{-\frac{1}{2}}(x-2)(x-1)$$

$$\frac{3(x-2)(x-1)}{x^{\frac{1}{2}}} \quad x > 0$$

$$7. (2+x)^{-\frac{2}{3}}x + (2+x)^{\frac{1}{3}}$$

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

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

$$2(2+x)^{-\frac{2}{3}}(x+1)$$

$$\frac{2(x+1)}{(2+x)^{\frac{2}{3}}} \quad x \neq -2$$

$$9. x^{-\frac{3}{2}} + 2x^{-\frac{1}{2}} + x^{\frac{1}{2}}$$

$$x^{-\frac{3}{2}}(1 + 2x + x^2)$$

$$x^{-\frac{3}{2}}(x+1)^2$$

$$\frac{(x+1)^2}{x^{\frac{3}{2}}} \quad x > 0$$

$$11. 2x^{\frac{1}{3}}(x-2)^{\frac{2}{3}} - 5x^{\frac{4}{3}}(x-2)^{-\frac{1}{3}}$$

$$x^{\frac{1}{3}}(x-2)^{-\frac{1}{3}}[2(x-2) - 5x]$$

$$x^{\frac{1}{3}}(x-2)^{-\frac{1}{3}}[-3x-4]$$

$$\frac{(-3x-4)x^{\frac{1}{3}}}{(x-2)^{\frac{1}{3}}} \quad x \neq 2$$

$$6. 4a^2c^2 - (c^2 - b^2 + a^2)^2$$

$$(2ac - (c^2 - b^2 + a^2))(2ac + (c^2 - b^2 + a^2))$$

$$(2ac - c^2 + b^2 - a^2)(2ac + c^2 - b^2 + a^2)$$

$$(b^2 - a^2 + 2ac - c^2)(a^2 + 2ac + c^2 - b^2)$$

$$(b^2 - (a^2 - 2ac + c^2))((a+c)^2 - b^2)$$

$$(b^2 - (a-c)^2)(a+c-b)(a+c+b)$$

$$(b-a+c)(b+a-c)(a+c-b)(a+c+b)$$

$$8. x^{\frac{5}{2}} - x^{\frac{1}{2}}$$

$$x^{\frac{1}{2}}(x^2 - 1) \quad x > 0$$

$$x^{\frac{1}{2}}(x-1)(x+1)$$

$$10. (x^2+1)^{\frac{1}{2}} + 2(x^2+1)^{-\frac{1}{2}}$$

$$(x^2+1)^{-\frac{1}{2}}(x^2+1+2)$$

$$\frac{x^2+3}{(x^2+1)^{\frac{1}{2}}}$$

$$12. 5(x^2+4)^4(2x)(x-2)^4 + (x^2+4)^5(4)(x-2)^3$$

$$(x^2+4)^4(x-2)^3 \left[10x^2 - 20x + 4x^2 + 16 \right]$$

$$(x^2+4)^4(x-2)^3(14x^2 - 20x + 16)$$

$$2(x^2+4)^4(x-2)^3(7x^2 - 10x + 8)$$

$$13. 3(2x-1)^2(2)(x+3)^{\frac{1}{2}} + (2x-1)^3 \left(\frac{1}{2}\right)(x+3)^{-\frac{1}{2}}$$

$$\frac{1}{2}(2x-1)^2(x+3)^{-\frac{1}{2}} \left[\overset{12x+36}{12(x+3)} + 2x-1 \right]$$

$$\frac{1}{2}(2x-1)^2(x+3)^{-\frac{1}{2}}(14x+35)$$

$$\frac{1}{2}(2x-1)^2(x+3)^{-\frac{1}{2}} \cdot 7(2x+5) = \frac{7}{2}(2x-1)^2(x+3)^{-\frac{1}{2}}$$

$$\frac{7(2x-1)^2(2x+5)}{2(x+3)^{\frac{1}{2}}}$$

$$x > -3$$

Homework 09-14

$$\begin{aligned} 2. \quad & x^2 + 6x + 9 - 121y^2 \\ & (x+3)^2 - 121y^2 \\ & (x+3 - 11y)(x+3 + 11y) \end{aligned}$$

$$\begin{aligned} 3. \quad & (x+2)^3 - 16x - 32 \\ & (x+2)^3 - 16(x+2) \\ & (x+2) \left[(x+2)^2 - 16 \right] \\ & (x+2)(x+2-4)(x+2+4) \\ & (x+2)(x-2)(x+6) \end{aligned}$$

$$\begin{aligned} 9. \quad & x^4 + 6x^2 + 25 + 4x^2 - 4x^2 \\ & x^4 + 10x^2 + 25 - 4x^2 \\ & (x^2 + 5)^2 - 4x^2 \\ & (x^2 - 2x + 5)(x^2 + 2x + 5) \end{aligned}$$

$$\begin{aligned} 11. \quad & 9x^4 + 3x^2 + 4 + 9x^2 - 9x^2 \\ & 9x^4 + 12x^2 + 4 - 9x^2 \\ & (3x^2 + 2)^2 - 9x^2 \\ & (3x^2 - 3x + 2)(3x^2 + 3x + 2) \end{aligned}$$

$$\begin{aligned} 7. \quad & a^2 - b^2 - 14b - 49 \\ & a^2 - (b^2 + 14b + 49) \\ & a^2 - (b+7)^2 \\ & (a-b-7)(a+b+7) \end{aligned}$$

$$\begin{aligned} 10. \quad & 4x^4 + 8x^2 + 9 + 4x^2 - 4x^2 \\ & 4x^4 + 12x^2 + 9 - 4x^2 \\ & (2x^2 + 3)^2 - 4x^2 \\ & (2x^2 + 2x + 3)(2x^2 - 2x + 3) \end{aligned}$$

$$\begin{aligned} 12. \quad & 16x^4 - x^2 + 1 + 9x^2 - 9x^2 \\ & 16x^4 + 8x^2 + 1 - 9x^2 \\ & (4x^2 + 1)^2 - 9x^2 \\ & (4x^2 - 3x + 1)(4x^2 + 3x + 1) \end{aligned}$$