Name: _____ Date: _____
PCH Ms. Loughran

Do Now:
Factor each of the following completely.

1. $121s^2 - 66st + 9t^2$

$(11s - 3t)^2$

2. $u^2 - v^2 + 2v - 1$

$u^2 - (v^2 - 2v + 1)$
$u^2 - (v-1)^2$
$(u - (v-1))(u + (v-1))$
$(u - v + 1)(u + v - 1)$

3. $x^{2n} - 1$

$(x^n - 1)(x^n + 1)$
we could
$(x^{\frac{n}{2}} - 1)(x^{\frac{n}{2}} + 1)(x^n + 1)$
⋮

(5)
$(x^{\frac{2}{5}} - 16)$
$(x^{\frac{1}{5}} + 4)(x^{\frac{1}{5}} - 4)$
$(x^{\frac{1}{5}} + 4)(x^{\frac{1}{10}} + 2)(x^{\frac{1}{10}} - 2)$

4. $x^{2n} + 2x^n y^n + y^{2n}$

$(x^n + y^n)^2$

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Do Now:
Factor each of the following completely.

1. $x^6 + 5x^5 - 5x^4 - 25x^3 + 4x^2 + 20x$

$x^5(x+5) - 5x^3(x+5) + 4x(x+5)$

$(x^5 - 5x^3 + 4x)(x+5)$

$x(x^4 - 5x^2 + 4)(x+5)$

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

$x(x+1)(x-1)(x+2)(x-2)(x+5)$

2. $4x^8 - 61x^4 + 225$ $+x^4 - x^4$

$4x^8 - 60x^4 + 225 - x^4$

$(2x^4 - 15)^2 - x^4$

$(2x^4 - x^2 - 15)(2x^4 + x^2 - 15)$

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

3. $(5x-6)^2 - (4x-3)^2$

$(5x-6+4x-3)(5x-6-(4x-3))$

$(9x-9)(x-3)$

$9(x-1)(x-3)$

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

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

$(x+2)^{-\frac{1}{3}}(7x+8)$

$\frac{7x+8}{(x+2)^{\frac{1}{3}}}$ $x \neq -2$

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

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

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

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

Simplify: $\dfrac{3(x+2)^2(x-3)^2 - (x+2)^3(2)(x-3)}{(x-3)^4}$

$$\frac{(x+2)^2(x-3)\left[\begin{matrix}3x-9 & -2x-4\\ 3(x-3) & -2(x+2)\end{matrix}\right]}{(x-3)^4}$$

$$\frac{(x+2)^2\cancel{(x-3)}(x-13)}{(x-3)^4}$$

$$\frac{(x+2)^2(x-13)}{(x-3)^3} \qquad x \neq 3$$

⑨ $x^{3/5} + 5x^{2/5} - 3x^{\frac{1}{5}} - 15$

$x^{2/5}\left(x^{\frac{1}{5}} + 5\right) - 3\left(x^{\frac{1}{5}} + 5\right)$

$\left(x^{2/5} - 3\right)\left(x^{\frac{1}{5}} + 5\right)$

$16x^4 + 16x^2y^2 + 16y^4$

$16\left(x^4 + x^2y^2 + y^4 + x^2y^2 - x^2y^2\right)$

$16\left[\left(x^2 + y^2\right)^2 - x^2y^2\right]$

$16\left(x^2 - xy + y^2\right)\left(x^2 + xy + y^2\right)$