PRINCIPLES - LESSON 13B
FACTORING COMPLETELY

Recall: To factor means to rewrite as a product (things being multiplied).

Factor.

ex1) $12x^3y^2 - 6x^4y^3 + 4x^2y$ ← GCF

$= \boxed{2x^2y(6xy - 3x^2y^2 + 2)}$ All remaining factors are prime.

FACTORING COMPLETELY

To factor completely is to break down each factor until it cannot be factored any further. When factoring polynomials, we always factor completely.

Factor completely.

ex2) $27n^2 - 3$ ← Always start with GCF

$= 3(\underline{9n^2 - 1})$ ← Difference of Two Squares

$= \boxed{3(3n+1)(3n-1)}$ All remaining factors are prime.

FACTORING COMPLETELY

Factor.

ex3) $30c^2 + 5c - 10$ ← Always start with GCF

$= 5(6c^2 + c - 2)$ ← Reverse FOIL

$= \boxed{5(3c-2)(c+1)}$ All remaining factors are prime.

FACTORING COMPLETELY

Factor.

ex4) $3d^3 - 6d^2 - 144d$ ← Always start with GCF

$= 3d(d^2 - 2d - 48)$ ← Reverse FOIL

$= \boxed{3d(d-8)(d+6)}$

All remaining factors are prime.

FACTORING COMPLETELY

Factor.

ex5) $3n^{32} - 3$ ← Always start with GCF

$= 3(\underline{n^{32} - 1})$ ← Difference of Two Squares

$= 3(n^{16}+1)(\underline{n^{16}-1})$ ← Difference of Two Squares

$= 3(n^{16}+1)(n^{8}+1)(\underline{n^{8}-1})$ ← Difference of Two Squares

$= 3(n^{16}+1)(n^{8}+1)(n^{4}+1)(\underline{n^{4}-1})$ ← Difference of Two Squares

$= 3(n^{16}+1)(n^{8}+1)(n^{4}+1)(n^{2}+1)(\underline{n^{2}-1})$ ← Difference of Two Squares

$= \boxed{3(n^{16}+1)(n^{8}+1)(n^{4}+1)(n^{2}+1)(n+1)(n-1)}$ All remaining factors are prime.