Polynomial and Rational Functions
A2RCC U8D6 Quiz #2

PRACTICE QUIZ

1) Prove the identity: $(x-y)^3 = x^3 - 3x^2y + 3xy^2 - y^3$

$$(x-y)(x-y)(x-y) = x^3 - 3x^2y + 3xy^2 - y^3$$

$$(x^2 - 2xy + y^2)(x-y) = x^3 - 3x^2y + 3xy^2 - y^3$$

$$x^3 - x^2y - 2x^2y + 2xy^2 + xy^2 - y^3 = x^3 - 3x^2y + 3xy^2 - y^3$$

$$x^3 - 3x^2y + 3xy^2 - y^3 = x^3 - 3x^2y + 3xy^2 - y^3$$

2) Factor completely.

A) $8x^3 - 27$

$(2x-3)(4x^2+6x+9)$

C) $x^3 + 216$

$(x+6)(x^2-6x+36)$

B) $169x^2 - 16y^2$

$(13x+4y)(13x-4y)$

D) $x^4 + 64x$

$x(x^3+64)$

$x(x+4)(x^2-4x+16)$

3) Find the inverse of $g(x) = \dfrac{x-9}{x+1}$ and state the domain of $g(x)$

D: $x \neq -1$

$$y = \frac{x-9}{x+1}$$

$$(y+1)(x) = \left(\frac{y-9}{\cancel{y+1}}\right)\cancel{y+1}$$

$$xy + x = y - 9$$

$$xy - y = -x - 9$$

$$\frac{y(x-1)}{x-1} = \frac{-x-9}{x-1}$$

$$y = \frac{-x-9}{x-1}$$

$$g^{-1}(x) = \frac{-x-9}{x-1}$$

4) Create the equation, in standard form, of a cubic whose x-intercepts are given by the set $\{3, -5, 2\}$ and which passes through the point $(4, -54)$.

F.F.

$y = a(x-3)(x+5)(x-2)$

$-54 = a(4-3)(4+5)(4-2)$

$-54 = a(1)(9)(2)$

$\frac{-54}{18} = \frac{18a}{18}$

$a = -3$

S.F.

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

$y = (-3x+9)(x^2+3x-10)$

$y = -3x^3 - 9x^2 + 30x + 9x^2 + 27x - 90$

$y = -3x^3 + 57x - 90$

Factored Form: $y = -3(x-3)(x+5)(x-2)$

Standard Form: $y = -3x^3 + 57x - 90$

Sketch the graph indicating the window which shows all turning points, x-intercepts, and y-intercept.