Wed. Week 4

- Review for Exam
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MA 115 Exam 1(A) Name:

1. Simplify the expression:

(a) $6y^0(3y^2)^{-1}$

$6 \cdot 1 \cdot \frac{1}{3y^2} = \boxed{\frac{2}{y^2}}$

(b) $\frac{4^2 b^3 c^{-3}}{(2a)^3 b^2 c^0} = \frac{4^2 \cdot b^3 \cdot b^{-2}}{2^3 a^3 \cdot c^0 \cdot c^3} = \frac{(2^2)^2 b}{2^3 a^3 c^3} = \frac{2^4 \cdot b}{2^3 \cdot a^3 \cdot c^3} = \boxed{\frac{2b}{a^3 c^3}}$

(c) $\frac{(x+y)^2}{x^2-y^2}$ rewrite $\frac{(x+y)\cdot(x+y)}{(x-y)\cdot(x+y)} = \boxed{\frac{x+y}{x-y}}$

2. Completely factor the polynomial:

(a) $3x^2 + 7x - 6$

tri-nomial, deg. 2 (quadratic)

$AC = -18$

$\pm$ 1, 18
2, 9

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

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

$3xA - 2A = A(3x-2)$

$\leftarrow (x+3 = A)$

$\boxed{(x+3)(3x-2)}$

(b) $x^3 - 6x^2 - 4x + 24$

4-terms ... think grouping

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

$(x^2-4)(x-6)$ keep going!

diff. of □'s

$\boxed{(x-2)(x+2)(x-6)}$

More Factoring!

looks bad b/c multi variables, but ok, b/c grouping

$$(s^2 + 4st) + 7s + 28t$$

4 pieces ... try grouping

$$s(s + 4t) + 7(s + 4t) = (s+4t)(s+7)$$

3. Find all solutions to the equations:

(a) $x^6 - 7x^3 + 6 = 0$

degree 6, trinomial
└ often in quadratic-type
$(au^2 + bu + c = 0)$
└ factor or Q.F.

① $AC = 6$
$1, 6$

$x^6 - x^3 - 6x^3 + 6 = 0$

$x^3(x^3 - 1) - 6(x^3 - 1) = 0$

$(x^3 - 6)(x^3 - 1) = 0$

$x = \sqrt[3]{6}, \sqrt[3]{1}$

$\boxed{x = \sqrt[3]{6}, 1}$

NOTE: NO $\pm$ w/ odd roots

(b) $x - 5 = 4\sqrt{x}$

see $x^{\frac{1}{2}}$ $\sqrt{x}$ ... isolate the radical & square

squaring: $(x-5)^2 = 4^2 x$

$x^2 - 10x + 25 = 16x$

$x^2 - 26x + 25 = 0$

$(x - 25)(x - 1) = 0$

... 0 is special

—check these—

$x = 1, 25$

$1 - 5 = 4\sqrt{1}$

$-4 = 4$ ⊗

$\boxed{x = 25}$

(c) $\sqrt[3]{2x+3} + 1 = 0$

Isolate the radicals then cube

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

$2x + 3 = -1$

$\boxed{x = -2}$

- Can't ÷ by 0
- Can't sq. root a negative (or even-root)
- Can't log a negative #

4. Find the Domain of the given functions:

(a) $f(x) = 13$ $(-\infty, \infty)$

constant — doesn't depend on x ——

(b) $f(x) = \dfrac{1}{x^2 - 3x}$ ← can't be 0

1. set it equal to 0: $x^2 - 3x = 0$

$x(x-3) = 0$

$x = 0, \; x = 3$

	(or)
$(-\infty,0) \cup (0,3) \cup (3,\infty)$	$\mathbb{R} - \{0,3\}$

(c) $f(x) = \sqrt{4 - x}$

set $4 - x \geq 0$

$4 \geq x$

$(-\infty, 4]$ interval not

or

$\{x \mid x \leq 4\}$ set notation

5. Write an equation for a line the satisfies the given characteristics:

(a) passes through the points (5,2) and (3,3)

Need: slope & point

$m = \dfrac{\text{rise}}{\text{run}} = \dfrac{\Delta y}{\Delta x} = \dfrac{3-2}{3-5} = \dfrac{1}{-2}$

$y - 3 = -\frac{1}{2}(x - 3)$ or $y = -\frac{1}{2}x + \frac{3}{2} + 3 \Rightarrow y = -\frac{1}{2}x + \frac{9}{2}$

$y - 3 = -\frac{1}{2}x + \frac{3}{2}$

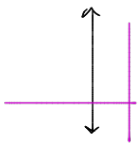
$\{(x,y) \mid y = -\frac{1}{2}x + \frac{9}{2}\}$

(b) passes through the points (-3,2) and (-3,7)

$m = \dfrac{7-2}{-3-(-3)} = \dfrac{5}{0}$ undefined slope $\Rightarrow$ vertical line.

$x = -3$

Line $= \{(x,y) \mid x = -3\}$



(c) passes through (3,-2) perpendicular to $y = -\frac{1}{2}x - 6$

$\perp$ - slope $\Rightarrow$ negative recip:

since $m = -\frac{1}{2}$, $m_\perp = 2$

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

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

6. Find the following compositions of:

$$f(x) = x^2 - 3x + 4 \qquad \text{and} \qquad g(x) = x - 3$$

(a) $f \circ g$

(b) $g \circ g$

7. For each function find its inverse:

(a) $f(x) = \sqrt[3]{x+5}$

(b) $f(x) = \dfrac{3x+2}{x-5}$

WeBWorK:

The due dates will be pushed back

- Long Div. (next thing due)
- Rad. / Reg. (much later)