Review questions (mostly from the online the "Math 98, Prep for Test 1" review assignment):

Example 1: Does the correspondence on a sports team between a player's name and the number on their jersey represent a function?

At any give time, yes.
But occasionally players
change Numbers.

Example 2: Multiply $(x^3 + yz)(x^3 - yz)$

$$= x^6 - x^3yz + x^3yz - y^2z^2$$

$$= x^6 - y^2z^2$$

(b) $f(a+h) - f(a) = \left[(a+h)^2 + 5\right] - \left[a^2 + 5\right]$

$$= a^2 + 2ah + h^2 + 5 - a^2 - 5$$

$$= 2ah + h^2$$

Example 3: If $f(x) = x^2 + 5$, find

a.) $f(t-1)$

b.) $f(a+h) - f(a)$

c.) $f(a) - f(a-h)$

(c) $f(a) - f(a-h) = \left[a^2 + 5\right] - \left[(a-h)^2 + 5\right]$

$$= a^2 + 5 - \left[a^2 - 2ah + h^2 + 5\right]$$

$$= a^2 + 5 - a^2 + 2ah - h^2 - 5$$

$$= 2ah - h^2$$

(a) $f(t-1) = (t-1)^2 + 5$

$$= t^2 - 2t + 1 + 5$$

$$= t^2 - 2t + 6$$

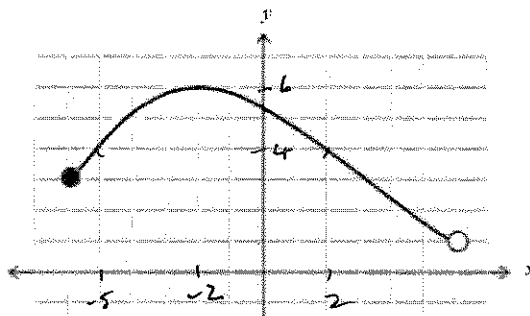Example 4: Consider the graph of f

a.) Find $f(-2) = 6$

b.) Solve $f(x) = 4$

$x = -5$ or $x = 2$

c.) Find the domain of f.

$[-6, 6)$

d.) Find the range of f.

$(1, 6]$

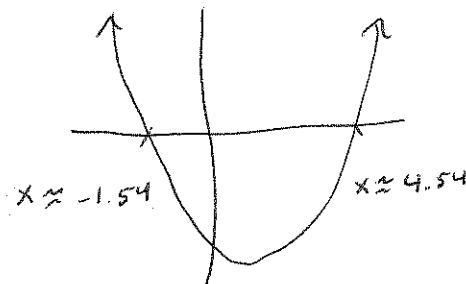Example 5: Factor $x^4 + 3x^3 - 18x^2$

$$= x^2(x^2 + 3x - 18)$$
$$= x^2(x + 6)(x - 3)$$

Example 6: Solve $x^2 - 3x - 7 = 0$

Does Not factor so solve graphically.

$x \approx -1.54$ $x \approx 4.54$

Example 7: Solve $35 - x^2 = 2x$

$$\Rightarrow \quad 0 = x^2 + 2x - 35$$
$$\Rightarrow \quad 0 = (x + 7)(x - 5)$$
$$\Rightarrow \quad x = -7 \quad \text{or} \quad x = 5$$

Example 8: Find the zeros of
$f(x) = x^3 - 3x^2 - 4x$

solve $0 = x^3 - 3x^2 - 4x$
$$= x(x^2 - 3x - 4)$$
$$= x(x - 4)(x + 1)$$

$$\Rightarrow \quad x = 0, 4, -1$$

Example 9: Solve $(x+1)(x-2) = 4$

$$\Rightarrow \quad x^2 - x - 2 = 4$$
$$\Rightarrow \quad x^2 - x - 6 = 0$$
$$\Rightarrow \quad (x - 3)(x + 2) = 0$$
$$\Rightarrow \quad x = 3, -2$$

Example 10: Factor $8x^2 - 8y^2$

$$= 8(x^2 - y^2)$$
$$= 8(x + y)(x - y)$$