unit 2 Quadratics Review

(1) Solve:

(A) $x^2+5x=0$

$x(x+5)=0$

$\boxed{x=0}$ $x+5=0$

$\boxed{x=-5}$

(B) $3x-5x^2=0$

$x(3-5x)=0$

$\boxed{x=0}$ $3-5x=0$

$-5x=-3$

$\boxed{x=\frac{3}{5}}$

(C) $4x^2-64=0$

$4x^2=64$

$x^2=16$

$\boxed{x=4}$ $\boxed{x=-4}$

(D) $x^2+bx=7$

$x^2+bx-7=0$

$(x+7)(x-1)=0$

$\boxed{x=-7}$ $\boxed{x=1}$

(E) $2x^2+8x+5=0$

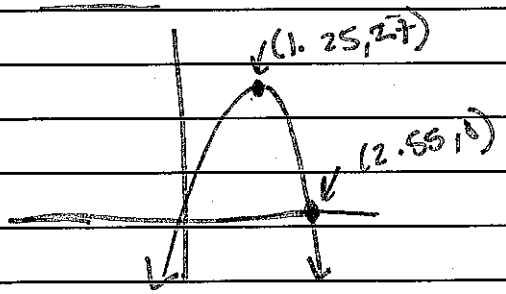
$x=\frac{-8\pm\sqrt{(8)^2-4(2)(5)}}{2(2)}=\frac{-8\pm\sqrt{64-40}}{4}$

$=\boxed{\frac{-8\pm\sqrt{24}}{4}}$

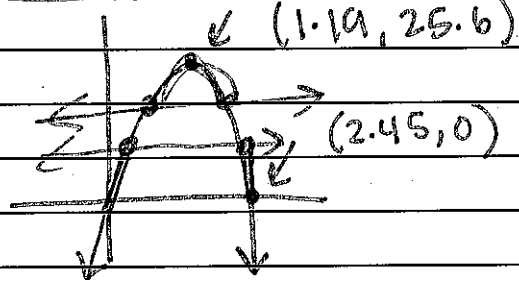
(2) Soccer ball: $f(x)=-16x^2+40x+2$

football: $f(x)=-16x^2+38x+3$

soccer:



football:



a) soccerball by 1.4 ft

b) soccerball by .10 feet

c) 2.45 seconds

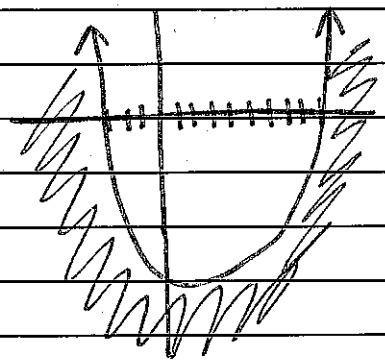
(7) $y = a(x+3)(x-4)$ y-int: $(0,4)$

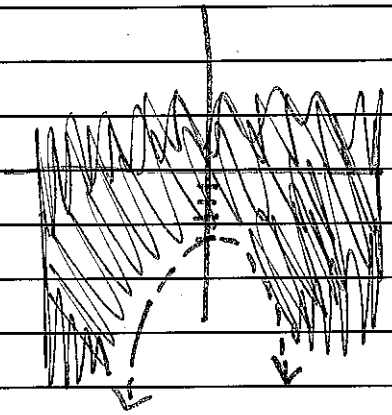
$4 = a(0+3)(0-4)$

$4 = -12a$

$a = \frac{-1}{3}$ → $\boxed{y = -\frac{1}{3}(x+3)(x-4)}$

(8) A) $y \leq x^2 - 6x - 27$ B) $y > -x^2 - 4$





(9) $y = x^2 - 5x - 6$

x-int: $(x+1)(x-6)$

$x = -1, \; x = 6$

y-int: $y = (0)^2 - 5(0) - 6$

$y = -6 \quad (0, -6)$

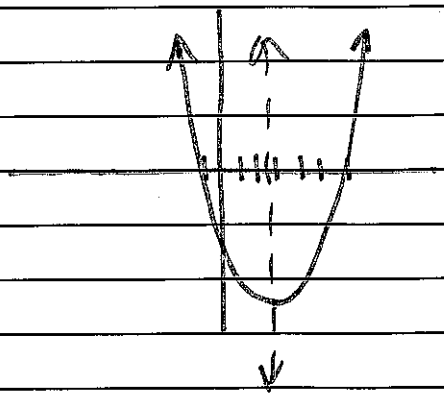
Axis of symmetry: $x = \frac{-b}{2a} = \frac{--5}{2(1)} = \frac{5}{2}$

Vertex: $x = \frac{-1+6}{2} = \frac{5}{2}$

$y = \left(\frac{5}{2}\right)^2 - 5\left(\frac{5}{2}\right) - 6$

$y = \frac{-49}{4}$

$\boxed{\left(\frac{5}{2}, \frac{-49}{4}\right)}$



$y = x^2$

(3) a) $y = -(x-2)^2 - 7$

- opens downward
- right 2 units
- down 7 units

b) $y = 4(x+3)^2 + 4$

- vt st by a factor of 4 (vertical stretch)
- left 3 units
- up 4 units

c) $y = \frac{1}{3}x^2$

- vertical shrink by a factor of $\frac{1}{3}$

(4) $y = 2x^2 - 3x + 7$

$a = 2, \quad b = -3, \quad c = 7$

$b^2 - 4ac$ "discriminant"

$(-3)^2 - 4(2)(7)$

$9 - 56$

-47

no real solutions

(5) x-int: $(3,0)$ $(-9,0)$

$y = a(x-3)(x+9)$

(6) x-int: $(-2,0)$ $(2,0)$ vertex: $(0,3)$

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

$3 = a(0+2)(0-2)$

$3 = a(2)(-2)$

$3 = -4a$

$a = \frac{-3}{4}$ $\rightarrow$ $y = -\frac{3}{4}(x+2)(x-2)$

(10) a) $\frac{20}{x} = x+1$

$20 = (x+1)x$

$20 = x^2 + x$

$0 = x^2 + x - 20$

$0 = (x+5)(x-4)$

$\boxed{x = -5}$ $\boxed{x = 4}$

b) $x^2 - 4x = x - 3$

$x - 5x + 3 = 0$

$a = 1,\ b = -5,\ c = 3$

$x = \frac{5 \pm \sqrt{(-5)^2 - 4(1)(3)}}{2(1)}$

$x = \frac{5 \pm \sqrt{25 - 12}}{2} = \boxed{\frac{5 \pm \sqrt{13}}{2}}$

(11) Michael : max (1.56, 44.06)
zero (3.22, 0)

Henry : $y = -16x^2 + 75x + 4$
(4.74, 0) (2.34, 91.89)

a) Whose ball was in the air the longest? Michael

b) Who threw their ball the highest? Henry

c) Henry because he threw the ball the highest