Section 4: Converting Between Standard & Vertex Form

37. Rewrite the quadratic equation below in ***standard form***

ax^2+bx+c → $a, b, ?c$

1) FOIL → 2) distribute → 3) simplify

$y = 2(x-3)^2 - 8$ (a = 2, h = 3, k = −8)

$y = 2(x-3)(x-3) - 8$

$y = 2(x^2 - 3x - 3x + 9) - 8$

$y = 2x^2 - 6x - 6x + 18 - 8$

$\boxed{y = 2x^2 - 12x + 10}$ $a=2$ $B=-12$ $C=10$

38. Which of the following is the quadratic function below written in ***standard form***?

ax^2+bx+c → $a, b, ?c$

$y = 3(x+2)^2 - 6$ (a = 3, h = −2, k = −6)

$y = 3(x+2)(x+2) - 6$

$y = 3(x^2 + 2x + 2x + 4) - 6$

$y = 3x^2 + 6x + 6x + 12 - 6$

A. $3x^2 - 2$ B. $3x^2 + 12x - 6$

(C.) $3x^2 + 12x + 6$ D. $3x^2 + 12x + 12$

39. Which of the following is the quadratic function below written in ***vertex form***?

$y = a(x-h)^2 + k$ ← $a, h, ?k$

$y = x^2 - 2x - 5$ ($a = 1$, $B = -2$, $C = -5$)

$h = \frac{-b}{2a} = \frac{-(-2)}{2(1)} = \frac{2}{2} = 1$

$K = (1)^2 - 2(1) - 5$

$K = 1 - 2 - 5$

$K = -6$

A. $y = (x+1)^2 + 2$ B. $y = (x-1)^2 + 6$

C. $y = (x+1)^2 - 2$ (D.) $y = (x-1)^2 - 6$

40. Rewrite the quadratic equation below in ***vertex form***?

$y = 2x^2 - 4x - 5$ ($a = 2$, $B = -4$, $C = -5$)

$y = a(x-h)^2 + k$

$h = \frac{-b}{2a} = \frac{-(-4)}{2(2)} = \frac{4}{4} = 1$

$K = 2(1)^2 - 4(1) - 5$

$K = 2(1) - 4 - 5$

$K = -7$

$\boxed{y = 2(x-1)^2 - 7}$

Section 5: Quadratic Formula

41. Find the solutions of the quadratic equation below. Write your answer in simplest radical form.

$y = 8x^2 - 12x + 3$ ($a = 8$, $B = -12$, $C = 3$)

$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-(-12) \pm \sqrt{(-12)^2 - 4(8)(3)}}{2(8)}$

$= \frac{12 \pm \sqrt{144 - 96}}{16}$

$= \frac{12 \pm \sqrt{48}}{16}$ (simplify $\sqrt{48}$)

$= \frac{12 \pm 4\sqrt{3}}{16}$

12, 4, ?16 are divisible by 4. divide each by 4.

$= \boxed{\frac{3 \pm \sqrt{3}}{4}, \frac{3 - \sqrt{3}}{4}}$

$\sqrt{48}$: 48 → 2, 24 → 2, 12 → 2, 6 → 2, 3 → 2 · 2 · 2 · 3 = $4\sqrt{3}$

42. Which of the following are the solutions of the quadratic equation below?

$y = 9x^2 + 3x - 1$ ($a = 9$, $B = 3$, $C = -1$)

$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-3 \pm \sqrt{(3)^2 - 4(9)(-1)}}{2(9)}$

$= \frac{-3 \pm \sqrt{9 + 36}}{18} = \frac{-3 \pm \sqrt{45}}{18}$ (simplify)

$\sqrt{45} = \sqrt{3 \cdot 3 \cdot 5} = 3\sqrt{5}$ (5 → 3, 3)

$= \frac{-3 + 3\sqrt{5}}{18}$

−3, 3, ?18 are divisible by 3 divide by 3.

(A.) $\frac{-1+\sqrt{5}}{6}, \frac{-1-\sqrt{5}}{6}$ B. $\frac{1+3\sqrt{5}}{6}, \frac{1-3\sqrt{5}}{6}$

C. $\frac{1+\sqrt{5}}{6}, \frac{1-\sqrt{5}}{6}$ D. $\frac{-1+3\sqrt{5}}{6}, \frac{-1-3\sqrt{5}}{6}$

$\boxed{\frac{-1+\sqrt{5}}{6}, \frac{-1-\sqrt{5}}{6}}$