Name key Date_____ Pd._____

FACTORING & CONVERTING REVIEW

(1) Convert to standard form ($y = ax^2 + bx + c$) by FOIL / Distribute

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

$y = -3(2x^2 + 10x - 3x - 15)$

$y = -3(2x^2 + 7x - 15)$

$\boxed{y = -6x^2 - 21x + 45}$

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

$y = -(12x^2 - 21x + 8x - 14)$

$y = -(12x^2 - 13x - 14)$

$\boxed{y = -12x^2 + 13x + 14}$

(c) $y = 2(x-4)^2 - 15$

$y = 2(x^2 - 8x + 16) - 15$

$y = 2x^2 - 16x + 32 - 15$

$\boxed{y = 2x^2 - 16x + 17}$

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

$y = -3(x^2 + 4x + 4) + 9$

$y = -3x^2 - 12x - 12 + 9$

$\boxed{y = -3x^2 - 12x - 3}$

(2) Convert to intercept form ($y = a(x-p)(x-q)$) by factoring / GCF

(a) $y = x^2 - 8x + 15$

$\boxed{y = (x-3)(x-5)}$

(b) $y = 5x^2 - 125$

$y = 5(x^2 - 25)$

$\boxed{y = 5(x-5)(x+5)}$

(c) $y = -4x^2 + 16x + 84$

$y = -4(x^2 - 4x - 21)$

$\boxed{y = -4(x-7)(x+3)}$

(d) $y = 12x^2 + 14x - 40$

$y = 2(6x^2 + 7x - 20)$

$\boxed{y = 2(2x+5)(3x-8)}$

(3) Convert to vertex form ($y = a(x-h)^2 + k$) by completing the square

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

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

$9 + y = (x^2 - 6x + 9) + 4$

$9 + y = (x-3)^2 + 4$

$\boxed{y = (x-3)^2 - 5}$

(b) $y = x^2 + 5x - 2$

$y = (x^2 + 5x + \_\_) - 2$

$6.25 + y = (x^2 + 5x + 6.25) - 2$

$6.25 + y = (x + 2.5)^2 - 2$

$\boxed{y = (x+2.5)^2 - 8.25}$

(c) $y = 2x^2 + 8x + 11$

$y = (2x^2 + 8x + \_\_) + 11$

$y = 2(x^2 + 4x + \_\_) + 11$

$8 + y = 2(x^2 + 4x + 4) + 11$

$8 + y = 2(x+2)^2 + 11$

$\boxed{y = 2(x+2)^2 + 3}$

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

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

$6.75 + y = 3(x^2 - 3x + 2.25) + 8$

$6.75 + y = 3(x - 1.5)^2 + 8$

$\boxed{y = 3(x - 1.5)^2 + 1.25}$

(4) Factor the following expressions.

(a) $x^2 + 14x + 48$

$\boxed{(x+6)(x+8)}$

(b) $-7x^2 + 42x - 35$

$-7(x^2 - 6x + 5)$

$\boxed{-7(x-1)(x-5)}$

(c) $5x^2 - 80$

$5(x^2 - 16)$

$\boxed{5(x+4)(x-4)}$

(d) $-6x^2 - 42x$

$\boxed{-6x(x+7)}$

(e) $10x^2 - 14x - 12$

$2(5x^2 - 7x - 6)$

$\boxed{2(5x+3)(x-2)}$

(f) $-4x^2 + 14x + 30$

$-2(2x^2 - 7x - 15)$

$\boxed{-2(2x+3)(x-5)}$

(5) The function $P(t) = -5t^2 + 100t - 95$ models the profit, P, made by the dance team at their concert depending on the cost of the ticket, t. **Explain all answers in the context of the problem!**

(a) Identify the vertex algebraically (*Two choices: _____ or _____)

$x = \frac{-b}{2a}$

$x = \frac{-100}{2(-5)} = \frac{-100}{-10} = 10$

$y = -5(10)^2 + 100(10) - 95$

$y = -500 + 1000 - 95$

$y = 405$

$(10, 405)$

(b) Identify the zeros algebraically by converting to _____.

$y = -5t^2 + 100t - 95$

$y = -5(t^2 - 20t + 19)$

$y = -5(t-1)(t-19)$

$\boxed{(1,0)\ (19,0)}$

(c) Identify the y-intercept.

$(0, -95)$