Pre-Calculus 11: Factoring Quadratics Quiz

Full credit will only be awarded for all work shown in a neat and organized manner.

Factor completely.

1. $p^2 - 12p + 27$

(×) 27 | (−3, −9)
(+) −12 | −12

$(p-3)(p-9)$

2. $-72 + m + m^2$

(×) −72 | (−8, 9)
(+) 1 | 1

$= m^2 + m - 72$

$= (m-8)(m+9)$

3. $64 - 9x^2$ Diff. of Sq.

$\sqrt{64} = 8$, $\sqrt{9x^2} = 3x$

$(8-3x)(8+3x)$

4. $2y^2 + 5y - 25$

(×) −50 | (10, −5)
(+) 5 | +5

$((2y^2 + 10y)(-5y - 25))$

$= [2y(y+5) - 5(y+5)]$

$= (2y-5)(y+5)$

5. $16b^4 - 1$ Diff of Sq

$\sqrt{16b^4} = 4b^2$ $\sqrt{1} = 1$

$(4b^2+1)(4b^2-1)$ ← Diff. of Sq.

$\sqrt{4b^2} = 2b$

$\sqrt{1} = 1$

$(4b^2+1)(2b-1)(2b+1)$

6. $5y^{6n} + 15y^{3n} - 90$

(×) −18 | (6, −3)
(+) 3 | 3

$= 5(y^{6n} + 3y^{3n} - 18)$

$= 5(y^{3n} + 6)(y^{3n} - 3)$

7. $(x+3y)^2 z - 2(x+3y)z - 35z$

Let $a = (x+3y)$

$= a^2 z - 2az - 35z$

$= z(a^2 - 2a - 35)$

$= z(a-7)(a+5)$

(×) −35 | (−7, 5)
(+) −2 | −2

$= z(x+3y-7)(x+3y+5)$

8. $15(2x-1)a^2 - 19(2x-1)a + 6(2x-1)$

$= (2x-1)[15a^2 - 19a + 6]$

(×) 90 | (−9, −10)
(+) −19 | −19

$= (2x-1)[(15a^2 - 9a) + (-10a + 6)]$

$= (2x-1)[3a(5a-3) - 2(5a-3)]$

$= (2x-1)(3a-2)(5a-3)$

9. $24h^{10} - 6h^5k^3 - 9k^6$

Let $h^5 = a$, $k^3 = b$

$= 24a^2 - 6ab - 9b^2$

$= 3(8a^2 - 2ab - 3b^2)$

$\otimes -24 \mid (6, 4)$

$\oplus -2 \mid -2$

$= 3((8a^2 - 6ab) + (4ab - 3b^2))$

$= 3(2a(4a - 3b) + b(4a - 3b))$

$= 3(2a + b)(4a - 3b)$

$= \boxed{3(2h^5 + k^3)(4h^5 - 3k^3)}$

10. $-8b^4x^4 + 14b^4x^2 + 9b^4$

$= -b^4(8x^4 - 14x^2 - 9)$ $\otimes -72 \mid (4, -18)$ $\oplus -14 \mid -14$

$= -b^4((8x^4 + 4x^2) + (-18x^2 - 9))$

$= -b^4(4x^2(2x^2 + 1) - 9(2x^2 + 1))$

$= -b^4(2x^2 + 1)(4x^2 - 9)$ Diff. of Sq.

$= \boxed{-b^4(2x^2 + 1)(2x - 3)(2x + 3)}$

Find an integer, k, so that the trinomial is a perfect square, then factor it using that value of k

11. $t^2 + kt + 49$ Perfect Square

$\sqrt{1^{st}} = \sqrt{t^2} = t$

$\sqrt{last} = \sqrt{49} = 7$

middle $= \pm 2(t)(7)$

$= \pm 14t = kt$

$\boxed{k = \pm 14}$

$\boxed{(t \pm 7)^2}$

12. $4y^2 - 24xy + kx^2$

$\sqrt{1^{st}} = \sqrt{4y^2} = 2y$

$\sqrt{last} = \sqrt{kx^2} = \sqrt{k}x$

middle: $\pm 2(2y)(\sqrt{k}x)$

$= \ominus 4\sqrt{k}xy = -24xy$

$-4\sqrt{k} = -24$ (must be $\oplus$)

$\sqrt{k} = 6$, $\boxed{k = 36}$

$4y^2 - 24xy + 36x^2$ $\sqrt{y^2} = y$ $\sqrt{9x^2} = 3x$

$= 4(y^2 - 6xy + 9x^2)$ middle: $\pm 2(y)(3x)$ $= \ominus 6xy$

$\boxed{= 4(y - 3x)^2}$