§5.7 #s 1, 4, 7, 10, 13, 16, 17, 19, 23, 26, 27, 28, 29*, 32*

#s 1 – END FACTOR THE Following

(1) $x^2 + 6x + 9 = (x+3)^2$

x^2 ↗ x^2+6x+9 ↖ 3^2

$2 \cdot 3x = 6x$ Nice

(4) $25x^2 + 10x + 1 = (5x+1)^2$

$5^2x^2 = (5x)^2$ ↗ $25x^2+10x+1$ ↖ 1^2

$2(5x)(1) = 10x$ Nice

(7) $9y^2x^2 + 12yx^2 + 4x$

$= x^2(9y^2 + 12y + 4) = \boxed{x^2(3y+2)^2}$

$3^2y^2 = (3y)^2$ ↗ $9y^2+12y+4$ ↖ 2^2

$2(3y)(2) = 12y$ Cool!

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

(13) $(y+2)^2 - 49 = (y+2)^2 - 7^2$

$= ((y+2)+7)((y+2)-7)$

$= \boxed{(y+9)(y-5)}$

MAT 099 S 5.6 #s 16, 17, 19, 23, 26-29, 32

(16) $4x^2 - 36 = 2^2x^2 - 6^2 = (2x)^2 - 6^2 = (2x+3)(2x-3)$

(17) $x^3 + 27 = x^3 + 3^3 = (x+3)(x^2 - 3x + 3^2)$

$= \boxed{(x+3)(x^2 - 3x + 9)}$

(19) $z^3 - 1 = z^3 - 1^3 = \boxed{(z-1)(z^2 + z + 1)}$

(23) $x^3y^2 - 27y^2 = y^2(x^3 - 27) = y^2(x^3 - 3^3)$

$= y^2(x-3)(x^2 + 3x + 3^2) = \boxed{y^2(x-3)(x^2 + 3x + 9)}$

(26) $8ab^3 + 27a^4 = a\left[8b^3 + 27a^3\right]$

$= a\left[2^3b^3 + 3^3a^3\right] = a\left[(2b)^3 + (3a)^3\right]$

$= a\left[(2b+3a)((2a)^2 - (2a)(3b) + (3a)^2)\right]$

$= a\left[(2b+3a)(2^2a^2 - 6ab + 3^2a^2)\right]$

$= \boxed{a\left[(2b+3a)(4a^2 - 6ab + 9a^2)\right]}$

(27) $125y^3 - 8x^3 = 5^3y^3 - 2^3x^3 = (5y)^3 - (2x)^3$

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

$= \boxed{(5y-2x)(25y^2 + 10yx + 4x^2)}$

MAT 099 S' 5.7 #s 28, 29, 32

(28) $54y^3 - 128 = 2\left[27y^3 - 64\right]$

$= 2\left[3^3y^3 - 4^3\right]$

$= 2\left[(3y)^3 - 4^3\right] = 2\left[(3y-4)((3y)^2 + (3y)(4) + 4^2)\right]$

$= \boxed{2\left[(3y-4)(9y^2 + 12y + 16)\right]}$

(29) $x^2 + 6x + 9 - y^2$

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

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

(32) $x^2 - 18x + 81 - y^2$

x^2 ↗ ↖ ↑ 9^2

$2(x)(9) = 18x$ Nice!

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

$= \boxed{(x-9+y)(x-9-y)}$