7.5 p 75

① $5x^3 - 20x$

$= 5x(x^2 - 4)$

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

③ $7x^3 + 7x$

$= 7x(x^2+1)$

⑤ $5x^2 - 5x - 30$

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

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

⑦ $2x^4 - 162$

$= 2(x^4 - 81)$

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

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

⑨ $x^3 + 2x^2 - 9x - 18$

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

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

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

⑪ $3x^3 - 24x^2 + 48x$

$= 3x(x^2 - 8x + 16)$

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

⑬ $2x^5 + 2x^2$

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

$= 2x^2(x+1)(x^2 - x + 1)$

⑮ $6x^2 + 8x$

$= 2x(3x+4)$

⑰ $2y^2 - 2y - 112$

$= 2(y^2 - y - 56)$

$= 2(y-8)(y+7)$

⑲ $7y^4 + 14y^3 + 7y^2$

$= 7y^2(y^2+2y+1)$

$= 7y^2(y+1)^2$

㉑ $y^2 + 8y - 16$

Prime

㉓ $16y^2 - 4y - 2$

$= 2(8y^2 - 2y - 1)$

$= 2(2y-1)(4y+1)$

㉕ $r^2 - 25r$

$= r(r-25)$

1.5 p45 ~

(27) $4w^2 + 8w - 5$

$a \cdot c = -20$

$-1 \cdot 20$

$-2 \cdot 10$ ← most sum to 8

$-4 \cdot 5$

$= 4w^2 - 2w + 10w - 5$

$= 2w(2w-1) + 5(2w-1)$

$= \boxed{(2w-1)(2w+5)}$

(29) $x^3 - 4x$

$= x(x^2 - 4)$

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

(31) $x^2 + 64$ since $64 = 8^2$

$x^2 + 8^2$ is sum of two squares.

Sum of two squares is always prime

PRIME

(33) $9y^2 + 13y + 4$

$a \cdot c = 36$

$1 \cdot 36$

$2 \cdot 18$

$3 \cdot 12$

$4 \cdot 9$

$9y^2 + 9y + 4y + 4$

$9y(y+1) + 4(y+1)$

$= (y+1)(9y+4)$

(35) $y^3 + 2y^2 - 4y - 8$

$= y^2(y+2) - 4(y+2)$

$= (y^2 - 4)(y+2)$

$(y-2)(y+2)(y+2)$

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

(37) $16y^2 + 24y + 9$

$a \cdot c$

144

$1 \cdot 144$

$2 \cdot 72$

$3 \cdot 48$

$4 \cdot 36$

$6 \cdot 24$

$8 \cdot 18$

$9 \cdot 16$

$12 \cdot 12$

$16y^2 + 12y + 12y + 9$

$= 4y(4y+3) + 3(4y+3)$

$= (4y+3)(4y+3)$

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

(39) $4y^3 - 28y^2 + 40y$

$= 4y(y^2 - 7y + 10)$

$= \boxed{4y(y-5)(y-2)}$

7.5 p452

(41) $y^5 - 81y$

$= y(y^4 - 81)$

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

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

(43) $20a^4 - 45a^2$

$= 5a^2(4a^2 - 9)$

$= \boxed{5a^2(2a-3)(2a+3)}$

(45) $9x^4 + 18x^3 + 6x^2$

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

(47) $12y^2 - 11y + 2$

a·c
24
1·24
2·12
-3·-8

$= 12y^2 - 8y - 3y + 2$

$= 4y(3y-2) - (3y-2)$

$= \boxed{(4y-1)(3y-2)}$

(49) $9y^2 - 64$

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

(51) $9y^2 + 64$ sum of two squares

Prime

(53) $2y^3 + 3y^2 - 50y - 75$

$= y^2(2y+3) - 25(2y+3)$

$= (y^2 - 25)(2y+3)$

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

(55) $2r^3 + 30r^2 - 68r$

$= 2r(r^2 + 15r - 34)$

$2r(r-2)(r+17)$

(57) $8x^5 - 2x^3$

$= 2x^3(4x^2 - 1)$

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

(59) $3x^2 + 243$

$\boxed{3(x^2 + 81)}$

(61) $x^4 + 8x$

$x(x^3 + 8)$

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

7.5 p 452

(63) $2y^5 - 2y^2$

$= 2y^2(y^3 - 1)$

$= 2y^2(y-1)(y^2+y+1)$

(65) $6x^2 + 8xy$

$2x(3x+4y)$

(67) $xy - 7x + 3y - 21$

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

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

(69) $x^2 - 3xy - 4y^2$

$= (x+1)(x-4y)$

(71) $72a^3b^2 + 12a^2 - 24a^4b^2$

$12a^2(6ab^2 + 1 - 2a^2b^2)$

(73) $3a^2 + 27ab + 54b^2$

$= 3(a^2 + 9ab + 18b^2)$

$= 3(a+3b)(a+6b)$

(75) $48x^4y - 3x^2y$

$= 3x^2y(16x^2 - 1)$

$= 3x^2y(4x-1)(4x+1)$

(77) $6a^2b + ab - 2b$

$= b(6a^2 + a - 2)$ $\quad -12 = -3 \cdot 4$

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

$= b[3a(2a-1) + 2(4a-1)]$

$= b(2a-1)(3a+2)$

(79) $7x^5y - 7xy^5$

$= 7xy(x^4 - y^4)$

$= 7xy(x^2-y^2)(x^2+y^2)$

$= 7xy(x-y)(x+y)(x^2+y^2)$

(81) $10x^3y - 14x^2y^2 + 4xy^3$ $\quad 1,5$ $\quad 1,2$

$= 2xy(5x^2 - 7xy + 2y^2)$

$= 2xy(5x-2y)(x-y)$

7.5 45 ✓

(83) $2bx^2 + 44bx + 242b$

$= 2b(x^2 + 22x + 121)$

$= \boxed{2b(x+11)^2}$

(85) $15a^2 + 11ab - 14b^2$ (3·5, −2·7)

$= \boxed{(3a-2)(5a+7)}$

(87) $36x^3y - 62x^2y^2 + 12xy^3$ (3·6, 2·6, 2·9, 2·5)

$= 2xy(18x^2 - 31xy + 6y^2)$

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

(89) $a^2y - b^2y - a^2x + b^2x$

$= y(a^2-b^2) - x(a^2-b^2)$

$= (a^2-b^2)(y-x)$

$= \boxed{(a-b)(a+b)(y-x)}$ (3·3, −2·7)

(91) $9ax^3 + 15ax^2 - 14ax$ (3·3, −2·7)

$= ax(9x^2 + 15x - 14)$

$= \boxed{ax(3x-2)(3x+7)}$

7.5 p45

(93) $2x^4+6x^3y+2x^2y^2$

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

(95) $81x^4y-y^5$

$=y(81x^4-y^4)$

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

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

(97)

$10x^2(x+1)-7x(x+1)-6(x+1)$

$=(x+1)(10x^2-7x-6)$

$=(x+1)(10x^2-12x+5x-6)$

$=(x+1)[2x(5x-6)+(5x-6)]$

$=\boxed{(x+1)(5x-6)(2x+1)}$

a·c

-60

$-1\cdot 60$

$-2\cdot 30$

$-3\cdot 20$

$-4\cdot 15$

$-5\cdot 12$

$\boxed{5\cdot -12}$

(99) $6x^4+35x^2-6$

a·c

-36

$\boxed{-1\cdot 36}$

$-2\cdot 18$

$6x^4+36x^2-x^2-6$

$=6x^2(x^2+6)-1(x^2+6)$

$=\boxed{(x^2+6)(6x^2-1)}$

(101) $(x-7)^2-4a^2$

$=\boxed{[(x-7)+2a][(x-7)-2a]}$

(103) $x^2+8x+16-25a^2$

$=(x+4)^2-25a^2$

$=[(x+4)-5a][(x+4)+5a]$

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

(105) y^7+y

$=y(y^6+1)$

$=\boxed{y(y^2+1)(y^4-y^2+1)}$