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Factorize - 8th class

1. $9x^3 - 6x^2 + 12x$
2. $-5 - 10t + 20t^2$
3. $5x(x-4) + 7(4-x)$
4. $x^3(2a-b) + x^2(2a-b)$
5. $9a(3a-5b) - 12a^2(3a-5b)$
6. $2a + 6b - 3(a+3b)^2$
7. $(x+y)(x+5) - (x+y)(x+3)$
8. $y^2 - xy(1-x) - x^3$
9. $(ax+by)^2 + (bx-ay)^2$
10. $ab(x^2+y^2) - xy(a^2+b^2)$
11. $9a^2b^2 - 25$
12. $16p^3 - 4p$
13. $1 - (b-c)^2$
14. $(l+m)^2 - (l-m)^2$
15. $x^2 - y^2 - 2y - 1$
16. $25c^2 - 4b^2 + 28bc - 49c^2$
17. $9a^2 - b^2 + 4b - 4$
18. $z^2 + z + \frac{1}{4}$
19. $a^2b^2 - 6abc + 9c^2$
20. $(l+m)^2 - 4lm$

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- (1) $3x(3x^2 - 2x + 4)$
- (2) $-5(1 + 2t - 6t^2)$
- (3) $5x(x-4) + 7(4-x)$
 $= 5x(x-4) - 7(x-4)$
 $= (5x-7)(x-4)$
- (4) $x^2(2a-b)[x+1]$
- (5) $3a(3a-5b)[3-4a]$
- (6) $2(a+3b) - 3(a+3b)^2$
 $= (a+3b)[2 - 3(a+3b)]$
 $= (a+3b)[2 - 3a - 9b]$
- (7) $(x+y)[(2x+5)-(x+3)]$
 $= (x+y)(2x+5-x-3)$
 $= (x+y)(x+2)$

8. $y^2 - xy + x^2y - x^3$
 $= y(y-x) + x^2(y-x)$
 $= (y+x^2)(y-x)$
9. $(ax)^2 + (by)^2 + 2xaxby$
 $+ (bx)^2 + (ay)^2 - 2xbxay$
 $= a^2x^2 + b^2y^2 + 2abxy$
 $+ b^2x^2 + a^2y^2 - 2abxy$
 $= a^2x^2 + b^2x^2 + a^2y^2 + b^2y^2$
 $= x^2(a^2+b^2) + y^2(a^2+b^2)$
 $= (x^2+y^2)(a^2+b^2)$
10. ~~$abx^2 + aby^2 - a^2xy - b^2xy$~~
 $= abx^2 - a^2xy + aby^2 - b^2xy$
 $= ax(bx - ay) + by(ay - bx)$
 $= ax(bx - ay) - by(bx - ay)$
 $= (ax - by)(bx - ay)$

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$$11. \quad 9a^2b^2 - 25 = (3ab)^2 - (5)^2 = (3ab+5)(3ab-5)$$

$$12. \quad 16P^3 - 4P = 4P(4P^2 - 1) = 4P\{(2P)^2 - (1)^2\} \\ = 4P(2P+1)(2P-1)$$

$$13. \quad (1)^2 - (b-c)^2 = \{(1) + (b-c)\}\{(1) - (b-c)\} \\ = (1+b-c)(1-b+c)$$

$$14. \quad (l+m)^2 - (l-m)^2 = \{(l+m) + (l-m)\}\{(l+m) - (l-m)\} \\ = \{l+m+l-m\}\{l+m-l+m\} \\ = (2l) \times (2m) = 4lm$$

$$15. \quad x^2 - \underline{y^2 + 2y + 1} = x^2 - (y^2 + 2y + 1) \\ = x^2 - [(y)^2 + 2 \times y \times 1 + (1)^2] \\ = x^2 - (y+1)^2 = \{(x) + (y+1)\}\{(x) - (y+1)\} \\ = \underline{(x+y+1)(x-y-1)}$$

$$16. \quad 25a^2 - 4b^2 + 28bc - 49c^2 \\ = 25a^2 - (4b^2 - 28bc + 49c^2) \\ = 25a^2 - [(2b)^2 - 2 \times 2b \times 7c + (7c)^2] \\ = (5a)^2 - (2b-7c)^2 = (5a+2b-7c)(5a-2b+7c)$$

$$16. \quad 25a^2 - 4b^2 + 28bc - 49c^2 \quad / \quad 18. \quad z^2 + z + \frac{1}{4}$$

$$17. \quad 9a^2 - b^2 + 4b - 4$$

$$19. \quad a^2b^2 - 6abc + 9c^2$$

$$20. \quad (l+m)^2 - 4lm$$

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$$17. \quad 9a^2 - \underline{b^2 + 4b - 4}$$

$$= 9a^2 - [b^2 - 4b + (2)^2]$$

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

$$= (3a)^2 - [(b-2)^2]$$

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

$$= [3a + b - 2][3a - b + 2]$$

$$18. \quad z^2 + z + \frac{1}{4} = (z)^2 + 2 \times z \times \frac{1}{2} + \left(\frac{1}{2}\right)^2$$

$$= \left(z + \frac{1}{2}\right)^2 = \left(z + \frac{1}{2}\right)\left(z + \frac{1}{2}\right)$$

$$19. \quad a^2b^2 - 6abc + 9c^2$$

$$= (ab)^2 - 2 \times ab \times 3c + (3c)^2$$

$$= (ab - 3c)^2$$

$$20. \quad (l+m)^2 - 4lm$$

$$= l^2 + m^2 + 2lm - 4lm$$

$$= l^2 + m^2 - 2lm$$

$$= (l-m)^2 = (l-m)(l-m)$$