5A

4a

$$2(x+5)$$
$$2x+10$$

4b

$$3(x-4)$$
$$3x-12$$

4c

$$-5(x+3)$$
$$-5x-15$$

4d

$$-4(x-2)$$
$$-4x+8$$

4e

$$3(2x-1)$$
$$6x-3$$

4f

$$4(3x+1)$$
$$12x+4$$

4g

$$-2(5x-3)$$
$$-10x+6$$

4h

$$-5(4x+3)$$
$$-20x-15$$

4i

$$x(2x+5)$$
$$2x^2+5x$$

4j

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

4k

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

4l

$$3x(2-x)$$
$$6x-3x^2$$

4m

$$-2x(3x+2)$$
$$-6x^2-4x$$

4n

$$-3x(6x-2)$$
$$-18x^2+6x$$

4o

$$-5x(2-2x)$$
$$-10x+10x^2$$

4p

$$-4x(1-4x)$$
$$-4x+16x^2$$

4q

$$\frac{2}{5}(10x+4)$$
$$4x+\frac{8}{5}$$

4r

$$\frac{3}{4}(8x-5)$$
$$6x-\frac{15}{4}$$

4s

$$\frac{-1}{3}(6x+1)$$
$$-2x-\frac{1}{3}$$

4t

$$\frac{-1}{2}(4x-3)$$
$$-2x+\frac{3}{2}$$

4u

$$\frac{-3}{8}(24x-1)$$
$$-9+\frac{3}{8}$$

4v

$$\frac{-2}{9}(9x+7)$$
$$-2x-\frac{14}{9}$$

4w

$$\frac{3x}{4}(3x+8)$$
$$\frac{9}{4}x^2+6x$$

4x

$$\frac{2x}{5}(7-3x)$$
$$\frac{14}{5}x-\frac{6}{5}x^2$$

5a

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

5b

$$x(5x+2)+x(x-5)$$
$$5x^2+2x+x^2-5x$$
$$6x^2-3x$$

5c

$$x(4x-3)-2x(x-5)$$
$$4x^2-3x-2x^2+10x$$
$$2x^2+7x$$

5d

$$3x(2x+4)-x(5-2x)$$
$$6x^2+12x-5x+2x^2$$
$$8x^2+7x$$

5e

$$4x(2x-1)+2x(1-3x)$$
$$8x^2-4x+2x-6x^2$$
$$2x^2-2x$$

5f

$$2x(2-3x)-3x(2x-7)$$
$$4x-6x^2-6x^2+21x$$
$$25x-12x^2$$

6a

$$(x+2)(x+8)$$
$$x^2+8x+2x+16$$
$$x^2+10x+16$$

6b

$$(x+3)(x+4)$$
$$x^2+4x+3x+12$$
$$x^2+7x+12$$

6c

$$(x+7)(x+5)$$
$$x^2+5x+7x+35$$
$$x^2+12x+35$$

6d

$$(x+8)(x-3)$$
$$x^2-3x+8x-24$$
$$x^2+5x-24$$

6e

$$(x+6)(x-5)$$
$$x^2-5x+6x-30$$
$$x^2+x-30$$

6f

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

6g

$$(x-7)(x+3)$$
$$x^2+3x-7x-21$$

$$x^2 - 4x - 21$$

6h

$$(x-4)(x-6)$$
$$x^2 - 6x - 4x + 24$$
$$x^2 - 10x + 24$$

6i

$$(x-8)(x-5)$$
$$x^2 - 5x - 8x + 40$$
$$x^2 - 13x + 40$$

6j

$$(x+5)^2$$
$$(x+5)(x+5)$$
$$x^2 + 5x + 5x + 25$$
$$x^2 + 10x + 25$$

6k

$$(x+7)^2$$
$$(x+7)(x+7)$$
$$x^2 + 7x + 7x + 49$$
$$x^2 + 14x + 49$$

6l

$$(x+6)^2$$
$$(x+6)(x+6)$$
$$x^2 + 6x + 6x + 36$$
$$x^2 + 12x + 36$$

6m

$$(x-3)^2$$
$$(x-3)(x-3)$$
$$x^2 - 3x - 3x + 9$$
$$x^2 - 6x + 9$$

6n

$$(x-8)^2$$
$$(x-8)(x-8)$$
$$x^2 - 8x - 8x + 64$$
$$x^2 - 16x + 64$$

6o

$$(x-10)^2$$
$$(x-10)(x-10)$$
$$x^2 - 10x - 10x + 100$$
$$x^2 - 20x + 100$$

6p

$$(x+4)(x-4)$$
$$x^2 - 4x + 4x - 16$$
$$x^2 - 16$$

6q

$$(x+9)(x-9)$$
$$x^2 - 9x + 9x - 81$$
$$x^2 - 81$$

6r

$$(2x-3)(2x+3)$$
$$4x^2 + 6x - 6x - 9$$
$$4x^2 - 9$$

6s

$$(3x+4)(3x-4)$$
$$9x^2 - 12x + 12x - 16$$
$$9x^2 - 16$$

6t

$$(4x-5)(4x+5)$$
$$16x^2 + 20x - 20x - 25$$
$$16x^2 - 25$$

6u

$$(8x-7)(8x+7)$$
$$64x^2 + 56x - 56x - 49$$
$$64x^2 - 49$$

7a

$$(2x+1)(3x+5)$$
$$6x^2 + 10x + 3x + 5$$
$$6x^2 + 13x + 5$$

7b

$$(4x+5)(3x+2)$$
$$12x^2 + 8x + 15x + 10$$
$$12x^2 + 23x + 10$$

7c

$$(5x+3)(2x+7)$$
$$10x^2 + 35x + 6x + 21$$
$$10x^2 + 41x + 21$$

7d

$$(3x+2)(3x-5)$$
$$9x^2 - 15x + 6x - 10$$
$$9x^2 - 9x - 10$$

7e

$$(5x+3)(4x-2)$$
$$20x^2 - 10x + 12x - 6$$
$$20x^2 + 2x - 6$$

7f

$$(2x+5)(3x-5)$$
$$6x^2 - 10x + 15x - 25$$
$$6x^2 + 5x - 25$$

7g

$$(4x-5)(4x+5)$$
$$16x^2 + 20x - 20x - 25$$
$$16x^2 - 25$$

7h

$$(2x-9)(2x+9)$$
$$4x^2 + 18x - 18x - 81$$
$$4x^2 - 81$$

7i

$$(5x-7)(5x+7)$$
$$25x^2 + 35x - 35x - 49$$
$$25x^2 - 49$$

7j

$$(7x-3)(2x-4)$$
$$14x^2 - 28x - 6x - 12$$
$$14x^2 - 34x - 12$$

7k

$$(5x-3)(5x-6)$$
$$25x^2 - 30x - 10x + 18$$
$$25x^2 - 40x + 18$$

7l

$$(7x-2)(8x-2)$$
$$56x^2 - 14x - 16x + 4$$
$$56x^2 - 30x + 4$$

7m

$$(2x+5)^2$$
$$(2x+5)(2x+5)$$
$$4x^2 + 10x + 10x + 25$$
$$4x^2 + 20x + 25$$

7n

$$(5x+6)^2$$
$$(5x+6)(5x+6)$$
$$25x^2 + 30x + 30x + 36$$
$$25x^2 + 60x + 36$$

7o

$$(7x-1)^2$$
$$(7x-1)(7x-1)$$
$$49x^2 + 7x - 7x - 1$$
$$49x^2 - 1$$

8a

$$3$$

8b

$$3$$

8c

$$3$$

8d

$$8$$

8e

$$1$$

8f

$$2$$

9a

$$2(x+3)(x+4)$$
$$2(x^2+4x+3x+12)$$
$$2x^2+8x+6x+24$$
$$2x^2+14x+24$$

9b

$$3(x+2)(x+7)$$
$$3(x^2+7x+2x+14)$$
$$3x^2+21x+6x+54$$
$$3x^2+27x+54$$

9c

$$-2(x+8)(x+2)$$
$$-2(x^2+2x+8x+16)$$
$$-2x^2-4x-16x-32$$
$$-2x^2-20x-32$$

9d

$$-4(x+9)(x+2)$$
$$-4(x^2+2x+9x+18)$$
$$-4x^2-8x-36x-72$$
$$-4x^2-44x-72$$

9e

$$5(x-3)(x+4)$$
$$5(x^2+4x-3x-12)$$
$$5x^2+20x-15x-72$$
$$5x^2+5x-72$$

9f

$$3(x+5)(x-3)$$
$$3(x^2-3x+5x-15)$$
$$3x^2-9x+15x-15$$
$$3x^2+6x-15$$

9g

$$-3(a+2)(a-7)$$
$$-3(a^2-7a+2a-14)$$
$$-3a^2+21a-6a+42$$
$$-3a^2+15x+42$$

9h

$$-5(a+2)(a-8)$$
$$-5(a^2-8a+2a-16)$$
$$-5a^2+40a-10a+80$$
$$-5a^2+30a+80$$

9i

$$4(a-3)(a-6)$$
$$4(a^2-6a-3a+18)$$
$$4a^2-24a-12a+54$$
$$4a^2-36a+54$$

9j

$$3(y-4)(y-5)$$
$$3(y^2-5y-4y+20)$$
$$3y^2-15y-12y+60$$
$$3y^2-27y+60$$

9k

$$-2(y-3)(y-8)$$
$$-2(y^2-8y-3y+24)$$
$$-2y^2+16y+6y-48$$
$$-2y^2+22y-48$$

9l

$$-6(y-4)(y-3)$$
$$-6(y^2-3y-4y+12)$$
$$-6y^2+18y+24y-72$$
$$-6y^2+42y-72$$

9m

$$3(2x+3)(2x+5)$$
$$3(4x^2+10x+6x+15)$$
$$12x^2+30x+18x+45$$
$$12x^2+48x+45$$

9n

$$6(3x-4)(x+2)$$
$$6(3x^2+6x-4x-8)$$
$$18x^2+36x-24x-48$$
$$18x^2+12x-48$$

9o

$$-2(x+4)(3x-7)$$
$$-2(3x^2-7x+12x-28)$$
$$-6x^2+14x-24x+56$$
$$-6x^2-10x+56$$

9p

$$2(x+3)^2$$
$$2(x+3)(x+3)$$
$$2(x^2+3x+3x+9)$$
$$2x^2+6x+6x+18$$
$$2x^2+12x+18$$

9q

$$4(m+5)^2$$
$$4(m+5)(m+5)$$
$$4(m^2+5m+5m+25)$$
$$4m^2+20m+20m+100$$
$$4m^2+40m+100$$

9r

$$2(a-7)^2$$
$$2(a-7)(a-7)$$
$$2(a^2-7a-7a+49)$$
$$2a^2-14a-14a+49$$
$$2a^2-28a+49$$

9s

$$-3(y-5)^2$$
$$-3(y-5)(y-5)$$
$$-3(y^2-5y-5y+25)$$
$$-3y^2+15y+15y-75$$
$$-3y^2+30y+75$$

9t

$$3(2b-1)^2$$
$$3(2b-1)(2b-1)$$
$$3(4b^2-2b-2b+1)$$
$$12b^2-6b-6b+3$$
$$12b^2-12b+3$$

9u

$$-3(2y-6)^2$$
$$-3(2y-6)(2y-6)$$
$$-3(4y^2-12y-12y+36$$
$$-12y^2+36y+36y+36$$
$$-12y^2+72$$

10a

$$(x+1)(x+3)+(x+2)(x+4)$$
$$(x^2+3x+x+3)+(x^2+4x+2x+8)$$
$$x^2+3x+x+3+x^2+4x+2x+8$$
$$2x^2+10x+11$$

10b

$$(x+8)(x+3)+(x+4)(x+5)$$
$$(x^2+3x+8x+24)+(x^2+5x+4x+20)$$
$$x^2+3x+8x+24+x^2+5x+4x+20$$
$$2x^2+20x+44$$

10c

$$(y+3)(y-1)+(y-2)(y-4)$$
$$(y^2-y+3y-3)+(y^2-4y-2y+8)$$
$$y^2-y+3y-3+y^2-4y-2y+8$$
$$2y^2-6y+5$$

10d

$$(y-7)(y+4)+(y+5)(y-3)$$
$$(y^2+4y-7y-28)+(y^2-3y+5y-15)$$
$$y^2+4y-7y-28+y^2-3y+5y-15$$
$$2y^2-y-43$$

10e

$$(2a+3)(a-5)-(a+6)(2a+5)$$
$$(2a^2-7a-15)-(2a^2+17a+30)$$
$$2a^2-7a-15-2a^2-17a-30$$
$$-24a-45$$

10f

$$(4b+8)(b+5)-(3b-5)(b-7)$$
$$(4b^2+20b+8b+40)-(3b^2-21b-5b+35)$$
$$4b^2+20b+8b+40-3b^2+21b+5b-35$$
$$b^2+54b+5$$

10g

$$(x+5)^2-7$$
$$(x+5)(x+5)-7$$
$$(x^2+5x+5x+25)-7$$
$$x^2+5x+5x+25-7$$
$$x^2+10x+18$$

10h

$$(x-7)^2-9$$
$$(x-7)(x-7)-9$$
$$(x^2-7x-7x+49)-9$$
$$x^2-7x-7x+49-9$$
$$x^2-14x+40$$

10i

$$3-(2x-9)^2$$
$$3-(2x-9)(2x-9)$$
$$3-(4x^2-18x-18x+81)$$
$$3-4x^2+18x+18x-81$$
$$-4x^2+36x-78$$

10j

$$14-(5x+3)^2$$
$$14-(5x+3)(5x+3)$$
$$14-(25x^2+15x+15x+9)$$
$$14-25x^2-15x-15x-9$$
$$-25x^2-30x+5$$

11a

$$(x-6)(x-6)$$
$$x^2-6x-6x+36$$
$$x^2-12x+36$$

11b

$$(x+20)(x-10)$$
$$x^2-10x+20x-200$$
$$x^2+10x-200$$

12a

$$(a+b)(a-b)$$
$$a^2-ab+ba-b^2$$
$$a^2-b^2$$

12b

$$(a+b)^2$$
$$(a+b)(a+b)$$
$$a^2+ab+ba+b^2$$
$$a^2+2ab+b^2$$

12c

$$(a-b)^2$$
$$(a-b)(a-b)$$
$$a^2-ab-ba+b^2$$
$$a^2-2ab+b^2$$

12d

$$(a+b)^2-(a-b)^2$$
$$(a+b)(a+b)-(a-b)(a-b)$$
$$(a^2+2ab+b^2)-(a^2-2ab+b^2)$$
$$a^2+2ab+b^2-a^2+2ab-b^2$$
$$4ab$$

13a

$$6\times 103$$
$$6\times 100+6\times 3$$
$$600+18$$
$$618$$

13b

$$4\times 55$$
$$4\times 50+4\times 5$$
$$200+20$$
$$220$$

13c

$$9\times 63$$
$$9\times 60+9\times 3$$
$$540+27$$
$$567$$

13d

$$8\times 208$$
$$8\times 200+8\times 8$$
$$1600+64$$
$$1664$$

13e

$$7\times 198$$
$$7\times 100+7\times 90+7\times 8$$
$$700+630+56$$
$$1386$$

13f

$$3\times 297$$
$$3\times 200+3\times 90+3\times 7$$
$$600+270+21$$
$$891$$

13g

$$8\times 495$$
$$8\times 400+8\times 90+8\times 5$$
$$3200+720+40$$
$$3960$$

13h

$$5\times 696$$
$$5\times 600+5\times 90+5\times 6$$
$$3000+450+30$$
$$3480$$

14a

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

14b

$$3a-7(4-a)$$
$$3a-28+7a$$

$$10a - 28$$

14c

$$(2x+3)^2$$
$$(2x+3)(2x+3)$$
$$4x^2+6x+6x+9$$
$$4x^2+12x+9$$

14d

$$(x+2)^2-(x+2)(x-2)$$
$$(x+2)(x+2)-(x+2)(x-2)$$
$$(x^2+4x+4)-(x^2-4)$$
$$x^2+4x+4-x^2+4$$
$$4x+8$$

15a

$$(x+2)(x+3)(x+1)$$
$$(x^2+3x+2x+6)(x+1)$$
$$(x^2+5x+6)(x+1)$$
$$x^2(x+1)+5x(x+1)+6(x+1)$$
$$x^3+x^2+5x^2+5x+6x+6$$
$$x^3+6x^2+11x+6$$

15b

$$(x+4)(x+2)(x+5)$$
$$(x^2+2x+4x+8)(x+5)$$
$$x^2+6x+8)(x+5)$$
$$x^2(x+5)+6x(x+5)+8(x+5)$$
$$x^3+5x^2+6x^2+30x+8x+40$$
$$x^3+11x^2+38x+40$$

15c

$$(x+3)(x-4)(x+3)$$
$$(x^2-4x+3x-12)(x+3)$$
$$(x^2-x-12)(x+3)$$
$$x^2(x+3)-x(x+3)-12(x+3)$$
$$x^3+3x^2-x^2-3x-12x-36$$
$$x^3+2x^2-15x-36$$

15d

$$(x-4)(2x+1)(x-3)$$
$$(2x^2+x-8x-4)(x-3)$$
$$(2x^2-7x-4)(x-3)$$
$$2x^2(x-3)-7x(x-3)-4(x-3)$$
$$2x^3-6x^2-7x^2+21x-4x+12$$
$$2x^3-13x^2+17x+12$$

15e

$$(x+6)(2x-3)(x-5)$$
$$(2x^2-3x+12x-18)(x-5)$$
$$(2x^2+9x-18)(x-5)$$
$$2x^2(x-5)+9x(x-5)-18(x-5)$$
$$2x^3-10x^2+9x^2-45x-18x+90$$
$$2x^2-x^2-63x+90$$

15f

$$(2x-3)(x-4)(3x-1)$$
$$(2x^2-8x-3x+12)(3x-1)$$
$$(2x^2-11x+12)(3x-1)$$
$$2x^2(3x-1)-11x(3x-1)+12(3x-1)$$
$$6x^3-2x^2-33x^2+11x+36x-12$$
$$6x^3-35x^2+47x-12$$

16a

$$\frac{ab}{2}+\frac{ab}{2}+\frac{ab}{2}+\frac{ab}{2}$$
$$\frac{ab+ab+ab+ab}{2}$$
$$\frac{4ab}{2}$$
$$2ab$$

16b

$$(a+b)(a+b)-c^2$$
$$(a+b)^2-c^2$$

16c

$$(a+b)^2-c^2=2ab$$
$$(a+b)(a+b)-c^2=2ab$$
$$(a^2+ab+ba+b^2)-c^2=2ab$$
$$a^2+2ab+b^2-c^2=2ab$$
$$a^2+b^2-c^2=0$$
$$a^2+b^2=c^2$$

5B

3a

$$5(x-1)-a(x-1)$$
$$(x-1)(5-a)$$

3b

$$b(x+2)+3(x+2)$$
$$(x+2)(b+3)$$

3c

$$a(x+5)-4(x+5)$$
$$(x+5)(a-4)$$

3d

$$x(x+2)+5(x+2)$$
$$(x+2)(x+5)$$

3e

$$x(x-4)-2(x-4)$$
$$(x-4)(x-2)$$

3f

$$3(x+1)-x(x+1)$$
$$(x+1)(3-x)$$

3g

$$a(x+3)+(x+3)$$
$$(x+3)(a+1)$$

3h

$$x(x-2)-(x-2)$$
$$(x-2)(x-1)$$

3i

$$(x-6)-x(x-6)$$
$$(x-6)(1-x)$$

4a

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

4b

$$x^2-25$$
$$x^2-5^2$$
$$(x+5)(x-5)$$

4c

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

4d

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

4e

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

4f

$$36a^2-25$$
$$6^2a^2-5^2$$
$$(6a+5)(6a-5)$$

4g

$$1-81y^2$$
$$1^2-9^2y^2$$
$$(1+9y)(1-9y)$$

4h

$$100-9x^2$$
$$10^2-3^2x^2$$
$$(10+3x)(10-3x)$$

4i

$$25x^2-4y^2$$
$$5^2x^2-2^2y^2$$
$$(5x+2y)(5x-2y)$$

4j

$$64x^2-25y^2$$
$$8^2x^2-5^2y^2$$
$$(8x+5y)(8x-5y)$$

4k

$$9a^2-49b^2$$
$$3^2a^2-7^2b^2$$
$$(3a+7b)(3a-7b)$$

4l

$$144a^2-49b^2$$
$$12^2a^2-7^2b^2$$
$$(12a+7b)(12a-7b)$$

5a

$$2x^2-32$$
$$2(x^2-16)$$
$$2(x^2-4^2)$$
$$2(x+4)(x-4)$$

5b

$$5x^2-45$$
$$5(x^2-9)$$
$$5(x^2-3^2$$
$$5(x+3)(x-3)$$

5c

$$6y^2-24$$
$$6(y^2-4)$$
$$6(y^2-2^2)$$
$$6(y+2)(y-2)$$

5d

$$3y^2-48$$
$$3(y^2-16)$$
$$3(y^2-4^2)$$
$$3(y+4)(y-4)$$

5e

$$3x^2-75y^2$$
$$3(x^2-25y^2)$$
$$3(x^2-5^2y^2)$$
$$3(x+5y)(x-5y)$$

5f

$$3a^2-300b^2$$
$$3(a^2-100b^2)$$
$$3(a^2-10^2b^2)$$
$$3(a+10b)(a-10b)$$

5g

$$12x^2-27y^2$$
$$3(4x^2-9y^2)$$
$$3(2^2x^2-3^2y^2$$
$$3(2x+3y)(3x-3y)$$

5h

$$63a^2-112b^2$$
$$7(9a^2-16b^2)$$
$$3(3^2a^2-4^2b^2)$$
$$3(3a+4b)(3a-4b)$$

5i

$$(x+5)^2-16$$
$$(x+5)^2-(4)^2$$
$$(x+5+4)(x+5-4)$$
$$(x+9)(x+1)$$

5j

$$(x-4)^2-9$$
$$(x-4)^2-(3)^2$$
$$(x-4+3)(x-4-3)$$
$$(x-1)(x-7)$$

5k

$$(a-3)^2-64$$
$$(a-3)^2-(8)^2$$

$$(a-3+8)(a-3-8)$$
$$(a+5)(a-11)$$

5l

$$(a-7)^2-1$$
$$(a-7)^2-(1)^2$$
$$(a-7+1)(a-7-1)$$
$$(a-6)(a-8)$$

5m

$$(3x+5)^2-x^2$$
$$(3x+5+x)(3x+5-x)$$
$$(4x+5)(2x+5)$$

5n

$$(2y+7)^2-y^2$$
$$(2y+7+y)(2y+7-y)$$
$$(3y+7)(y+7)$$

5o

$$(5x+11)^2-4x^2$$
$$(5x+11)^2-2^2x^2$$
$$(5x+11+2x)(5x+11-2x)$$
$$(7x+11)(3x+11)$$

5p

$$(3x-5y)^2-25y^2$$
$$(3x-5y)^2-5^2y^2$$
$$(3x-5y+5y)(3x-5y-5y)$$
$$3x(3x-10y)$$

6a

$$x^2-7$$
$$x^2-\sqrt{7}^2$$
$$(x+\sqrt{7})(x-\sqrt{7})$$

6b

$$x^2-5$$
$$x^2-\sqrt{5}^2$$
$$(x+\sqrt{5})(x-\sqrt{5})$$

6c

$$x^2-19$$
$$x^2-\sqrt{19}^2$$
$$(x+\sqrt{19})(x-\sqrt{19})$$

6d

$$x^2-21$$
$$x^2-\sqrt{21}^2$$
$$(x+\sqrt{21})(x-\sqrt{21})$$

6e

$$x^2-14$$
$$x^2-\sqrt{14}^2$$
$$(x+\sqrt{14})(x-\sqrt{14})$$