1. Factor: $8x^2 + 18x - 5$

$a \cdot c = 8 \cdot (-5) = -40$

20 and −2

$8x^2 - 2x + 20x - 5$

$2x(4x - 1) + 5(4x - 1)$

Answer: $(2x + 5)(4x - 1)$

2. Factor: $6x^2 + 5x - 25$

$a \cdot c = 6 \cdot (-25) = -150$

15 and −10

$6x^2 - 10x + 15x - 25$

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

Answer: $(2x + 5)(3x - 5)$

3. Factor: $12x^2 + 11x - 15$

$a \cdot c = 12 \cdot (-15) = -180$

20 and −9

$12x^2 - 9x + 20x - 15$

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

Answer: $(3x + 5)(4x - 3)$

4. Factor: $15x^2 - 23x + 4$

$a \cdot c = 15 \cdot 4 = 60$

−3 and −20

$15x^2 - 20x - 3x + 4$

$5x(3x - 4) - 1(3x - 4)$

Answer: $(5x - 1)(3x - 4)$

5. Factor: $10x^2 + 11x - 6$

$a \cdot c = 10 \cdot (-6) = -60$

15 and −4

$10x^2 + 15x - 4x - 6$

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

Answer: $(5x - 2)(2x + 3)$

6. Factor: $10x^2 + 9x - 9$

$a \cdot c = 10 \cdot (-9) = -90$

15 and −6

$10x^2 + 15x - 6x - 9$

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

Answer: $(5x - 3)(2x + 3)$

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7. Factor: $20x^2 + 13x - 15$

$a \cdot c = 20 \cdot (-15) = -300$

25 and -12

$20x^2 + 25x - 12x - 15$

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

Answer: $(5x - 3)(4x + 5)$

8. Factor: $3x^2 + 14x + 8$

$a \cdot c = 3 \cdot 8 = 24$

12 and 2

$3x^2 + 2x + 12x + 8$

$x(3x + 2) + 4(3x + 2)$

Answer: $(x + 4)(3x + 2)$

9. Factor: $6x^2 - 17x + 7$

$a \cdot c = 6 \cdot 7 = 42$

-3 and -14

$6x^2 - 14x - 3x + 7$

$2x(3x - 7) - 1(3x - 7)$

Answer: $(2x - 1)(3x - 7)$

10. Factor: $10x^2 + 27x + 18$

$a \cdot c = 10 \cdot 18 = 180$

15 and 12

$10x^2 + 15x + 12x + 18$

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

Answer: $(5x + 6)(2x + 3)$

11. Factor: $15x^2 - 28x + 12$

$a \cdot c = 15 \cdot 12 = 180$

-10 and -18

$15x^2 - 10x - 18x + 12$

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

Answer: $(5x - 6)(3x - 2)$

12. Factor: $6x^2 - 5x - 6$

$a \cdot c = 6 \cdot (-6) = -36$

4 and -9

$6x^2 - 9x + 4x - 6$

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

Answer: $(3x + 2)(2x - 3)$

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13. Factor: $3x^2 - 23x + 14$

$a \cdot c = 3 \cdot 14 = 42$

-2 and -21

$3x^2 - 2x - 21x + 14$

$x(3x - 2) - 7(3x - 2)$

Answer: $(x - 7)(3x - 2)$

14. Factor: $4x^2 + 27x + 18$

$a \cdot c = 4 \cdot 18 = 72$

24 and 3

$4x^2 + 3x + 24x + 18$

$x(4x + 3) + 6(4x + 3)$

Answer: $(x + 6)(4x + 3)$

15. Factor: $10x^2 + 31x + 15$

$a \cdot c = 10 \cdot 15 = 150$

25 and 6

$10x^2 + 25x + 6x + 15$

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

Answer: $(5x + 3)(2x + 5)$

16. Factor: $8x^2 - 6x - 9$

$a \cdot c = 8 \cdot (-9) = -72$

6 and -12

$8x^2 + 6x - 12x - 9$

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

Answer: $(2x - 3)(4x + 3)$

17. Factor: $6x^2 + 19x + 10$

$a \cdot c = 6 \cdot 10 = 60$

15 and 4

$6x^2 + 4x + 15x + 10$

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

Answer: $(2x + 5)(3x + 2)$

18. Factor: $12x^2 + 37x + 28$

$a \cdot c = 12 \cdot 28 = 336$

21 and 16

$12x^2 + 21x + 16x + 28$

$3x(4x + 7) + 4(4x + 7)$

Answer: $(3x + 4)(4x + 7)$

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19. Factor: $4x^2 + x - 5$

$a \cdot c = 4 \cdot (-5) = -20$

5 and −4

$4x^2 + 5x - 4x - 5$

$x(4x + 5) - 1(4x + 5)$

Answer: $(x - 1)(4x + 5)$

20. Factor: $12x^2 + 5x - 3$

$a \cdot c = 12 \cdot (-3) = -36$

9 and −4

$12x^2 + 9x - 4x - 3$

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

Answer: $(3x - 1)(4x + 3)$

21. Factor completely: $6x^2 + 10x + 4$ ★ challenge

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

Answer: $2(3x + 2)(x + 1)$

22. Factor: $4x^2 - 4x - 15$ ★ challenge

$a \cdot c = -60 \rightarrow -10$ and 6

$4x^2 - 10x + 6x - 15$

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

Answer: $(2x - 5)(2x + 3)$

23. Factor: $9x^2 + 12x + 4$ ★ challenge

$a \cdot c = 36 \rightarrow 6$ and 6

$9x^2 + 6x + 6x + 4$

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

Answer: $(3x + 2)^2$

24. Factor completely: $-2x^2 - 7x - 3$ ★ challenge

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

Answer: $-(2x + 1)(x + 3)$

25. Factor $2x^2 + 5x - 3$, then find the zeros of $y = 2x^2 + 5x - 3$. ★ challenge

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

Answer: $(2x - 1)(x + 3)$; zeros $x = \frac{1}{2}$ and $x = -3$

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