1. **Factor completely: $6x^2 + 30x$**
   2 terms, common factor
   Answer: $6x(x + 5)$

2. **Factor completely: $9x^2 - 4$**
   GCF = 1; 2 terms, both squares, minus
   Answer: $(3x - 2)(3x + 2)$

3. **Factor: $x^2 + 12x + 27$**
   GCF = 1; 3 terms, a = 1
   × = 27, + = 12 → 9 and 3
   Answer: $(x + 9)(x + 3)$

4. **Factor: $6x^2 - 13x - 28$**
   GCF = 1; 3 terms, a ≠ 1
   $6x^2 - 21x + 8x - 28$
   $3x(2x - 7) + 4(2x - 7)$
   Answer: $(3x + 4)(2x - 7)$

5. **Factor completely: $3x^2 - 108$**
   $3(x^2 - 36)$
   Answer: $3(x - 6)(x + 6)$

6. **Factor completely: $2x^2 - 10x + 12$**
   $2(x^2 - 5x + 6)$
   Answer: $2(x - 2)(x - 3)$

7. **Factor completely: $4x^3 + 20x$**
   2 terms, common factor
   Answer: $4x(x^2 + 5)$

8. **Factor completely: $x^2 - 36$**
   GCF = 1; 2 terms, both squares, minus
   Answer: $(x - 6)(x + 6)$

9. **Factor: $x^2 - 3x - 4$**
   GCF = 1; 3 terms, a = 1
   × = −4, + = −3 → 1 and −4
   Answer: $(x + 1)(x - 4)$

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10. Factor: $8x^2 + 30x + 7$

GCF = 1; 3 terms, $a \neq 1$

$8x^2 + 2x + 28x + 7$

$2x(4x + 1) + 7(4x + 1)$

Answer: $(2x + 7)(4x + 1)$

11. Factor completely: $2x^2 - 50$

$2(x^2 - 25)$

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

12. Factor completely: $3x^2 + 12x + 9$

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

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

13. Factor completely: $10x^2 + 15$

2 terms, common factor

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

14. Factor completely: $9x^2 - 121$

GCF = 1; 2 terms, both squares, minus

Answer: $(3x - 11)(3x + 11)$

15. Factor: $x^2 + 2x - 80$

GCF = 1; 3 terms, $a = 1$

$\times = -80$, $+ = 2 \rightarrow 10$ and -8

Answer: $(x + 10)(x - 8)$

16. Factor: $9x^2 + 6x + 1$

GCF = 1; 3 terms, $a \neq 1$

$9x^2 + 3x + 3x + 1$

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

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

17. Factor completely: $2x^3 - 72x$

$2x(x^2 - 36)$

Answer: $2x(x - 6)(x + 6)$

18. Factor completely: $3x^2 + 6x - 9$

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

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

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19. Factor completely: $24x + 6$

2 terms, common factor

Answer: $6(4x + 1)$

20. Factor completely: $25x^2 - 1$

GCF = 1; 2 terms, both squares, minus

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

21. Factor completely: $2x^3 + 6x^2 - 20x$ ★ challenge

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

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

22. Factor completely: $3x^4 - 48$ ★ challenge

$3(x^4 - 16)$

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

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

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

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

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

24. Which expression is equivalent to $5x^2 - 45$?

(1) $5(x - 3)^2$
(2) $5(x - 3)(x + 3)$
(3) $(5x - 9)(x + 5)$
(4) $5(x - 9)(x + 9)$ ★ challenge

$5(x^2 - 9)$

Answer: (2)

25. Factor completely: $x^2 + 9$. Explain your answer. ★ challenge

2 terms, but a SUM

Answer: does not factor — it is a sum of squares

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