

Section 5.3 – Practice Problems

EMERGING LEVEL QUESTIONS

Factor using Grouping or the AC Method

1. $2x^2 + 13x + 15$

AC

\downarrow
 $x^2 + 13x + 30$

$(x+10)(x+3)$

$(x+\frac{10}{2})(x+\frac{3}{2})$

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

2. $3x^2 + 8x + 4$

Grouping

two numbers multiply to 12
add to +8

$3x^2 + 6x + 2x + 4$

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

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

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

3. $10x^2 + 17x + 3$

AC

$x^2 + 17x + 30$

$(x+15)(x+2)$

$(x+\frac{15}{10})(x+\frac{2}{10})$

$(x+\frac{3}{2})(x+\frac{1}{5})$

$(2x+3)(5x+1)$

4. $8y^2 - 18y + 9$

$a \cdot b = 72$
 $a + b = -18$

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

$(8y^2 - 12y)(-6y + 9)$

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

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

12.6

5. $21y^2 - 41y + 10$

AC

$y^2 - 41y + 210$

$(y-35)(y-6)$

$(y-\frac{35}{21})(y-\frac{6}{21})$

$(y-\frac{5}{3})(y-\frac{2}{7})$

$(3y-5)(7y-2)$



6. $2y^2 - 7y + 5$

$a \cdot b = 10$
 $a + b = -7$

$2y^2 - 2y - 5y + 5$

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

$2y(y-1) - 5(y-1)$

$(y-1)(2y-5)$

-2 -5

7. $20z^2 - 27z - 8$

AC

$$z^2 - 27z - 160$$

$$(z - 32)(z + 5)$$

$$(z - \frac{32}{26})(z + \frac{5}{20})$$

$$(z - \frac{8}{5})(z + \frac{1}{4})$$



- 32 5

$$(5z - 8)(4z + 1)$$

Factor Completely

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

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

AC

$$-1(x^2 + x - 12)$$

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

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

8. $3z^2 - 20z - 63$

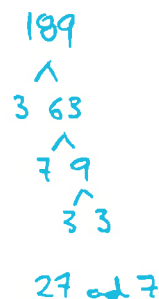
Grouping

$$3z^2 - 27z + 7z - 63$$

$$(3z^2 - 27z) + (7z - 63)$$

$$3z(z - 9) + 7(z - 9)$$

$$(z - 9)(3z + 7)$$



10. $-2x^2 - 5xy - 2y^2$

Grouping

$$-1(2x^2 + 5xy + 2y^2)$$

$$a \cdot b = 4$$

$$a + b = 5$$

$$\boxed{1 \quad 4}$$

$$-1(2x^2 + xy + 4xy + 2y^2)$$

$$-1(2x^2 + xy) + (4xy + 2y^2)$$

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

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

11. $-6a^2 - 17ab + 3b^2$

AC

$$-1(6a^2 + 17ab - 3b^2)$$

$$-1(a^2 + 17ab - 18b^2)$$

$$-1(a + 18b)(a - b)$$

$$-1(a + \frac{18b}{6})(a - \frac{b}{6})$$

$$-1(a + 3b)(6a - b)$$

12. $-4a^2b - 4ab^2 + 3b^3$

$$a \cdot b = -12$$

$$a + b = 4$$

$$\boxed{6 \quad -2}$$

$$-b(4a^2 + 4ab - 3b^2)$$

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

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

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

PROFICIENT LEVEL QUESTIONS

Factor Completely

13. $25x^2(a-1)^3 - 5x(a-1)^3 - 2(a-1)^3$

$(a-1)^3(25x^2 - 5x - 2)$ AC

$(a-1)^3(x^2 - 5x - 50)$

$(a-1)^3(x - \frac{10}{25})(x + \frac{5}{25})$

$(a-1)^3(x - \frac{2}{5})(x + \frac{1}{5})$

$(a-1)^3(5x-2)(5x+1)$

14. $9 - 10x^2 + x^4$

let $x^2 = z$

$x^4 - 10x^2 + 9$

$z^2 - 10z + 9$

$(z-9)(z-1)$

sub in

$(x^2-9)(x^2-1)$

DoS

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

15. $8x^4 + 19x^2 - 27$

let $x^2 = z$

$8z^2 + 19z - 27$

$a \cdot b = 216$

$8z^2 - 8z + 27z - 27$

$a+b = 19$

$(8z^2 - 8z)(+27z - 27)$



$8z(z-1) + 27(z-1)$

$(8z+27)(z-1)$

sub back

$(8x^2+27)(x^2-1)$
DoS

$(8x^2+27)(x+1)(x-1)$

16. $9x^4 - 145x^2 + 16$

let $x^2 = z$

$9z^2 - 145z + 16$

AC

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$z^2 - 145z + 144$

$(z - \frac{144}{9})(z - \frac{1}{9})$

$(z - 16)(9z - 1)$

sub back in

$(x^2-16)(9x^2-1)$

DoS DoS

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