Long Division

$$\frac{3x^2 - 7x + 5}{x - 3}$$

$$3x + 2 + \frac{11}{x-3}$$

$$x-3 \overline{)\, 3x^2 - 7x + 5}$$

$$-3x^2 \pm 9x$$

$$2x + 5$$

$$-2x \pm 6$$

$$11$$

$$\frac{4x^3 - 3x + 5}{x+7}$$

$$4x^2 - 28x + 193 + \frac{1346}{x+7}$$

$$x+7 \overline{)\ 4x^3 + 0x^2 - 3x + 5}$$

$$-4x^3 - 28x^2$$

$$-28x^2 - 3x$$

$$+28x^2 + 196x$$

$$193x + 5$$

$$-193x - 1351$$

$$-1346$$

6.1 (51)

$$ax + ay + bx + by + cx + cy$$

$$a(x+y) + b(x+y) + c(x+y)$$

$$(x+y)(a+b+c)$$

$$ax + bx + cx + ay + by + cy$$

$$x(a+b+c) + y(a+b+c)$$

$$(a+b+c)(x+y)$$

6.2 (39)

$2y^4 - 6y^3 - 8y^2$

now factor this

GCF

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

prod -4 $-4(+1)$
sum -3

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

$y^2 - 3y - 4$

quadratic
highest power of 2

6.3 More trinomials to factor.

$12x^2 + 20x + 3$

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

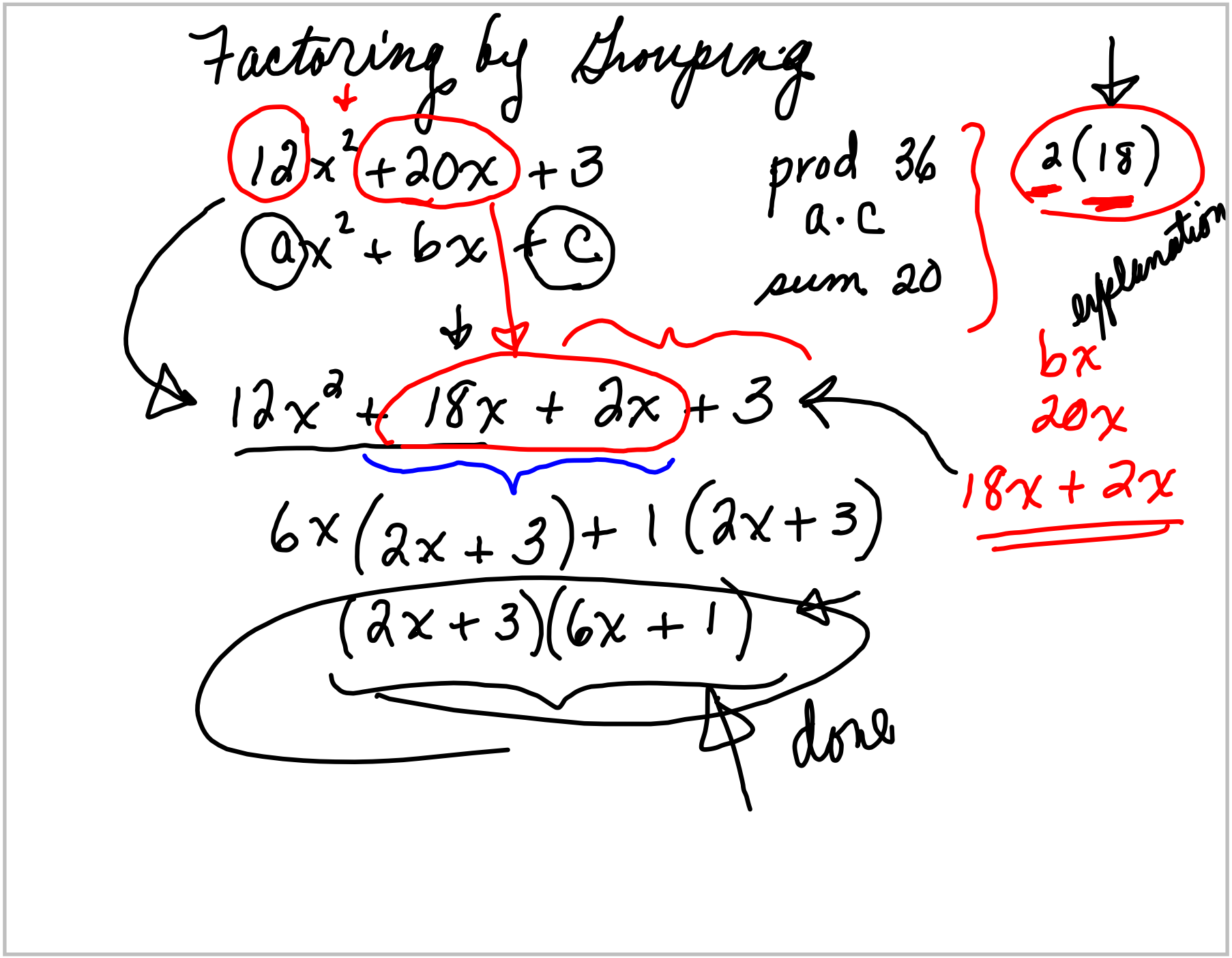
$9x + 4x = 13x$

12 (1)(12)
(2)(6)
(3)(4)
·3 (3)(1)

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

Guess & Check

$18x + 2x = 20x$


Factoring by Grouping
12x² + 20x + 3
ax² + bx + c
prod 36
a·c
sum 20
2(18)
explanation
bx
20x
18x + 2x
12x² + 18x + 2x + 3
6x(2x + 3) + 1(2x + 3)
(2x + 3)(6x + 1)
done

PROCESS $ax^2 + bx + c$

1. Find the product $a \cdot c$
2. Find a pair of numbers whose product is ac and sum is b
3. Rewrite the trinomial so that the middle term is written as the sum of the two terms whose coefficients are the two numbers found in step 2.
4. Factor by grouping

(24) $20x^2 + 13x - 15$

prod -300
sum $+13$

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

$3(100)$
$6(50)$
$-12(+25)$

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

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

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(ex) $3y^2 + 14y - 5$ prod -15 sum 14 $15(-1)$

$3y^2 + 15y - y - 5$

$3y(y+5) - 1(y+5)$

$(y+5)(3y-1)$ done

(27) $10a^5 - 17a^4 + 3a^3$

$a^3(10a^2 - 17a + 3)$ prod 30, sum −17

$a^3[10a^2 - 15a - 2a + 3]$ (−2)(−15)

$a^3[5a(2a-3) - 1(2a-3)]$

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

6.4 The Difference of two squares

$a^2 - b^2$

$(a + b)(a - b) = a(a-b) + b(a-b)$

conjugates $= a^2 - ab + ab - b^2$

$= a^2 - b^2$

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

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

conjugates

ex $36a^2 - 1$

$(6a)^2 - (1^2)$

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

$1 = 1^2 = 1^3 = 1^4$

ex $16x^2 - 25$

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

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

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

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

perfect square trinomial

ex $x^2 - 2x + 1 = (x-1)^2$

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

$x(-1)(2)$

$-2x$

(e) $9y^2 \pm 30y + 25$

$(3y)^2$: $(-5)^2$

$3y(-5)(2)$

$-30y$ yes

a perfect square trinomial

$(3y-5)^2$