Example 3: Three consecutive odd integers have a product of −105. What are the three integers?

First integer $(2x+1)$ 2nd integer $(2x+3)$ 3rd integer $(2x+5)$

$(2x+1)(2x+3)(2x+5) = -105$

$(4x^2+6x+2x+3)(2x+5) = -105$

$(4x^2+8x+3)(2x+5) = -105$

$8x^3+20x^2+16x^2+40x+6x+15 = -105$

$8x^3+36x^2+46x+120 = 0$

$2(4x^3+18x^2+23x+60) = 0$

$f(-4) = 0$ $\quad x+4=0$ $\quad x=-4$

If $x=-4$

1st #: $2(-4)+1=-7$

2nd #: $2(-4)+3=-5$

3rd #: $2(-4)+5=-3$

Example 4: The product of four integers is $x^4+6x^3+11x^2+6x$ where x is one of the integers. What are possible expressions for the other three integers?

$x^4+6x^3+11x^2+6x$

$=(x)(x^3+6x^2+11x+6)$

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

completely factored form

$P(-2)=(-2)^3+6(-2)^2+11(-2)+6$

$P(-2)=-8+24-22+6$

$P(-2)=0$ $(x+2)$ is a factor

-2 | 1 6 11 6

−2 −8 −6

1 4 3 0

x^2+4x+3

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