Find a and b such that (x+2) and (x-2) are factors of of p(x)=ax4+2x3-3x2+bx-4

Let a1,a2,a3 and a4 be roots (may be complex) of p(x).

(x+2) and (x-2) are factors of p(x) => we can assume a3 = 2, a4 = -2.

Factor p(x):

P(x) = a(x – a1) (x – a2) (x – a3) (x – a4) = a(x – a1) (x – a2) (x – 2) (x + 2) =

= a (x^2 – (a1 + a2)x + a1*a2)(x^2 - 4) = a(x^4 - (a1 + a2)x^3 + (a1*a2 – 4)x^2 +4(a1 + a2)x – 4a1*a2) =

= ax^4 - a(a1 + a2)x^3 + a(a1*a2 – 4)x^2 +4a(a1 + a2)x – 4a*a1*a2 = ax^4+2x^3-3x^2+bx-4

Coefficients beside the same powers of x must be equal:

a = a (1)

- a(a1 + a2) = 2 (2)

a(a1*a2 – 4) = -3 (3)

4a(a1 + a2) = b (4)

– 4a*a1*a2 = -4 (5)

(2) => 4a(a1 + a2) = 2*(-4) = -8

(4) => 4a(a1 + a2) = b = -8

(5) => a1*a2 = 1/a

(3) => a(1/a – 4) = -3 => -4a= -3 => a = ¾

So, we get a = ¾, b = -8