How to factor x^3-5x^2 8x-4

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Now, to get another factor let's divide the given polynomial with (x - 1) x - 1) $x^3 - 5x^2 + 8x - 4$ ($x^2 - 4x + 4$ $x^3 - x^2$ - + - $4x^2 + 8x - 4x^2 + 4x$ + - 4x - 4 4x - 4 - + × × Here, Yield = $x^3 - 5x^2 + 8x - 4$ Divisor = x - 1 Quotient = $x^2 - 4x + 4$ Rest = 0 Also, We know that ; Yield = Divisor×Quotient + RemainderNow,=> LHS = Yield => LHS = $x^3 - 5x^2 + 8x - 4$ Also, => RHS = Divisor × Quotient + Rest=> RHS = ($x^2 - 4x + 4$) × (x - 1) => RHS = $x^3 - x^2 - 4x^2 + 4x + 4x - 4$ => RHS = $x^3 - 5x^2 + 8x - 4$ Clear, LHS = RHS Thus,Dividend = Divisor×Quotient + RemainderHence verified .°°We can also check the division rule using another factor in the given polynomial. Now, Yield = Divisor×Quotient + RemainderThus, => $x^3 - 5x^2 + 8x - 4 = (x^2- 4x + 4) \times (x - 1) + 0$ => $x^3 - 5x^2 + 8x - 4 = (x^2 - 4x + 4) \times (x - 1)$ => $x^3 - 5x^2 + 8x - 4 = (x - 2)^2(x - 1)$ => $x^3 - 5x^2 + 8x - 4 = (x - 1)(x - 2)(x - 2)$ Thus, the given cubic polynomial can be rewritten as $x^3 - 5x^2 + 8x - 4 = (x - 1)(x - 2)(x - 2)$. Therefore, the factors in the given cubic polynomial are ; (x - 1), (x - 2), (x - 2) Thus,Let's use another factor (x - 2) to check the division rule. Thus, let's divide the given polynomial with (x-2) .x - 2) $x^3 - 5x^2 + 8x - 4$ ($x^2 - 3x + 2$ $x^3 - 2x^2$ - + - $3x^2 + 8x - 3x^2 + 6x$ + - 2x - 4 2x - 4 - + × ×Her, Yield = $x^3 - 5x^2 + 8x - 4$ Divisor = x - 2Quotient = $x^2 - 3x + 2$Remainder = 0 Also, we know that; Yield = Divisor×Quotient + RemainderNow,=> LHS = Yield => LHS = $x^3 - 5x^2 + 8x - 4$ Also, => RHS = Divisor × Quotient + Rest=> RHS = ($x^2 - 3x + 2$) × (x - 2) + 0=> RHS = $x^3 - 2x^2 - 3x^2 + 6x + 2x - 4$= > RHS = $x^3 - 5x^2 + 8x - 4$ Clear LHS = RHS Thus,Yield = Divisor×Quotient + RemainderHence Verified . If a polynomial function has integer coefficients, then each rational zero will have the shape where is a factor in the constant and is a factor in the leading coefficient. If a function has integer coefficients, so each rational zero will have the shape where is a factor in the constant and is a factor in the leading coefficient. Changes to your input should not affect the solution: (1): x2 was replaced by x^2. 1 more similar replacement (s). Step 1 : Equation at the end of step 1 : (((x3) - 5x2) + 8x) - 4 Steps 2 :Control for a perfect cube: 2.1 x3-5x2 +8x-4 is not a perfect cube Trying to factor by pulling out: 2.2 Factoring: x3-5x2 +8x-4 Thoughtfully divide the expression by hand into groups, each group with two expressions : Group 1: x3-5x2 Group 2: 8x-4 Pull out from each group separately :Group 1: (x-5) • (x2)Group 2: (2x-1) • (4)Bad news!! Factoring in pulling out fails: The groups have no common factor and cannot be set up to form a multiplication. Polynomial Roots Calculator: 2.3 Find Roots (Zeros) by: F (x) = x3-5x2 +8x-4Polynomial Roots Calculator is a set of methods aimed at finding values of x, as the F (x)= 0 Rational Roots Test is one of the above tools. It would only find Rational Roots, which are number x, which can be expressed as the quotient of two integersThe rational Root Phrase states that if a polynomial zeros for a rational number of P/Q then P is a factor in Trailing Constant and Q is a factor in the leading CoefficientIn this case, the leading coefficient is 1 and Trailing Constant is the factor (s) is: of the leading coefficient: 1 of Trailing Constant: Let's test.... P Q P/Q F(P/Q) Divisor -1 1 -1.00 -18.00 -2 1 -2.00 -48.00 -4 1 -4.00 -180.00 1 1 11 1 1.00 00.00 x-1 2 1 2.00 0.00 x-2 4 1 4.00 12.00 The factoror indicates that if P/Q is the root of a polynomial, this polynomial can be divided by q*x-p Note, that q and p originates from P /Q reduced to its lowest terms In our case it means that x3-5x2 +8x-4 can be divided by 2 different polynomials, including x-2 Polynomial Long Division : 2.4 Polynomial Long Division Dividing : By: x-2 (Divisor) yield x3 - 3 5x2 + 8x - 4 - divisor * x2 x3 - 2x2 remaining - 3x2 + 8x - 4 - divisor * -3x1 - 3x2 + 6x remaining 2x - 4 - divisor * 2x0 2x - 4 remaining 0Quotient : x2-3x+2 The rest: 0 Trying to factor by splitting the middle term 2.5 Factoring x2-3x +2 The first term is, x2 its coefficient is 1. The middle term is, -3x its coefficient is -3 . The the expression constant is +2 Step-1 : Multiply the coefficient of the first expression with the constant 1 • 2 = 2 Step-2 : Find two factors of 2 whose sum is equal to the coefficient of the intermediate, which is -3 . Step-3 : Rewrite polynomial breakdown of the middle term using the two factors found in step 2 above, -2 and -1 x2 - 2x - 1x - 2Step-4 : Add up the first 2 terms, pull out as factors: x • (x-2) Add up the last 2 terms, pull out common factors: 1 • (x-2) Step-5 : Add up the four expressions in step 4 : (x-1) • (x-2) Which is the desired factorizationMultiplying Exponential expression : 2.6 Multiply (x-2) with (x-2) The rule says: To multiply exponential expressions that have the same base, add their exponents. In our case, the common base (x-2) and the exponents are: 1, which (x-2) is the same number as (x-2)1 and 1, which (x-2) is the same number as (x-2)1 The product is therefore, (x-2)(1+1) = (x-2)2 Final result : (x - 1) • (x - 2)2 ((x3) - 5x2) + 8x) - 4 = 0 2.1 x3-5x2+8x-4 is not a perfect cube Trying to factor by pulling out : 2.1 x3-5x2+8x-4 is not a perfect cube Trying to factor by pulling out: 2.1 x 5x2+8x-4 is not a perfect cube Trying to factor by pulling out : 2.1 x3-5x2+8x-4 is not a perfect cube Trying to factor by pulling out : 2.1 x 5x2 +8x-4 is not a perfect cube Trying to factor by pulling out : 2.1 x 5x2 +8x-4 is not a perfect cube Trying to factor by pulling out: 2.1 x3-5x2 +8x-4 is not a perfect cube Trying to factor by at2 Factoring: x3-5x2+8x-4 Gently divide the expression by hand into groups, each group with two expressions : Group 1: x3-5x2 Group 2: 8x-4 Pull out from each group separately :Group 1: (x-5) • (x2)Group 2: (2x-1) • (4)Bad news!! 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P Q P/Q F(P/Q) Divisor -1 1 -1.00 -18.00 -2 1 -2.00 -48.00 -4 1 -4.00 -180.00 1 1 1 1.00 0.00 x-1 2 1 2.00   4.00 12.00 The Factorocourt states that if P/Q is the root of a polynomial, this polynomial can be divided by q*x-p Note that q and p are derived from P/Q reduced to the lowest expressions In our case, this may mean that at x3-5x2 +8x-4 can be divided by 2 different polynomials, including x-2 Polynomial Long Division : 2.4 Polynomial Long Division Dividing : By: x-2 (Divisor)yield x3 - 5x2 + 8x - 4 - divisor * x2 x3 - 2x2 remaining - 3x2 + 8x - 4 - divisor * x2 x3 - 2x2 remaining - 3x2 + 8x - 4 - divisorvisor * -3x1 - 3x2 + 6x the rest 2x - 2x - 04 - divisor * 2x0 2x - 4 remaining 0Quotient : x2-3x +2 The rest: 0 Trying to factor by splitting the middle term 2.5 Factoring x2-3x +2 The first term is, x2 coefficient is 1 . The middle term is, -3x its coefficient is -3 . 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In our case, the common base (x-2) and the exponents are: 1, which (x-2) is the same number as (x-2)1 and 1, which (x-2) is the same number as (x-2)1 The product is therefore, (x-2)(1+1) = (x-2)2 Equation at the end of step 2 : (x - 1) • (x - 2)2 = 0 Step 3 :Theory - Roots of a product : 3.1 A product of several expressions equals zero. When a product with two or more expressions is equal to zero, at least one of the conditions must be zero. We must now solve each expression = 0 separateIn other words, we are going to solve as many equations as there are expressions in the productAny solution of term = 0 solves product = 0 as well. Solving a single variable equation: 3.2 Solve : x-1 = 0Add 1 to both sides of the equation : x = 1 Solution of a single variable equation: 3.3 Loose : (x-2)2 = 0 (x-2) 2 represents in effect a of 2 terms equal to zero For the product to be zero, at least one of these terms must be zero. Since all these expressions are equal to each other, it actually means: x-2 = 0 Add 2 to both sides of the equation : x = 2 Supplement: Solution square equation DirectSolving x2-3x + 2 = 0 directly Previously we recognized this polynomial by splitting the middle term. Now let's solve the equation by filling the space and using the square FormulaParabola, Find Vertex: 4.1 Find junction parabolas have a highest or a lowest point called Vertex.   Our parabola opens up and therefore has a lowest point (AKA absolute minimum).   We know this even before plotting y, because the coefficient of the first expression, 1 , is positive (greater than zero). Each parable has a vertical line of symmetry that passes through its node. Because of this symmetry, the line of symmetry, for example, would pass through the midpoint of the two x-intercepts (roots or solutions) of parabola. That is, if parabola actually has two real solutions. Parabolas can model many real situations, such as the height above ground, of an object thrown upwards, after a certain period of time. The node of the parabola can give us information, such as the maximum height that the object, thrown upwards, can reach. That is why we want to be able to find the coordinates of the top text. For any parable, Ax2+Bx+C, the x-coordinate of the node is specified by -B/(2A). I vores tilfælde x koordinat er 1.5000 Tilslutning i parabola formel 1,5000 for x vi kan beregne y-koordinat: y = 1,0 * 1,50 * 1,50 - 3,0 * 1,50 + 2,0 eller y = -0,250Parabola, Graftegning vertex og X-intercepts :Root plot for : y = x2-3x +2 akse symmetri (stiplede) {x}={ 1,50} Vertex på {x,y} = { 1,50,-0,25} x -Opfanger (Rødder) : Root 1 på {x,y} = { 1,00, 0.00} Rod 2 kl. {x,y} = { 2.00, 0,00} Løs kvadratisk ligning ved at udfylde Square 4,2 Løsning x2-3x +2 = 0 ved at udfylde SquareSubtract 2 fra begge sider af ligningen: x2-23x = -2Nu den kloge bit: Tag koefficienten x , som er 3 , dividere med to, hvilket giver 3 / 2, og endelig kvadratisk det giver 9 / 4 Tilføj 9 / 4 til begge sider af ligningen : On the right side we have : -2 + 9/4 or(-2/1)+(9/4) The common denominator of the two factions is 4 Addition (-8/4)+(9/4) gives 1/4 So adding to both sides we finally get : x2-3x+(9/4) = 1/4Inion 9/4 has completed the left side in a perfect square: x2-3x+(9/4) = (x-(3/2)) • (x-(3/2)) = (x-(3/2))2 Things equal to the same, equals each other. Da x2-3x+(9/4) = 1/4 = (x-(3/2)))2 thereafter, according to the Transitivity Act, (x-(3/2))2 = 1/4We will refer to this equation as Eq. #4.2.1 The square root principle says that when two things are equal, their square roots are equal. Note that the square root of (x-(3/2))2 is (x-(3/2))2/2 = (x-(3/2))1 = x-(3/2)Now, applying the square root principle to Eq. #4.2.1 we get: x-(3/2) = √ 1/4 Add 3/2 to both sides to achieve: x = 3/2 + √ 1/4 Since a square root has two values, one positive and the other negative x2 - 3x + 2 = 0 have two solutions: x = 3/2 + √ 1/4 or x = 3/2 - √ 1/4 Note that √ 1/4 can be written as √ 1/√ <7> 4, which is 1 / 2 Solve square equation using the square Formula 4.3 Solution x2-3x +2 = 0 of the square FormulaAccording to the square formula, x , the solution for Ax2 + Bx + C = 0 , where A, B and C are numbers, often called coefficients, is given by : - B ± √ B2-4AC x = ———————— 2A In our case, Therefore, apply square formula : So now we are looking at : x = (((3 ± 1) / 2Two real solutions:x =(3 +√1)/2= 2,000 or:x =(3-√1)/2= 1,000 Two solutions were found: :

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