
Exercise 3.2 For each expression, provide two levels of description:

1. i An identity.
   ii An arithmetical identity, expressing a cube as the sum of three cubes.
2. i An arithmetical expression.
   ii A quadratic surd, with same radicands.
3. i A chain of inequalities.
   ii Upper and lower rational bounds for the square root of 2.
4. i An algebraic expression.
   ii An algebraic expression consisting of three monomials.
5. i An inequality.
   ii An algebraic inequality in two unknowns.
6. i An identity.
   ii An algebraic formmula for the expansion of the cube of an expression.
7. i An equality.
   ii The cartesian equation of a parabola passing through the origin.
8. i An equation.
   ii An equation which has no answers. (The solution set is empty.)
9. i An identity.
   ii The trigonometric formula for the sine of the difference of two angles.
10. i An equation
    ii A differential equation, with the underlying ambient set of differentiable functions.
11. i An inequality.
    ii An inequality with multivariate functions on each side.
12. i A system of equations.
    ii A system of two simultaneous equations in 2 unknowns.
13. i An identity.
    ii An identity, expressing associative law on sets.
14. i An identity.
    ii A formula for the infinite summation of reciprocal of the fourth power of natural numbers.

Exercise 3.4

1. i A function.
   ii The real function that adds 1 to its argument.

2. i A function.
   ii The integral of a rational function.
3. i An identity. (A functional identity.)
   ii The formula for the derivative of the product of two functions.
4. i An identity. (A functional identity.)
   ii The formula for integral of a function with substituted unknown.
5. i An integral.
   ii The indefinite integral of a function of two variables, performed with respect to the first variable.
6. i An integral.
   ii The indefinite double integral of a function, performed with respect to the xy plane.
7. i An identity. (A definition.)
   ii The power series of the cosine.
8. i A derivative.
   ii The sum of partial derivatives of a multivariate function.
9. i A finite product of functions.
   ii The product of all the partial derivatives of a function of several variables.
10. i An infinite summation.
    ii Infinite summation of an unknown raised to square numbers.
11. i An integral
    ii The infinite integral of a function containing napier's constant.
12. i An infinite product
    ii The infinite product of a function divided by square numbers.

Exercise 3.5

1. i A Set.
   ii The intersection of the inverse images of the elements of a sequence of sets.
2. i A Number.
   ii The size of the infinite union of a sequence of power sets.
3. i A Set equation.
   ii The set equation expressing the union of sets over a function equals union of each individual set over the function.
4. i A Set.
   ii The set is cartesian product of n copies of irrational multiples of integer set.
5. i A Set.
   ii The set of all infinite sequences of the set of non-negative and less than 2 powers of x.

6. i A Set.
   ii The set of doubly-infinite sequences of elements of Z.
7. i An Equation.
   ii A set equation with and empty solution set.
8. i An Equation.
   ii The set of functions which multiply previous argument and its value in function as the result.
9. i An Equation
   ii A functional equation where composition of the function for n times results the identity function.
10. i A Set.
    ii The Minkowski sum of an interval for n times. (The closed interval of $[0, n]$.)