Lesson 2: Linear and Nonlinear Expressions in $x$

Classwork

Exercises

Write each of the following statements in Exercises 1–12$ $as a mathematical expression. State whether or not the expression is linear or nonlinear. If it is nonlinear, then explain why.

1. The sum of a number and four times the number.
2. The product of five and a number.
3. Multiply six and the reciprocal of the quotient of a number and seven.
4. Twice a number subtracted from four times a number, added to $15$.
5. The square of the sum of six and a number.
6. The cube of a positive number divided by the square of the same positive number.
7. The sum of four consecutive numbers.
8. Four subtracted from the reciprocal of a number.
9. Half of the product of a number multiplied by itself three times.
10. The sum that shows how many pages Maria read if she read $45$ pages of a book yesterday and $\frac{2}{3}$ of the remaining pages today.
11. An admission fee of $\$10$ plus an additional $\$2$ per game.
12. Five more than four times a number and then twice that sum.

Lesson Summary

**Linear expressions** are sums of constants and products of constants and $x $raised to a power of $0 $or $1$. For example, $4+3x$, $7x+x-15$, and $\frac{1}{2}x+7-2$ are all linear expressions in $x.$

**Nonlinear expressions** are also sums of constants and products of constants and $x$ raised to a power that is not $0$
or $1$. For example, $2x^{2}-9$, $-6x^{-3}+8+x$, and $\frac{1}{x}+8$ are all nonlinear expressions in $x.$

Problem Set

Write each of the following statements as a mathematic expression. State whether the expression is linear or nonlinear. If it is nonlinear, then explain why.

1. A number decreased by three squared.
2. The quotient of$ $two and a number, subtracted from seventeen.
3. The sum of thirteen and twice a number.
4. $5.2$ more than the product of seven and a number.
5. The sum that represents the number of tickets sold if$ 35$ tickets were sold Monday, half of the remaining tickets were sold on Tuesday, and $14$ tickets were sold on Wednesday.
6. The product of $19$ and a number, subtracted from the reciprocal of the number cubed.
7. The product of $15$ and a number, and then the product multiplied by itself$ $four times.
8. A number increased by five and then divided by two.
9. Eight times the result of subtracting three from a number.
10. The sum of twice a number and four times a number subtracted from the number squared.
11. One-third of the result of three times a number that is increased by$ 12$.
12. Five times the sum of one-half and a number.
13. Three-fourths of a number multiplied by seven.
14. The sum of a number and negative three, multiplied by the number.
15. The square of the difference between a number and $10$.