Exit Ticket Sample Solutions

> Write each of the following statements as a mathematical expression. State whether the expression is a linear or nonlinear expression in x.
>
> 1. Seven subtracted from five times a number, and then the difference added to nine times a number
>
>   *Let x be a number; then, $(5x - 7) + 9x$. The expression is a linear expression.*
>
> 2. Three times a number subtracted from the product of fifteen and the reciprocal of a number
>
>   *Let x be a number; then, $15 \cdot \frac{1}{x} - 3x$. The expression is a nonlinear expression.*
>
> 3. Half of the sum of two and a number multiplied by itself three times
>
>   *Let x be a number; then, $\frac{1}{2}\left(2 + x^3\right)$. The expression is a nonlinear expression.*

Problem Set Sample Solutions

Students practice writing expressions and identifying them as linear or nonlinear.

> Write each of the following statements as a mathematical expression. State whether the expression is linear or nonlinear. If it is nonlinear, then explain why.
>
> 1. A number decreased by three squared
>
>   *Let x be a number; then, $x - 3^2$ is a linear expression.*
>
> 2. The quotient of two and a number, subtracted from seventeen
>
>   *Let x be a number; then, $17 - \frac{2}{x}$ is a nonlinear expression. The term $\frac{2}{x}$ is the same as $2 \cdot \frac{1}{x}$ and $\frac{1}{x} = x^{-1}$, which is why it is not linear.*
>
> 3. The sum of thirteen and twice a number
>
>   *Let x be a number; then, $13 + 2x$ is a linear expression.*
>
> 4. 5.2 more than the product of seven and a number
>
>   *Let x be a number; then, $5.2 + 7x$ is a linear expression.*
>
> 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
>
>   *Let x be the remaining number of tickets; then, $35 + \frac{1}{2}x + 14$ is a linear expression.*

6. The product of 19 and a number, subtracted from the reciprocal of the number cubed

Let x be a number; then, $\frac{1}{x^3} - 19x$ is a nonlinear expression. The term $\frac{1}{x^3}$ is the same as x^{-3}, which is why it is not linear.

7. The product of 15 and a number, and then the product multiplied by itself four times

Let x be a number; then, $(15x)^4$ is a nonlinear expression. The expression can be written as $15^4 \cdot x^4$. The exponent of 4 with a base of x is the reason it is not linear.

8. A number increased by five and then divided by two

Let x be a number; then, $\frac{x+5}{2}$ is a linear expression.

9. Eight times the result of subtracting three from a number

Let x be a number; then, $8(x-3)$ is a linear expression.

10. The sum of twice a number and four times a number subtracted from the number squared

Let x be a number; then, $x^2 - (2x + 4x)$ is a nonlinear expression. The term x^2 is the reason it is not linear.

11. One-third of the result of three times a number that is increased by 12

Let x be a number; then, $\frac{1}{3}(3x + 12)$ is a linear expression.

12. Five times the sum of one-half and a number

Let x be a number; then, $5\left(\frac{1}{2} + x\right)$ is a linear expression.

13. Three-fourths of a number multiplied by seven

Let x be a number; then, $\frac{3}{4}x \cdot 7$ is a linear expression.

14. The sum of a number and negative three, multiplied by the number

Let x be a number; then, $(x + (-3))x$ is a nonlinear expression because $(x + (-3))x = x^2 - 3x$ after using the distributive property. It is nonlinear because the power of x in the term x^2 is greater than 1.

15. The square of the difference between a number and 10

Let x be a number; then, $(x - 10)^2$ is a nonlinear expression because $(x - 10)^2 = x^2 - 20x + 100$. The term x^2 is a positive power of $x > 1$; therefore, this is not a linear expression.