***Section* R.2 − Linear and Rational Equations**

**Definition of a Linear Equation**

A linear equation in one variable *x* is an equation that can be written in the form

*ax + b = 0*

where *a* and *b* are real number, and *a* ≠ 0

**Addition and Multiplication Properties of Equalities**





***Example***

Solve: 

***Solution***















***Example***

Solve: 

***Solution***















***Example***

Solve: 

***Solution***

 *Restriction:* ***x* ≠ 0**

45 = 17***x*** – 6

45 + 6 = 17***x***

17***x*** = 51



***Example***

Solve: 

***Solution***

 *Restriction*: ***x* ≠ 2**

3***x*** = 6 – 2(***x*** – 2)

3***x*** = 6 – 2***x*** + 4

3***x*** + 2***x*** = 10

⇒ 5***x*** = 10

⇒ ***x*** = 2

*No Solution* ***or*** {∅}

**Identities, Conditional Equations, and Contradictions**

***Example***

Solve: 

***Solution***







 *True statement*

***Solution:*** ***All real numbers***

***Example***

Solve: 

***Solution***







***This is a conditional equation, and its solution set is {3}***

***Example***

Solve: 

***Solution***





 ***False statement***

***This is a contradiction equation, and its solution set is empty set* {∅} *or null***

**Solving for a Specified Variable**

***Example***

Solve

1. 





1. 





 

1. 









***Example***

Solve the formula 2*l* + 2*w* = *P* for ***w***

***Solution***

2***w*** = P – 2*l*



***Example***

Solve the formula  for *C*

***Solution***







***Exercises Section* R.2 − Linear and Rational Equations**

(**1 – 78**) Solve

|  |  |
| --- | --- |
|  |  |
|  |  |

1. 
2. 
3. 
4. 
5. 
6. 
7. 
8. 
9. 
10. 
11. 

(**79 – 100**) Solve for the specific variable

|  |  |  |  |
| --- | --- | --- | --- |
|  | |  | |
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