Simple Equations: Exercise 4.1

Q.1 Complete the last column of the table.

S. No.	Equation	Value	Say, whether the Equation is Satisfied. (Yes/ No)
(i)	$x + 3 = 0$	$x = 3$	
(ii)	$x + 3 = 0$	$x = 0$	
(iii)	$x + 3 = 0$	$x = -3$	
(iv)	$x - 7 = 1$	$x = 7$	
(v)	$x - 7 = 1$	$x = 8$	
(vi)	$5x = 25$	$x = 0$	
(vii)	$5x = 25$	$x = 5$	
(viii)	$5x = 25$	$x = -5$	
(ix)	$\frac{m}{3} = 2$	$m = -6$	
(x)	$\frac{m}{3} = 2$	$m = 0$	
(xi)	$\frac{m}{3} = 2$	$m = 6$	

Sol:

In order to find whether equations is satisfied, we need to put the given values in the equations.

(i) Given: $x + 3 = 0$

On putting the value of $x = 3$ in given equation,

$3 + 3 = 0$

$6 \neq 0$

Thus, the equation is not satisfied.

(ii) Given: $x + 3 = 0$

On putting the value of $x = 0$ in given equation,

$0 + 3 = 0$

$3 \neq 0$

Thus, the equation is not satisfied.

(iii) Given: $x + 3 = 0$

On putting the value of $x = -3$ in given equation,

$(-3) + 3 = 0$

$0 = 0$

Thus, the equation is satisfied.

(iv) Given: $x - 7 = 1$

On putting the value of $x = 7$ in given equation,

$(7) - 7 = 1$

$0 \neq 1$

Thus, the equation is not satisfied.

(v) Given: $x - 7 = 1$

On putting the value of $x = 8$ in given equation,

$(8) - 7 = 1$

$1 = 1$

Thus, the equation is satisfied.

(vi) Given: $5x = 25$

On putting the value of $x = 0$ in given equation,

$5 \times (0) = 25$

$0 \neq 25$

Thus, the equation is not satisfied.

(vii) Given: $5x = 25$

On putting the value of $x = 5$ in given equation,

$5 \times (5) = 25$

$25 = 25$

Thus, the equation is satisfied.

(viii) Given: $5x = 25$

On putting the value of $x = -5$ in given equation,

$5 \times (-5) = 25$

$-25 \neq 25$

Thus, the equation is not satisfied.

(ix) Given: $(m/3) = 2$

On putting the value of $m = -6$ in given equation,

$(-6/3) = 2$

$-2 \neq 2$

Thus, the equation is not satisfied.

(x) Given: $(m/3) = 2$

On putting the value of $m = 0$ in given equation,

$(0/3) = 2$

$0 \neq 2$

Thus, the equation is not satisfied.

(xi) Given: $(m/3) = 2$

On putting the value of $m = 6$ in given equation,

$(6/3) = 2$

$2 = 2$

Thus, the equation is satisfied.

Thus, the complete table:

S. No.	Equation	Value	Say, whether the Equation is Satisfied. (Yes/ No)
(i)	$x + 3 = 0$	$x = 3$	No
(ii)	$x + 3 = 0$	$x = 0$	No
(iii)	$x + 3 = 0$	$x = -3$	Yes
(iv)	$x - 7 = 1$	$x = 7$	No
(v)	$x - 7 = 1$	$x = 8$	Yes
(vi)	$5x = 25$	$x = 0$	No
(vii)	$5x = 25$	$x = 5$	Yes
(viii)	$5x = 25$	$x = -5$	No
(ix)	$\frac{m}{3} = 2$	$m = -6$	No
(x)	$\frac{m}{3} = 2$	$m = 0$	No
(xi)	$\frac{m}{3} = 2$	$m = 6$	Yes

Q.2 Check whether the value given in the brackets is a solution to the given equation or not:
(a) $n + 5 = 19$ ($n = 1$) (b) $7n + 5 = 19$ ($n = -2$) (c) $7n + 5 = 19$ ($n = 2$)
(d) $4p - 3 = 13$ ($p = 1$) (e) $4p - 3 = 13$ ($p = -4$) (f) $4p - 3 = 13$ ($p = 0$)

Sol: To check whether the value given in the brackets is a solution to the given equation or not, we need to put the given values in the equations. If equation is satisfied then given value will be the solution of that equation.

(a) Given: $n + 5 = 19$ ($n = 1$)
On putting the value n = 1 in given equation,
(1) + 5 = 19
6 ≠ 19
Since, the given equation is not satisfied. So, n = 1 is not the solution of given equation.

(b) Given: $7n + 5 = 19$ ($n = -2$)
On putting the value n = -2 in given equation,
7(-2) + 5 = 19
-14 + 5 = 19
-9 ≠ 19
Since, the given equation is not satisfied. So, n = -2 is not the solution of given equation.

(c) Given: $7n + 5 = 19$ ($n = 2$)
On putting the value n = 2 in given equation,
7(2) + 5 = 19
14 + 5 = 19
19 = 19
Since, the given equation is satisfied. So, n = 2 is the solution of given equation.

(d) Given: $4p - 3 = 13$ ($p = 1$)
On putting the value $p = 1$ in given equation,
$4(1) - 3 = 13$
$4 - 3 = 13$
$1 \neq 13$
Since, the given equation is not satisfied. So, $p = 1$ is not the solution of given equation.

(e) Given: $4p - 3 = 13$ ($p = -4$)
On putting the value $p = -4$ in given equation,
$4(-4) - 3 = 13$
$-16 - 3 = 13$
$-19 \neq 13$
Since, the given equation is not satisfied. So, $p = -4$ is not the solution of given equation.

(f) Given: $4p - 3 = 13$ ($p = 0$)
On putting the value $p = 0$ in given equation,
$4(0) - 3 = 13$
$- 3 = 13$
$0 \neq 13$
Since, the given equation is not satisfied. So, $p = 0$ is not the solution of given equation.

Q.3 Solve the following equations by trial and error method:
(i) $5p + 2 = 17$ (ii) $3m - 14 = 4$
Sol:
(i) Given: $5p + 2 = 17$
On putting let $p = 1$ in given equation,
$5(1) + 2 = 17$
$6 + 2 = 17$
$8 \neq 17$
Thus, the value of $p = 1$ is not the solution of equation.

Now, on putting let $p = 2$ in given equation,
$5(2) + 2 = 17$
$10 + 2 = 17$
$12 \neq 17$
Thus, the value of $p = 2$ is not the solution of equation.

On putting let $p = 3$ in given equation,
$5(3) + 2 = 17$
$15 + 2 = 17$
$17 = 17$
Thus, the value of $p = 3$ is the solution of equation.

(ii) Given: $3m - 14 = 4$
On putting let $m = 2$ in given equation,
$3(2) - 14 = 4$
$6 - 14 = 4$
$-8 \neq 4$
Thus, the value of $m = 2$ is not the solution of equation.

On putting let $m = 3$ in given equation,
$3(3) - 14 = 4$
$9 - 14 = 4$
$-5 \neq 4$
Thus, the value of $m = 3$ is not the solution of equation.

On putting let $m = 4$ in given equation,
$3(4) - 14 = 4$
$12 - 14 = 4$
$-2 \neq 4$
Thus, the value of $m = 4$ is not the solution of equation.

On putting let $m = 5$ in given equation,
$3(5) - 14 = 4$
$15 - 14 = 4$
$1 \neq 4$
Thus, the value of $m = 5$ is not the solution of equation.

On putting let $m = 6$ in given equation,
$3(6) - 14 = 4$
$18 - 14 = 4$
$4 = 4$
Thus, the value of $m = 6$ is the solution of equation.

Q.4 Write equations for the following statements:
(i) The sum of numbers x and 4 is 9.
(ii) 2 subtracted from y is 8.
(iii) Ten times a is 70.
(iv) The number b divided by 5 gives 6.
(v) Three-fourth of t is 15.
(vi) Seven times m plus 7 gets you 77.
(vii) One-fourth of a number x minus 4 gives 4.
(viii) If you take away 6 from 6 times y, you get 60.
(ix) If you add 3 to one-third of z, you get 30.
Sol: Equations for the statements:
(i) Given: The sum of numbers x and 4 is 9.
So, equation: $x + 4 = 9$

(ii) Given: 2 subtracted from y is 8.
So, equation: $y - 2 = 8$

(iii) Given: Ten times a is 70.
So, equation: $10a = 70$

(iv) Given: The number b divided by 5 gives 6.
So, equation: $(b/5) = 6$

(v) Given: Three-fourth of t is 15.
So, equation: $(¾)\ t = 15$

(vi) Given: Seven times m plus 7 gets you 77.

So, equation: $7m + 7 = 77$

(vii) Given: One-fourth of a number x minus 4 gives 4.
So, equation: $(x/4) - 4 = 4$

(viii) Given: If you take away 6 from 6 times y, you get 60.
So, equation: $6y - 6 = 60$

(ix) Given: If you add 3 to one-third of z, you get 30.
So, equation: $3 + (z/3) = 30$

Q.5 Write the following equations in statement forms:
(i) $p + 4 = 15$ (ii) $m - 7 = 3$ (iii) $2m = 7$ (iv) $(m/5) = 3$
(v) $(3m/5) = 6$ (vi) $3p + 4 = 25$ (vii) $4p - 2 = 18$ (viii) $(p/2) + 2 = 8$
Sol:
(i) Given: $p + 4 = 15$
Statement: Addition of p and 4 is 15.

(ii) Given: $m - 7 = 3$
Statement: Subtract number 7 from m is equal to 3.

(iii) Given: $2m = 7$
Statement: twice of m is equal to 7.

(iv) Given: $(m/5) = 3$
Statement: m divided by 5 equal to 3.

(v) Given: $(3m/5) = 6$
Statement: 3 times of m divide by 5 is equal to 6.

(vi) Given: $3p + 4 = 25$
Statement: Addition of 3 times of m and 4 is equal to 25.

(vii) Given: $4p - 2 = 18$
Statement: subtract 2 from 4 time of p is equal to 18.

(viii) Given: $(p/2) + 2 = 8$
Statement: Addition of half of p and 2 equal to 8.

Q.6 Set up an equation in the following cases:
(i) Irfan says that he has 7 marbles more than five times the marbles Parmit has. Irfan has 37 marbles. (Take m to be the number of Parmit's marbles.)
(ii) Laxmi's father is 49 years old. He is 4 years older than three times Laxmi's age. (Take Laxmi's age to be y years.)
(iii) The teacher tells the class that the highest marks obtained by a student in her class is twice the lowest marks plus 7. The highest score is 87. (Take the lowest score to be *l*.)
(iv) In an isosceles triangle, the vertex angle is twice either base angle. (Let the base angle be b in degrees. Remember that the sum of angles of a triangle is 180 degrees).
Sol: Equation for the given cases:

(i) Given: Irfan says that he has 7 marbles more than five times the marbles Parmit has. Irfan has 37 marbles. (Take m to be the number of Parmit's marbles.)
Let m be the number of Parmit's marbles.
And Irfan has 7 marbles more than five times of Parmit's marbles.
So, total marbles Irfan having = 5 x Number of Parmit's marble + 7
$= 5 \times m + 7$
Since, Irfan has 37 marbles.
Thus, Equation: $5m + 7 = 37$

(ii) Given: Laxmi's father is 49 years old. He is 4 years older than three times Laxmi's age. (Take Laxmi's age to be y years.)
Let y year be the age of Laxmi.
And Laxmi's father is 4 years older than three times Laxmi's age.
So, Laxmi's father age = 3 × Laxmi's age + 4
$= 3 \times y + 4$
Since, Laxmi's father is 49 years old.
So, Equation: $3y + 4 = 49$

(iii) Given: The teacher tells the class that the highest marks obtained by a student in her class is twice the lowest marks plus 7. The highest score is 87. (Take the lowest score to be l.)
Let l be the lowest marks in the class.
And the highest marks obtained by a student in her class is twice the lowest marks plus 7.
So, highest marks scored by student = 2 × Lowest scored marks + 7
$= 2 \times l + 7$
Since, highest score is 87.
So, Equation: $2l + 7 = 87$

(iv) Given: In an isosceles triangle, the vertex angle is twice either base angle. (Let the base angle be b in degrees. Remember that the sum of angles of a triangle is 180 degrees).
Let b degree be the base angle
And the vertex angle is twice either base angle.
So, vertex angle = 2 x base angle
$= 2 \times b$
Since, that the sum of angles of a triangle is 180 degrees
So equation: $2b + b + b = 180^o$
$4b = 180^o$