RS Aggarwal Solutions for Class 10 Maths Chapter 3 Exercise 3.5: The academic team of Physics Wallah has produced a comprehensive solution for Chapter 3 of the textbook RS Aggarwal Class 10 Linear Equations in Two Variables. The RS Aggarwal class 10 solution for Chapter 3 Linear Equations in Two Variables Exercise-3E is uploaded for reference only; do not copy the solutions.

Before going through the solution of Chapter 3 Linear Equations in Two Variables Exercise-3E, one must have a clear understanding of Chapter 3 Linear Equations in Two Variables. Read the theory of Chapter 3 Linear Equations in Two Variables and then try to solve all numerical of exercise-3E. It is strongly advised that students in class 10 utilize the NCERT textbook to solve numerical problems and refer to the NCERT solutions for maths in class 10.

RS Aggarwal Solutions for Class 10 Maths Chapter 3 Exercise 3.5 Overview

RS Aggarwal Solutions for Class 10 Maths Chapter 3 Exercise 3.5 provides a comprehensive overview of linear equations, a fundamental topic in mathematics. This exercise focuses on solving linear equations with one variable, which is essential for understanding more complex algebraic concepts. The solutions offered are meticulously crafted to guide students through each step of solving equations, ensuring clarity and reinforcing problem-solving skills.

By using these solutions, students can effectively practice and master the techniques required to solve linear equations, thereby laying a strong foundation for further mathematical studies. Overall, RS Aggarwal Solutions for Chapter 3 Exercise 3.5 serves as a valuable resource for students to enhance their understanding and proficiency in handling linear equations.

RS Aggarwal Solutions for Class 10 Maths Chapter 3 Exercise 3.5

Below we have provided RS Aggarwal Solutions for Class 10 Maths Chapter 3 Exercise 3.5 for the ease of the students –

Question 1.

Solution: A

Given: Two equations, $x + 2y = 3$

$\Rightarrow x + 2y - 3 = 0$ - - - - (1)

$2x + 4y + 7 = 0$ - - - - (2)

We know that the general form for a pair of linear equations in 2 variables x and y is $a_1x + b_1y + c_1 = 0$

and $a_2x + b_2y + c_2 = 0$.

Comparing with above equations,

we have $a_1 = 1$, $b_1 = 2$, $c_1 = -3$; $a_2 = 2$, $b_2 = 4$, $c_2 = 7$

$$\frac{a_1}{a_2} = \frac{1}{2}; \frac{b_1}{b_2} = \frac{2}{4} = \frac{1}{2}; \frac{c_1}{c_2} = \frac{-3}{7}$$

Since $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

∴Both lines are parallel to each other.

Question 2.

Solution: D

Given: Two equations, $2x - 3y = 7$

$\Rightarrow 2x - 3y - 7 = 0$

$(a + b) x - (a + b - 3) y = 4a + b$

$(a + b) x - (a + b - 3) y - (4a + b) = 0$

We know that the general form for a pair of linear equations in 2 variables x and y is $a_1x + b_1y + c_1 = 0$

and $a_2x + b_2y + c_2 = 0$.

Comparing with above equations,

we have $a_1 = 2$,

$b_1 = -3$,

$c_1 = -7$;

$a_2 = a + b$,

$b_2 = -(a + b - 3)$,

$c_2 = -(4a + b)$

$$\frac{a_1}{a_2} = \frac{2}{(a + b)}$$

$$\frac{b_1}{b_2} = \frac{-3}{-(a + b - 3)} = \frac{3}{(a + b - 3)}$$

$$\frac{c_1}{c_2} = \frac{-7}{-(4a + b)} = \frac{7}{(4a + b)}$$

Since, it is given that the equations have infinite number of solutions, then lines are coincident and

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$$

So, $\frac{2}{(a + b)} = \frac{3}{(a + b - 3)} = \frac{7}{(4a + b)}$

Let us consider $\frac{2}{(a + b)} = \frac{3}{(a + b - 3)}$

Then, by cross multiplication, 2(a + b – 3) = 3(a + b)

⇒ 2a + 2b – 6 = 3a + 3b

⇒ a + b + 6 = 0 … (1)

Now consider $\frac{3}{(a + b - 3)} = \frac{7}{(4a + b)}$

Then, 3(4a + b) = 7(a + b – 3)

⇒ 12a + 3b = 7a + 7b – 21

⇒ 5a – 4b + 21 = 0 … (2)

Solving equations (1) and (2),

5 × (1), (5a + 5b + 30) – (5a – 4b + 21) = 0

⇒ 9b + 9 = 0

⇒ 9b = - 9

⇒ b = - 1

Substitute b value in (1),

a - 1 + 6 = 0

a + 5 = 0

a = - 5

∴ a = - 5; b = - 1

Question 3.

Solution: A

Given: $2x + y - 5 = 0$ and $3x + 2y - 8 = 0$

We know that the general form for a pair of linear equations in 2 variables x and y is $a_1x + b_1y + c_1 = 0$

and $a_2x + b_2y + c_2 = 0$.

Comparing with above equations,

we have $a_1 = 2$, $b_1 = 1$, $c_1 = -5$; $a_2 = 3$, $b_2 = 2$, $c_2 = -8$

$$\frac{a_1}{a_2} = \frac{2}{3}$$

$$\frac{b_1}{b_2} = \frac{1}{2}$$

$$\frac{c_1}{c_2} = \frac{-5}{-8} = \frac{5}{8}$$

Since $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$

The lines are intersecting.

∴The pair of equations has a unique solution.

Question 4.

Solution:

Answer D

Given that $x = -y$ and $y > 0$

Let us verify all the options by substituting the value of x.

Option A: $x^2y > 0$

$\Rightarrow (-y)^2 (y) > 0$

$\Rightarrow y^2(y) > 0$

$\Rightarrow y^3 > 0$

Since $y > 0$, $y^3 > 0$ satisfies.

Option B: $x + y = 0$

$\Rightarrow (-y) + y = 0$

0 = 0

LHS = RHS

Hence satisfies.

Option C: xy < 0

⇒ (- y)(y) < 0

⇒ - y^2 < 0

Hence satisfies.

Option D: $\frac{1}{x} - \frac{1}{y} = 0$

⇒ $\frac{1}{-y} - \frac{1}{y} = 0$

⇒ $\frac{-2}{y} \neq 0$

Since y > 0, also 1/y > 0 but - 2/y <0

Hence, it is not satisfied.

Question 5.

Solution:

Given: - x + 2y + 2 = 0 and $\frac{1}{2}x - \frac{1}{2}y - 1 = 0$

To Prove: The system of given equations has a unique solution.

Proof:

We know that the general form for a pair of linear equations in 2 variables x and y is $a_1x + b_1y + c_1 = 0$

and $a_2x + b_2y + c_2 = 0$.

Comparing with above equations,

we have $a_1 = -1$,

$b_1 = 2$,

$c_1 = 2$;

$a_2 = 1/2$,

$b_2 = -1/2$

$c_2 = -1$

$$\frac{a_1}{a_2} = \frac{-1}{\frac{1}{2}} = -2$$

$$\frac{b_1}{b_2} = \frac{2}{-\frac{1}{2}} = -4$$

$$\frac{c_1}{c_2} = \frac{2}{-1} = -2$$

Since $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$

The lines are intersecting.

Question 6.

Solution:

Given: $kx + 3y = k - 2$,

$12x + ky = k$

We know that the general form for a pair of linear equations in 2 variables x and y is $a_1x + b_1y + c_1 = 0$

and $a_2x + b_2y + c_2 = 0$.

Comparing with above equations,

we have $a_1 = k$, $b_1 = 3$, $c_1 = -(k - 2)$; $a_2 = 12$, $b_2 = k$, $c_2 = -k$

$$\frac{a_1}{a_2} = \frac{k}{12}$$

$$\frac{b_1}{b_2} = \frac{3}{k}$$

$$\frac{c_1}{c_2} = \frac{-(k-2)}{-k} = \frac{k-2}{k}$$

For given equations to be inconsistent,

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$$

$$\frac{k}{12} = \frac{3}{k}$$

By cross multiplication, $k^2 = 36$

So, $k = \pm 6$

For $k = \pm 6$, the system of equations $kx + 3y = k - 2$, $12x + ky = k$ is inconsistent.

Question 7.

Solution:

Given: 9x - 10y = 21,

$\frac{3}{2}x - \frac{5}{3}y - \frac{7}{2} = 0$

To Prove: The given equations have infinitely many solutions.

Proof:

We know that the general form for a pair of linear equations in 2 variables x and y is $a_1x + b_1y + c_1 = 0$

and $a_2x + b_2y + c_2 = 0$.

Comparing with above equations,

we have $a_1 = 9$,

$b_1 = -10$,

$c_1 = -21$;

$a_2 = 3/2$,

$b_2 = -5/3$

$c_2 = -7/2$

$\frac{a_1}{a_2} = \frac{9}{\frac{3}{2}} = 6$

$$\frac{b_1}{b_2} = \frac{-10}{\frac{-5}{3}} = 6$$

$$\frac{c_1}{c_2} = \frac{-21}{\frac{-7}{2}} = 6$$

Since $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

The lines are coincident.

Question 8.

Solution:

Given: x - 2y = 0 … (1)

3x + 4y = 20 …(2)

Solution By elimination method,

Step 1: Multiply equation (1) by 3 and equation (2) by 1 to make the coefficients of x equal.

Then, we get the equations as:

3x – 6y = 0 … (3)

3x + 4y = 20 … (4)

Step 2: Subtract equation (4) from equation (3),

(3x – 3x) + (4y + 6y) = 20 – 0

⇒ 10y = 20

$y = 2$

Step 3: Substitute y value in (1),

$x - 2(2) = 0$

$\Rightarrow x = 4$

The solution is $x = 4$, $y = 2$.

Question 9.

Solution:

Given: $x - 3y = 2$ and $-2x + 6y = 5$

To Prove: The paths represented by the given equations are parallel.

Proof:

We know that the general form for a pair of linear equations in 2 variables x and y is $a_1x + b_1y + c_1 = 0$

and $a_2x + b_2y + c_2 = 0$.

Comparing with above equations,

we have $a_1 = 1$, $b_1 = -3$, $c_1 = -2$; $a_2 = -2$, $b_2 = 6$, $c_2 = -5$

$$\frac{a_1}{a_2} = \frac{-1}{2}$$

$$\frac{b_1}{b_2} = \frac{-3}{6} = \frac{-1}{2}$$

$$\frac{c_1}{c_2} = \frac{-2}{-5} = \frac{2}{5}$$

Since $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

Both lines are parallel to each other.

Question 10.

Solution:

The pair of linear equations formed is:

a − b = 26 … (1)

a = 3b … (2)

We substitute value of a in equation (1), to get

3b − b = 26

⇒ 2b = 26

⇒ b = 13

Substituting value of b in equation (2),

a = 3(13)

⇒ a = 39

The numbers are 13 and 39.

Question 11.

Solution:

The given equations are 23x + 29y = 98, 29x + 23y = 110.

We know that the general form for a pair of linear equations in 2 variables x and y is $a_1x + b_1y + c_1 = 0$

and $a_2x + b_2y + c_2 = 0$.

Comparing with above equations,

we have $a_1 = 23$, $b_1 = 29$, $c_1 = -98$; $a_2 = 29$, $b_2 = 23$, $c_2 = -110$

We can solve by cross multiplication method using the formula

$$\frac{x}{b_1c_2 - b_2c_1} = \frac{y}{c_1a_2 - c_2a_1} = \frac{1}{a_1b_2 - a_2b_1}$$

Substituting values in the formula, we get

$$\frac{x}{29(-110) - 23(-98)} = \frac{y}{(-98)(29) - (-110)(23)} = \frac{1}{23(23) - 29(29)}$$

$$\Rightarrow \frac{x}{-3190-(-2254)} = \frac{y}{-2842-(-2530)} = \frac{1}{529-841}$$

$$\Rightarrow \frac{x}{-936} = \frac{y}{-312} = \frac{1}{-312}$$

$$\Rightarrow \frac{x}{-936} = \frac{1}{-312} \text{ and } \frac{y}{-312} = \frac{1}{-312}$$

$\Rightarrow x = 3$ and $y = 1$

The solution is $x = 3$ and $y = 1$.

Question 12.

Solution:

The given equations are $6x + 3y = 7xy$ and $3x + 9y = 11xy$.

Dividing by xy on both sides of the given equations, we get

$$\frac{6}{y} + \frac{3}{x} = 7$$

$\frac{3}{y} + \frac{9}{x} = 11$

Then,

$6\left(\frac{1}{y}\right) + 3\left(\frac{1}{x}\right) = 7$ … (1)

$3\left(\frac{1}{y}\right) + 9\left(\frac{1}{x}\right) = 11$ … (2)

If we substitute $\frac{1}{x} = p$ and $\frac{1}{y} = q$ in (1) and (2), we get

3p + 6q = 7 … (3)

9p + 3q = 11 … (4)

Now by elimination method,

Step 1: Multiply equation (3) by 3 and equation (4) by 1 to make the coefficients of x equal.

Then, we get the equations as:

9p + 18q = 21 … (5)

9p + 3q = 11 … (6)

Step 2: Subtract equation (6) from equation (5),

(9p – 9p) + (3q – 18q) = 11 – 21

⇒ - 15q = - 10

$\Rightarrow q = \frac{2}{3}$

Step 3: Substitute q value in (3),

$3p + 6\left(\frac{2}{3}\right) = 7$

$3p = 3$

$\Rightarrow p = 1$

We know that $\frac{1}{x} = p$ and $\frac{1}{y} = q$.

Substituting values of p and q, we get

$x = 1$ and $y = \frac{3}{2}$

The solution is $x = 1$ and $y = \frac{3}{2}$.

Question 13.

Solution:

The given system of equations is $3x + y = 1$ and $kx + 2y = 5$.

We know that the general form for a pair of linear equations in 2 variables x and y is $a_1x + b_1y + c_1 = 0$

and $a_2x + b_2y + c_2 = 0$.

Comparing with above equations,

we have $a_1 = 3$, $b_1 = 1$, $c_1 = -1$; $a_2 = k$, $b_2 = 2$, $c_2 = -5$

$$\frac{a_1}{a_2} = \frac{3}{k}$$

$$\frac{b_1}{b_2} = \frac{1}{2}$$

$$\frac{c_1}{c_2} = \frac{-1}{-5}$$

i) For the given system of equations to have a unique solution,

$\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$

$\Rightarrow \frac{3}{k} \neq \frac{1}{2}$

$\Rightarrow k \neq 6$

For $k \neq 6$, the given system of equations has a unique solution.

ii) For the given system of equations to have no solution,

$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

$\Rightarrow \frac{3}{k} = \frac{1}{2}$

$\Rightarrow k = 6$

For $k = 6$, the given system of equations has no solution.

Question 14.

Solution:

We know that the sum of angles of a triangle is 180°

i.e. A + B + C = 180°

The given relation is C = 3B = 2(A + B) … (1)

$\Rightarrow 3B = 2(A + B)$

$\Rightarrow 3B = 2A + 2B$

$\Rightarrow 2A = B$

$\Rightarrow A = B/2$

Substituting values in terms of B in equation (1),

$B/2 + B + 3B = 180°$

$B/2 + 4B = 180°$

$B(9/2) = 180°$

$B = 180 \times 9/2$

$B = 40°$

Substituting B value in (1),

$C = 3B = 3(40) = 120°$

And $A = B/2 = 40/2 = 20°$

The measures are A = 20°, B = 40°, C = 120°.

Question 15.

Solution:

Let the cost of pencils be x and cost of pens be y.

The linear equations formed are:

$5x + 7y = 195$ … (1)

$7x + 5y = 153$ … (2)

We know that the general form for a pair of linear equations in 2 variables x and y is $a_1x + b_1y + c_1 = 0$

and $a_2x + b_2y + c_2 = 0$.

Comparing with above equations,

we have $a_1 = 5$, $b_1 = 7$, $c_1 = -195$; $a_2 = 7$, $b_2 = 5$, $c_2 = -153$

We can solve by cross multiplication method using the formula

$$\frac{x}{b_1c_2 - b_2c_1} = \frac{y}{c_1a_2 - c_2a_1} = \frac{1}{a_1b_2 - a_2b_1}$$

Substituting values in the formula, we get

$$\frac{x}{7(-153) - 5(-195)} = \frac{y}{(-195)(7) - (-153)(5)} = \frac{1}{5(5) - 7(7)}$$

$$\Rightarrow \frac{x}{-1071-(-975)} = \frac{y}{-1365-(-765)} = \frac{1}{25-49}$$

$$\Rightarrow \frac{x}{-96} = \frac{y}{-600} = \frac{1}{-24}$$

$\Rightarrow \frac{x}{-96} = \frac{1}{-24}$ and $\frac{y}{-600} = \frac{1}{-24}$

$\Rightarrow x = 4$ and $y = 25$

The cost of each pencil is Rs.4 and cost of each pen is Rs.25.

Question 16.

Solution:

For $2x - 3y = 1$,(In graph - red line)

X	2	5
$Y = \frac{2x-1}{3}$	1	3

For $4x - 3y + 1 = 0$,(In graph – blue line)

X	2	5
$Y = \frac{4x+1}{3}$	3	7

From the above graph, we observe that there is a point (- 1, - 1) common to both the lines.

So, the solution of the pair of linear equations is x = - 1 and y = - 1.

Question 17.

Solution:

It is given that angles of a cyclic quadrilateral ABCD are given by:

A = (4x + 20)°,

B = (3x - 5)°,

C = (4y)°

and D = (7y + 5)°.

We know that the opposite angles of a cyclic quadrilateral are supplementary.

A + C = 180°

4x + 20 + 4y = 180°

4x + 4y – 160 = 0 … (1)

And B + D = 180°

3x − 5 + 7y + 5 = 180°

3x + 7y - 180° = 0… (2)

By elimination method,

Step 1: Multiply equation (1) by 3 and equation (2) by 4 to make the coefficients of x equal.

Then, we get the equations as:

12x + 12y = 480 … (3)

12x + 16y = 540 … (4)

Step 2: Subtract equation (4) from equation (3),

(12x − 12x) + (16y - 12y) = 540 − 480

⇒ 4y = 60

y = 15

Step 3: Substitute y value in (1),

4x − 4(15) − 160 = 0

⇒ 4x − 220 = 0

⇒ x = 55

The solution is x = 55, y = 15.

Question 18.

Solution:

Let us put $\frac{1}{x+y} = p$ and $\frac{1}{x-y} = q$.

On substituting these values in the given equations, we get

35p + 14q = 19 … (1)

14p + 35q = 37 … (2)

We know that the general form for a pair of linear equations in 2 variables x and y is $a_1x + b_1y + c_1 = 0$

and $a_2x + b_2y + c_2 = 0$.

Comparing with above equations,

we have $a_1 = 35$, $b_1 = 14$, $c_1 = -19$; $a_2 = 14$, $b_2 = 35$, $c_2 = -37$

We can solve by cross multiplication method using the formula

$$\frac{p}{b_1c_2 - b_2c_1} = \frac{q}{c_1a_2 - c_2a_1} = \frac{1}{a_1b_2 - a_2b_1}$$

Substituting values in the formula, we get

$$\frac{p}{14(-37) - 35(-19)} = \frac{q}{(-19)(14) - (-37)(35)} = \frac{1}{35(35) - 14(14)}$$

$\Rightarrow \frac{p}{-518-(-665)} = \frac{q}{-266-(-1295)} = \frac{1}{1225-196}$

$\Rightarrow \frac{p}{147} = \frac{q}{1029} = \frac{1}{1029}$

$\Rightarrow \frac{p}{147} = \frac{1}{1029}$ and $\frac{q}{1029} = \frac{1}{1029}$

$\Rightarrow p = 1/7$ and $q = 1$

Since $\frac{1}{x+y} = p$ and $\frac{1}{x-y} = q$

$\Rightarrow \frac{1}{x+y} = \frac{1}{7}$ and $\frac{1}{x-y} = 1$

⇒ x + y = 7 … (3) and x – y = 1 … (4)

Adding equations (3) and (4),

(x + x) + (y – y) = 7 + 1

2x = 8

x = 4

Substituting x value in (4),

4 – y = 1

y = 3

The solution is x = 4 and y = 3.

Question 19

Solution:

Let the fraction be x/y.

Given that $\frac{x+1}{y+1} = \frac{4}{5}$

⇒5x + 5 = 4y + 4

⇒5x – 4y + 1 = 0 … (1)

Also given that $\frac{x-5}{y-5} = \frac{1}{2}$

⇒ 2x – 10 = y – 5

$\Rightarrow 2x - y - 5 = 0$ … (2)

We know that the general form for a pair of linear equations in 2 variables x and y is $a_1x + b_1y + c_1 = 0$

and $a_2x + b_2y + c_2 = 0$.

Comparing with above equations,

we have $a_1 = 5$, $b_1 = -4$, $c_1 = 1$; $a_2 = 2$, $b_2 = -1$, $c_2 = -5$

We can solve by cross multiplication method using the formula

$$\frac{x}{b_1c_2 - b_2c_1} = \frac{y}{c_1a_2 - c_2a_1} = \frac{1}{a_1b_2 - a_2b_1}$$

Substituting values in the formula, we get

$$\frac{x}{-4(-5) - (-1)(1)} = \frac{y}{(1)(2) - (-5)(5)} = \frac{1}{5(-1) - 2(-4)}$$

$\Rightarrow \frac{x}{20-(-1)} = \frac{y}{2-(-25)} = \frac{1}{-5-(-8)}$

$\Rightarrow \frac{x}{21} = \frac{y}{27} = \frac{1}{3}$

$\Rightarrow \frac{x}{21} = \frac{1}{3}$ and $\frac{y}{27} = \frac{1}{3}$

$\Rightarrow x = 7$ and $y = 9$

The fraction is 7/9.

Question 20.

Solution:

Given: $\frac{ax}{b} - \frac{by}{a} = a + b$ ... (1)

$ax - by = 2ab$ ... (2)

Multiplying by ab to (1) and a to (2), we get

$a^2x - b^2y = a^2b + ab^2$ ... (3)

$a^2x - aby = 2a^2b$ ... (4)

Subtracting equation (4) from equation (3),

$(a^2x - a^2x) + (-aby) - (-b^2y) = (2a^2b - a^2b) - ab^2$

$\Rightarrow -aby + b^2y = a^2b - ab^2$

$\Rightarrow by(b - a) = ab(a - b)$

$\Rightarrow y = b(b - a) / ab(a - b)$

$\Rightarrow y = -a$

Substitute y value in (2),

$ax - b(-a) = 2ab$

$\Rightarrow ax + ab = 2ab$

$\Rightarrow ax = ab$

$\Rightarrow x = b$

The solution is $x = b$ and $y = -a$.

Benefits of RS Aggarwal Solutions for Class 10 Maths Chapter 3 Exercise 3.5

RS Aggarwal Solutions for Class 10 Maths Chapter 3 Exercise 3.5, which deals with linear equations, offers several benefits for students:

Comprehensive Coverage: The solutions provide a thorough explanation of each problem in Chapter 3 Exercise 3.5 of RS Aggarwal's textbook. This ensures that students understand the concepts and methods required to solve linear equations.

Step-by-Step Solutions: Each solution is presented in a step-by-step manner, making it easier for students to follow the logic and sequence of solving linear equations. This helps in developing problem-solving skills.

Clarity and Understanding: The solutions are designed to clarify any doubts or confusion that students may have regarding the application of concepts related to linear equations. This clarity enhances the understanding of the subject matter.

Practice and Revision: By using these solutions, students can practice solving various types of linear equations, which is crucial for reinforcing their learning and improving their proficiency in the topic.

Exam Preparation: Since the solutions cover the entire exercise comprehensively, they serve as an excellent resource for exam preparation. Students can use them to revise the chapter thoroughly and prepare effectively for tests and exams.

Self-Study: These solutions enable students to engage in self-study effectively. They can attempt problems independently and refer to the solutions to check their answers and understand any mistakes they might have made.

Accessibility: The solutions are readily available in the RS Aggarwal textbook or can be found in supplementary materials online, making them easily accessible for students to use at their convenience.