EXAM PAPERS PRACTICE

Linear Equations

Model Answers

Question 1

Solve the inequality $\frac{x}{3} + 5 > 2$.

Answer:

First, we can subtract 5 from both sides of the inequality to isolate the term with x.
This gives us: $\frac{x}{3} > 2-5$ *which simplifies to* $\frac{x}{3} > -3$

Next, we can multiply both sides of the inequality by 3 to solve for x.
*This gives us x - > 3*3 which simplifies to x > -9. So, the solution to the inequality*

$\frac{x}{3} + 5 > 2$ *is* $x > -9$

Question 2

Pavan saves $x each month.
His two brothers each save $4 more than Pavan each month.
Altogether the three boys save $26 each month.

(a.) Write down an equation in x

Answer:

Pavan saves $x each month. His two brothers each save $4 more than Pavan, so they each save $x + $4 per month. Altogether, the three boys save $26 each month.

So, the equation is: x (Pavan's savings) + (x + 4) (first brother's savings) + (x + 4) (second brother's savings) = $26 Simplifying this, we get: 3x + 8 = 26

(b) Solve your equation to find the amount Pavan saves each month.

Answer:

First, we know that Pavan saves $x each month. His two brothers each save $4 more than Pavan, so they each save $x + $4. Since there are two brothers, together they save 2 * ($x + $4) = 2x + $8 each month. Altogether, the three boys save $26 each month. So, we can set up the equation: x (Pavan's savings) + 2x + $8 (brothers' savings) = $26 This simplifies to 3x + $8 = $26 Subtract $8 from both sides to isolate the term with x: 3x = $18

Finally, divide both sides by 3 to solve for x: x = $6 So, Pavan saves $6 each month.

Question 3

During her holiday, Hannah rents a bike.
She pays a fixed cost of $8 and then a cost of $4.50 per day.
Hannah pays with a $50 note and receives $10.50 change.

Calculate for how many days Hannah rents the bike

Answer:

First, we need to calculate how much Hannah actually paid for the bike rental. We know she gave a $50 note and received $10.50 change. So, she paid $50 - $10.50 = $39.50.

Divide the total daily cost by the cost per day to find out how many days Hannah rented the bike. So, $31.50 / $4.50 = 7 days. Therefore, Hannah rented the bike for 7 days.

Question 4

Solve the equations

a) 0.2x – 3 = 0.5x,

Answer:

First, let's subtract 0.2x from both sides of the equation:
0.2x - 0.2x - 3 = 0.5x - 0.2x

Simplifying the left side of the equation: -3 = 0.3x

Now, we can isolate x by dividing both sides of the equation by 0.3:
-3/0.3 = x

Simplifying: x = -10

Therefore, the solution to the equation 0.2x – 3 = 0.5x is x = -10.

(b) $2x^2 - 11x + 12 = 0$.

Answer:

To solve the equation $2x^2 - 11x + 12 = 0$, we can use the factoring method. First, we need to find two numbers that multiply to 24 and add up to -11. These numbers are -3 and -8. We can then rewrite the equation as:
$2x^2 - 11x + 12 = (2x - 3)(x - 4) = 0$

Now, we can set each factor equal to zero and solve for x:
2x - 3 = 0 or x - 4 = 0

Solving for x in each equation gives us:
x = 1.5 or x = 4

Therefore, the solutions to the equation are x = 1.5 and x = 4.

Question 5

Angharad had an operation costing $500.
She was in hospital for x days.
The cost of nursing care was $170 for each day she was in hospital.

(a) Write down, in terms of x, an expression for the total cost of her operation and nursing care.

Answer:

First, the cost of the operation is a fixed amount of $500. Second, the cost of nursing care is $170 per day. If Angharad was in the hospital for x days, then the total cost of nursing care would be 170x.

Therefore, the total cost of the operation and nursing care would be the sum of these two amounts, which is $500 + 170x.

(b) The total cost of her operation and nursing care was $2370.
Work out how many days Angharad was in hospital.

Answer:

First, we know that the operation cost $500 and the total cost was $2370. So, the cost of the nursing care must be $2370 - $500 = $1870. We also know that the cost of nursing care was $170 per day. So, to find out how many days Angharad was in hospital, we divide the total cost of nursing care by the cost per day. So, $1870 ÷ $170 = 11 days.

Therefore, Angharad was in hospital for 11 days.

Question 6

Showing all your working, solve

a. $\frac{5x}{2} - 9 = 0$

Answer:

$$x = \frac{18}{5} = 3\frac{3}{5} = 3.6$$

(b) $x^2 + 12x + 3 = 0$, giving your answers correct to 1 decimal place.

Answer:

Solve for x. x = [-12 + 11.5] / 2 = -0.5 / 2 = -0.3 (rounded to 1 decimal place) x = [-12 - 11.5] / 2 = -23.5 / 2 = -11.8 (rounded to 1 decimal place) So, the solutions to the equation $x^2 + 12x + 3 = 0$ are x = -0.3 and x = -11.8, to 1 decimal place.

Question 7

Solve

(a) 0.2x + 3.6 = 1.2,

Answer:

First, we need to isolate x. To do this, we subtract 3.6 from both sides of the equation: 0.2x + 3.6 - 3.6 = 1.2 - 3.6 0.2x = -2.4

Next, we divide both sides by 0.2 to solve for x: 0.2x / 0.2 = -2.4 / 0.2 x = -12 So, the solution to the equation 0.2x + 3.6 = 1.2 is x = -12.

(b) $\frac{2-3x}{5} < x + 2.$

Answer:

Divide both sides by -4 to get $x > -2$. However, since we divided by a negative number, we need to reverse the inequality sign, so the final solution is

$x > -2$

Question 8

Solve the equation

$$\frac{x}{4} - 8 = -2$$

Answer:

Multiply both sides of the equation by 4.
x−32=−8
Add 32 to both sides.
x=−8+32
Add −8 and 32 to get 24.

x=24

Question 9

Solve the equation

$$\frac{n-8}{2} = 11$$

Answer:

Multiply both sides by 2.
n−8=11×2
Multiply 11 and 2 to get 22.
n−8=22
Add 8 to both sides.
n=22+8
Add 22 and 8 to get 30.

n=30

Question 10

Solve the equation.

$5 – 2x = 3x – 19$

Answer:

First, we can combine like terms by adding 2x to both sides of the equation to get rid of the negative 2x on the left side. This gives us: 5 = 5x - 19
Next, we can isolate the variable by adding 19 to both sides of the equation to get rid of the negative 19 on the right side. This gives us: 24 = 5x

Finally, we can solve for x by dividing both sides of the equation by 5. This gives us: x = 24/5 So, the solution to the equation is x = 24/5 or x = 4.8.

Question 11

Solve the equation

$1 + 2x = –15$.

Answer:

First, we need to isolate the variable x. We can do this by subtracting 1 from both sides of the equation: 1 + 2x - 1 = -15 - 1 This simplifies to: 2x = -16

Next, we divide both sides of the equation by 2 to solve for x: 2x / 2 = -16 / 2 This gives us the solution: x = -8

Question 12

Solve the equation.

$5(2y - 17) = 60$

Answer:

First, distribute the 5 to both terms inside the parentheses: 10y - 85 = 60
Next, add 85 to both sides to isolate the term with y: 10y = 145

Finally, divide both sides by 10 to solve for y: y = 14.5

Question 13

Solve the equation

$4x - 12 = 2(11 - 3x)$.

Answer:

First, distribute the 2 on the right side of the equation to get 4x - 12 = 22 - 6x.
Next, add 6x to both sides of the equation to get 10x - 12 = 22. Then, add 12 to both sides of the equation to get 10x = 34.

Finally, divide both sides of the equation by 10 to solve for x. So, x = 34/10 = 3.4.

Question 14

The cost of a cup of tea is t cents.
The cost of a cup of coffee is (t + 5) cents.
The total cost of 7 cups of tea and 11 cups of coffee is 2215 cents.
Find the cost of one cup of tea.

Answer:

First, we know that the cost of 7 cups of tea is 7t cents and the cost of 11 cups of coffee is 11(t + 5) cents. The total cost of 7 cups of tea and 11 cups of coffee is 2215 cents. So, we can set up the equation: 7t + 11(t + 5) = 2215 Solving this equation will give us the cost of one cup of tea. First, distribute the 11 to both t and 5: 7t + 11t + 55 = 2215 Combine like terms: 18t + 55 = 2215 Subtract 55 from both sides: 18t = 2160

Finally, divide both sides by 18 to solve for t: t = 120 So, the cost of one cup of tea is 120 cents.

Question 15

Solve the equation

$$3(y-4)+\frac{y}{2}=9$$

Answer:

Multiply both sides of the equation by 2.
6(y−4)+x=18

Use the distributive property to multiply 6 by y−4.
6y−24+x=18

Subtract 6y from both sides.
−24+x=18−6y

Add 24 to both sides.
x=18−6y+24
Add 18 and 24 to get 42.

x=42−6y

Question 16

Solve the equation

$$\frac{x-2}{4}=\frac{2x+5}{3}$$

Answer:

$$x=-\frac{26}{5}=-5\frac{1}{5}=-5.2$$

Question 17

Solve the equation

$$\frac{3x-2}{5}=8$$

Answer:

Multiply both sides by 5.
3x−2=8×5

Multiply 8 and 5 to get 40.
3x−2=40

Add 2 to both sides.
3x=40+2

Add 40 and 2 to get 42.
3x=42

Divide both sides by 3.

Divide 42 by 3 to get 14.
x=14

Question 18

Solve the equations.

(a) 7- 3n = 11n+ 2

Answer:

First, we can combine like terms by subtracting 11n from both sides of the equation. This gives us: 7 - 3n - 11n = 11n + 2 - 11n Simplifying, we get: -14n + 7 = 2
Next, we can isolate the variable term by subtracting 7 from both sides of the equation: -14n + 7 - 7 = 2 - 7 Simplifying, we get: -14n = -5

Finally, we can solve for n by dividing both sides of the equation by -14: n = -5 / -14
So, the solution to the equation is n = 5/14.

(b) $\frac{p-3}{5}=3$

Answer:

Multiply both sides by 5.
$p-3=3\times5$

Multiply 3 and 5 to get 15.
$p-3=15$

Add 3 to both sides.
$p=15+3$

Add 15 and 3 to get 18.

$p=18$

Question 19

Solve.

$$2- x = 5x+ 1$$

Answer:

Isolate the x term by adding 6x to both sides: 2 - 6x + 6x = 1 + 6x This simplifies to: 2 = 1 + 6x Then, we can isolate the x term by subtracting 1 from both sides: 2 - 1 = 1 + 6x - 1 This simplifies to: 1 = 6x

Finally, we can solve for x by dividing both sides by 6: 1/6 = x So, the solution to the equation 2 - x = 5x + 1 is x = 1/6.

Question 20

Solve the equation.

$$6(k – 8) = 78$$

Answer:

First, distribute the 6 to both terms inside the parentheses: 6k - 48 = 78
Next, add 48 to both sides to isolate the term with k: 6k = 78 + 48 6k = 126

Finally, divide both sides by 6 to solve for k: k = 126 / 6 k = 21

Question 21

Make a the subject of the formula $s = ut + \frac{1}{2}at^2$

Answer:

First, we can subtract u from both sides of the equation to isolate the term with a

Next, we can multiply both sides by 2 to get rid of the fraction: 2(s - ut) = a²

Finally, we can divide both sides by t2² to solve for a = 2(s - ut)/t²

Question 22

Solve.

$5(w + 4 \times 10^3) = 6 \times 10^4$

Answer:

First, simplify the equation: $5(w + 4 \times 10^3) = 6 \times 10^4$ $5w + 20 \times 10^3 = 6 \times 10^4$ $5w + 20000 = 60000$ Then, isolate w: $5w = 60000 - 20000$ $5w = 40000$

Finally, solve for w: $w = 40000 / 5$ $w = 8000$

Question 23

Solve the equation.

$3(x + 4) = 2(4x – 1)$

Answer:

First, distribute the 3 on the left side of the equation and the 2 on the right side of the equation: $3x + 12 = 8x - 2$

Next, let's get all the x terms on one side of the equation and the constants on the other side. Subtract 3x from both sides: $12 = 5x - 2$ Then, add 2 to both sides: $14 = 5x$

Finally, divide both sides by 5 to solve for x: $x = 14/5$ or 2.8

Question 24

Solve the equation.

$$\frac{x+5}{x} = \frac{7}{3}$$

Answer:

$$x = \frac{15}{4} = 3\frac{3}{4} = 3.75$$

Question 25

Solve the equation.

$$\frac{2x+5}{3} = 8$$

Answer:

$$x = \frac{19}{2} = 9\frac{1}{2} = 9.5$$