Extra Content for Foundation GCSE

95 Recognising Equivalent Expressions to Set Up Equations

Practice Questions

1. A triangle has sides of length $x + 2$, $2x + 3$, and $5 - x$. Its perimeter is equal to 24 cm. Find the value of x.
2. A rectangle has a length of $3x + 5$ and a width of $2x - 1$. Its perimeter is equal to 40 cm. Find the value of x.
3. A square has a side length of $x + 4$. Its area is equal to 64 cm². Find the value of x.
4. A triangle has sides of length $2x$, $3x - 1$, and $x + 5$. Its perimeter is equal to the perimeter of a square with side length $x + 3$. Find the value of x.
5. A rectangle has a length of $4x + 3$ and a width of $x - 2$. Its area is equal to the area of a square with side length $2x + 1$. Find the value of x.
6. A square has a perimeter of $8x + 12$. Its perimeter is equal to the perimeter of a triangle with sides $2x + 1$, $3x - 2$, and $4x + 3$. Find the value of x.
7. A triangle has sides of length $x + 1$, $2x - 3$, and $3x + 2$. Its perimeter is equal to the perimeter of a rectangle with length $5x$ and width $x + 4$. Find the value of x.
8. A rectangle has a length of $5x - 2$ and a width of $3x + 4$. Its perimeter is equal to the perimeter of a square with side length $2x + 5$. Find the value of x.
9. A square has a side length of $2x + 3$. Its area is equal to the area of a rectangle with length $4x$ and width $x + 2$. Find the value of x.
10. A triangle has sides of length x, $x + 4$, and $2x - 1$. Its perimeter is equal to the perimeter of a

Scenario Questions

1. **Ages**: Bob is x years old. Susan is 5 years older than Bob, and Jake is 3 times as old as Bob. Their total ages are 45.
   - (a) Write an equation to represent this situation.
   - (b) Solve the equation to find Bob's age.
2. **Spending**: Sarah spends x pounds on groceries. Tom spends twice as much as Sarah, and Emma spends £10 less than Sarah. Their total spending is £50.
   - (a) Write an equation to represent this situation.
   - (b) Solve the equation to find how much Sarah spent.
3. **Fuel**: A car uses x litres of fuel for a journey. A van uses 3 times as much fuel as the car, and a motorbike uses 5 litres less than the car. The total fuel used by all three vehicles is 45 litres.
   - (a) Write an equation to represent this situation.
   - (b) Solve the equation to find how much fuel the car used.

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5. **Savings**: Amy saves x pounds each month. Ben saves £5 more than Amy each month, and Chloe saves half as much as Amy. Their total savings in a month is £60.
   - (a) Write an equation to represent this situation.
   - (b) Solve the equation to find how much Amy saves each month.
6. **Shopping**: A shop sells apples for x pence each. Oranges cost 10 pence more than apples, and bananas cost half as much as apples. A customer buys 2 apples, 3 oranges, and 4 bananas for a total of £2.50.
   - (a) Write an equation to represent this situation.
   - (b) Solve the equation to find the cost of one apple.
7. **Books**: A library has x fiction books. It has 20 more non-fiction books than fiction books, and twice as many reference books as fiction books. The total number of books is 200.
   - (a) Write an equation to represent this situation.
   - (b) Solve the equation to find the number of fiction books.
8. **Tickets**: A cinema sells adult tickets for x pounds each. Child tickets cost £5 less than adult tickets, and senior tickets cost half as much as adult tickets. A group buys 4 adult tickets, 3 child tickets, and 2 senior tickets for a total of £60.
   - (a) Write an equation to represent this situation.
   - (b) Solve the equation to find the cost of an adult ticket.
9. **Time**: A train takes x minutes to travel from Station A to Station B. A bus takes 15 minutes longer than the train, and a taxi takes half as long as the train. The total time for all three journeys is 120 minutes.
   - (a) Write an equation to represent this situation.
   - (b) Solve the equation to find how long the train takes.
10. **Work**: John works x hours in a week. Sarah works 5 hours more than John, and Tom works twice as many hours as John. Together, they work 65 hours in a week.
    - (a) Write an equation to represent this situation.
    - (b) Solve the equation to find how many hours John works.

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Practice Questions

1. $x = 4$
2. $x = 3$
3. $x = 4$
4. $x = 2$
5. $x = 3$
6. $x = 2$
7. $x = 2$
8. $x = 3$
9. $x = 3$
10. $x = 5$

Scenario Questions

1. **Ages:**
   - (a) $x + (x + 5) + 3x = 45$
   - (b) $x = 8$ (Bob is 8 years old)
2. **Spending:**
   - (a) $x + 2x + (x - 10) = 50$
   - (b) $x = 15$ (Sarah spent £15)
3. **Fuel:**
   - (a) $x + 3x + (x - 5) = 45$
   - (b) $x = 10$ (The car used 10 litres)
4. **Savings:**
   - (a) $x + (x + 5) + \frac{x}{2} = 60$
   - (b) $x = 20$ (Amy saves £20 each month)
5. **Shopping:**
   - (a) $2x + 3(x + 10) + 4\left(\frac{x}{2}\right) = 250$
   - (b) $x = 40$ (One apple costs 40 pence)
6. **Books:**
   - (a) $x + (x + 20) + 2x = 200$
   - (b) $x = 45$ (There are 45 fiction books)
7. **Tickets:**
   - (a) $4x + 3(x - 5) + 2\left(\frac{x}{2}\right) = 60$
   - (b) $x = 10$ (An adult ticket costs £10)
8. **Time:**
   - (a) $x + (x + 15) + \frac{x}{2} = 120$
   - (b) $x = 30$ (The train takes 30 minutes)
9. **Work:**
   - (a) $x + (x + 5) + 2x = 65$
   - (b) $x = 15$ (John works 15 hours)