

ALGEBRA

Name: _____

1) Work out and simplify:

(2 points)

a) $\frac{2}{5} \times \left(\frac{1}{2} + \frac{1}{6} \right) =$

b) $\frac{5}{6} \div \left(\frac{2}{3} - \frac{3}{2} \right) + \frac{1}{2} =$

c) $\frac{3}{11} \times \frac{22}{5} - \frac{7}{5} =$

2) Solve and check:

(3 points)

a) $(6x - 1) - (4x + 5) = 2x - 3$

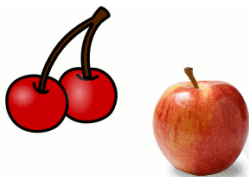
b) $3(2x - 1) - (3x + 2) = 4$

c) $3x + 2 = 5x - 1$

3) Three times a number minus six is equal to twice the number increased by two. What is the number?

(1 point)

4) A kilogram of cherries costs twice a kilogram of apples. If I have paid €15 for three kilos of cherries and four kilos of apples. How much does each cost?



(1.5 points)

5) Two consecutive numbers have a sum of 231. What are the numbers?

(1 point)

6) A rectangle is 4 times as long as it is wide. It has a perimeter of 420 cm. What are the dimensions of the rectangle?

(1.5 points)

SOLUTIONS

1) Work out and simplify:

$$a) \frac{2}{5} \times \left(\frac{1}{2} + \frac{1}{6} \right) = \frac{2}{5} \times \frac{3+1}{6} = \frac{2}{5} \times \frac{4}{6} = \frac{8}{30} = \frac{4}{15}$$

b)

$$\frac{5}{6} \div \left(\frac{2}{3} - \frac{3}{2} \right) + \frac{1}{2} = \frac{5}{6} \div \frac{4-9}{6} + \frac{1}{2} = \frac{5}{6} \div \frac{-5}{6} + \frac{1}{2} = \frac{5 \times 6}{-5 \times 6} + \frac{1}{2} = -1 + \frac{1}{2} = \frac{-2+1}{2} = -\frac{1}{2}$$

$$c) \frac{3}{11} \times \frac{22}{5} - \frac{7}{5} = \frac{3 \times 22}{11 \times 5} - \frac{7}{5} = \frac{6}{5} - \frac{7}{5} = -\frac{1}{5}$$

2) Solve and check:

$$a) (6x-1) - (4x+5) = 2x-3 \rightarrow 6x-1-4x-5 = 2x-3 \rightarrow 2x-6 = 2x-3 \\ 2x-2x = -3+6 \rightarrow 0x = 3 \quad \text{NO SOLUTION}$$

$$b) 3(2x-1) - (3x+2) = 4 \rightarrow 6x-3-3x-2 = 4 \rightarrow 6x-3x = 4+3+2 \\ 3x = 9 \rightarrow x = 3$$

$$\text{Checking: } 3(2 \cdot 3 - 1) - (3 \cdot 3 + 2) = 4 \rightarrow 3 \cdot 5 - 11 = 4 \rightarrow 4 = 4$$

$$c) 3x+2 = 5x-1 \rightarrow 2+1 = 5x-3x \rightarrow 3 = 2x \rightarrow x = \frac{3}{2}$$

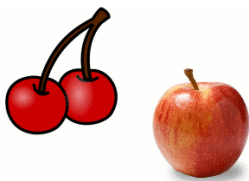
$$\text{Checking: } 3 \cdot \frac{3}{2} + 2 = 5 \cdot \frac{3}{2} - 1 \rightarrow \frac{9}{2} + 2 = \frac{15}{2} - 1 \rightarrow \frac{9+4}{2} = \frac{15-2}{2} \rightarrow \frac{13}{2} = \frac{13}{2}$$

3) Three times a number minus six is equal to twice the number increased by two. What is the number?

$$\text{Number} - x \qquad 3x-6 = 2x+2 \rightarrow 3x-2x = 2+6 \\ x = 8$$

The number is 8

4) A kilogram of cherries costs twice a kilogram of apples. If I have paid €15 for three kilos of cherries and four kilos of apples. How much does each cost?



x - price of 1 kilo of apples

$2x$ - price of 1 kilo of cherries

$$3(2x) + 4x = 15 \rightarrow 6x + 4x = 15 \rightarrow 10x = 15 \rightarrow x = 1.5$$

1 kilo of apples costs 1.5€

1 kilo of cherries costs $2 \times 1.5 = 3\text{€}$



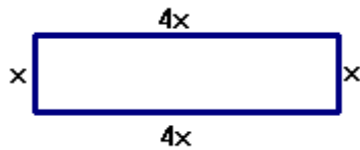
5) Two consecutive numbers have a sum of 231. What are the numbers?

Consecutive numbers: $x, x+1$

$$x + x + 1 = 231 \rightarrow 2x = 231 - 1 \rightarrow 2x = 230 \rightarrow x = 230 \div 2 = 115$$

The consecutive numbers are 115 and 116

6) A rectangle is 4 times as long as it is wide. It has a perimeter of 420 cm. What are the dimensions of the rectangle?



$$\text{Perimeter: } x + x + 4x + 4x = 420$$

$$10x = 420 \rightarrow x = 420 \div 10 \rightarrow x = 42$$

Wide of the rectangle: 42 cm

Long of the rectangle: $4 \times 42 = 168$ cm