Foundation Check In – 6.03 Algebraic equations

1. Solve $5x + 9 = 11$.

2. Solve $4(x + 8) = 3(6 - x)$.

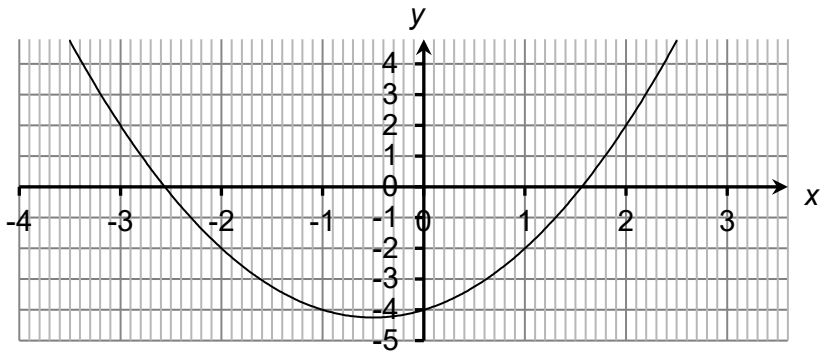
3. Solve $x^2 - 2x - 15 = 0$.

4. Solve $x^2 - 11x + 28 = 0$.

5. Solve algebraically these simultaneous equations.

$$2x + 5y = 17$$
$$x = 3y + 3$$

6. The graph shows the quadratic equation $y = x^2 + x - 4$. Explain how the graph can be used to find the approximate solutions of the equation $x^2 + x - 4 = 0$.



7. Karolina owns 19 pets. Each pet is either a guinea pig or a bird. The pets have a total of 46 legs. Write down two equations from this information.

8. Explain how the graph of the equations $y = 2x - 1$ and $y = x + 1$ could be used to solve the equations simultaneously.

9. A rectangle has an area of 104 cm² and sides of length x cm and $(x + 5)$ cm. Calculate the lengths of the two sides.

10. 1000 tickets are sold for a charity event. Adult tickets cost £5, children's tickets cost £2 and a total of £4175 is collected. How many tickets of each type are sold?

Extension

Penny leaves Liverpool at 08.15 and travels at a steady speed of 25 mph. Isabella leaves Liverpool two hours later and travels at a steady speed of 30 mph. If we assume that they keep to these speeds, at what time will Isabella catch up with Penny and how far will they have travelled?

Answers

1. $x = \frac{2}{5}$

2. $x = -2$

3. $(x+3)(x-5)=0$ so $x=-3$ and $x=5$

4. $(x-4)(x-7)=0$ so $x=4$ and $x=7$

5. $x=6$ and $y=1$

6. The solutions are where the graph cuts the x-axis ($x \approx -2.6$ and $x \approx 1.6$).

7. $g+b=19$ and $4g+2b=46$

8. Draw the two straight lines and where they intersect is the solution ($x=2$ and $y=3$).

9. 8 cm and 13 cm

10. 725 adults and 275 children

Extension

20. 15 and 300 miles

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AO1	2	Solve a linear equation with brackets and unknown on both sides of the equation			
AO1	3	Solve a quadratic equation by factorising			
AO1	4	Solve a quadratic equation by factorising			
AO1	5	Solve two linear simultaneous equations in two variables			
AO2	6	Use a graph to find approximate solutions of a quadratic equation			
AO2	7	Set up two simultaneous equations from quantities given in a worded scenario			
AO2	8	Explain how a graph can be used to find the approximate solution of two linear simultaneous equations			
AO3	9	Set up and solve a quadratic equation by factorising			
AO3	10	Set up and solve two linear simultaneous equations in two variables			

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