

# Mathemals Sheet 81

$$\begin{aligned}
 & \text{mushroom} + \text{rabbit} + \text{rabbit} = 18 \\
 & \text{snail} + \text{snail} + \text{snail} + \text{mushroom} = 31 \\
 & \text{snail} + \text{mushroom} + \text{mushroom} = 17 \\
 & \text{mushroom} = \text{snail} = \text{rabbit} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{butterfly} + \text{butterfly} + \text{octopus} + \text{butterfly} = 11 \\
 & \text{octopus} + \text{frog} = 13 \\
 & \text{frog} + \text{frog} + \text{frog} + \text{octopus} = 23 \\
 & \text{frog} = \text{octopus} = \text{butterfly} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{rabbit} + \text{frog} + \text{frog} + \text{frog} = 25 \\
 & \text{mushroom} + \text{mushroom} + \text{mushroom} + \text{rabbit} = 13 \\
 & \text{frog} + \text{mushroom} = 8 \\
 & \text{mushroom} = \text{frog} = \text{rabbit} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{cat} + \text{tree} + \text{cat} + \text{cat} + \text{cat} = 35 \\
 & \text{tree} + \text{cat} + \text{cat} = 19 \\
 & \text{fish} + \text{tree} = 5 \\
 & \text{tree} = \text{fish} = \text{cat} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{cat} + \text{cat} + \text{owl} = 22 \\
 & \text{tree} + \text{tree} + \text{tree} + \text{cat} = 23 \\
 & \text{owl} + \text{tree} + \text{tree} = 16 \\
 & \text{tree} = \text{owl} = \text{cat} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{tree} + \text{butterfly} + \text{butterfly} + \text{butterfly} = 7 \\
 & \text{butterfly} + \text{fish} + \text{fish} = 16 \\
 & \text{butterfly} + \text{butterfly} + \text{butterfly} + \text{fish} = 13 \\
 & \text{fish} = \text{butterfly} = \text{tree} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{fish} + \text{snail} + \text{snail} = 20 \\
 & \text{octopus} + \text{snail} + \text{snail} + \text{octopus} = 28 \\
 & \text{fish} + \text{octopus} + \text{fish} = 9 \\
 & \text{snail} = \text{fish} = \text{octopus} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{mushroom} + \text{fish} = 6 \\
 & \text{fish} + \text{fish} + \text{fish} + \text{frog} + \text{frog} = 12 \\
 & \text{frog} + \text{fish} = 5 \\
 & \text{fish} = \text{frog} = \text{mushroom} =
 \end{aligned}$$

# Mathemals Sheet 82

$$\begin{aligned}
 & \text{tree} + \text{tree} + \text{fish} + \text{tree} = 10 \\
 & \text{fish} + \text{mushroom} = 11 \\
 & \text{mushroom} + \text{mushroom} + \text{tree} + \text{mushroom} + \text{mushroom} = 30 \\
 & \text{mushroom} = \text{fish} = \text{tree} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{cat} + \text{tree} + \text{cat} + \text{cat} = 27 \\
 & \text{tree} + \text{tree} + \text{tree} + \text{cat} = 17 \\
 & \text{butterfly} + \text{tree} + \text{tree} = 7 \\
 & \text{tree} = \text{butterfly} = \text{cat} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{mushroom} + \text{fish} + \text{fish} = 8 \\
 & \text{mushroom} + \text{mushroom} + \text{mushroom} + \text{fish} + \text{mushroom} = 18 \\
 & \text{mushroom} + \text{butterfly} + \text{mushroom} = 9 \\
 & \text{fish} = \text{mushroom} = \text{butterfly} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{octopus} + \text{butterfly} + \text{octopus} + \text{octopus} = 17 \\
 & \text{fish} + \text{butterfly} + \text{butterfly} = 7 \\
 & \text{octopus} + \text{fish} + \text{fish} + \text{fish} = 14 \\
 & \text{butterfly} = \text{fish} = \text{octopus} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{tree} + \text{butterfly} + \text{tree} + \text{tree} = 25 \\
 & \text{owl} + \text{butterfly} + \text{butterfly} = 15 \\
 & \text{butterfly} + \text{butterfly} + \text{butterfly} + \text{owl} = 22 \\
 & \text{butterfly} = \text{owl} = \text{tree} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{mushroom} + \text{mushroom} + \text{mushroom} + \text{tree} = 10 \\
 & \text{owl} + \text{mushroom} + \text{mushroom} + \text{owl} = 14 \\
 & \text{tree} + \text{mushroom} = 8 \\
 & \text{mushroom} = \text{tree} = \text{owl} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{mushroom} + \text{rabbit} = 11 \\
 & \text{octopus} + \text{mushroom} + \text{mushroom} + \text{mushroom} + \text{octopus} = 22 \\
 & \text{octopus} + \text{rabbit} = 12 \\
 & \text{rabbit} = \text{mushroom} = \text{octopus} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{frog} + \text{tree} + \text{tree} = 21 \\
 & \text{snail} + \text{snail} + \text{snail} + \text{tree} + \text{snail} = 17 \\
 & \text{snail} + \text{tree} + \text{tree} = 20 \\
 & \text{tree} = \text{snail} = \text{frog} =
 \end{aligned}$$

# Mathemals Sheet 83

$$\begin{aligned}
 & \text{rabbit} + \text{rabbit} + \text{cat} + \text{rabbit} = 29 \\
 & \text{cat} + \text{butterfly} + \text{butterfly} = 10 \\
 & \text{butterfly} + \text{butterfly} + \text{butterfly} + \text{rabbit} = 10 \\
 & \text{butterfly} = \text{cat} = \text{rabbit} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{frog} + \text{octopus} + \text{frog} + \text{frog} + \text{frog} = 17 \\
 & \text{owl} + \text{octopus} = 11 \\
 & \text{frog} + \text{octopus} + \text{frog} + \text{frog} = 14 \\
 & \text{octopus} = \text{owl} = \text{frog} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{tree} + \text{tree} + \text{cat} + \text{tree} + \text{tree} = 32 \\
 & \text{tree} + \text{tree} + \text{tree} + \text{frog} = 21 \\
 & \text{frog} + \text{tree} = 9 \\
 & \text{tree} = \text{frog} = \text{cat} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{frog} + \text{tree} + \text{frog} + \text{frog} + \text{frog} = 13 \\
 & \text{owl} + \text{tree} + \text{tree} = 8 \\
 & \text{owl} + \text{frog} + \text{owl} = 15 \\
 & \text{tree} = \text{owl} = \text{frog} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{rabbit} + \text{rabbit} + \text{tree} + \text{rabbit} = 23 \\
 & \text{rabbit} + \text{octopus} + \text{octopus} + \text{rabbit} = 16 \\
 & \text{tree} + \text{octopus} = 3 \\
 & \text{octopus} = \text{tree} = \text{rabbit} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{butterfly} + \text{tree} = 6 \\
 & \text{snail} + \text{snail} + \text{snail} + \text{tree} + \text{tree} = 37 \\
 & \text{tree} + \text{snail} = 14 \\
 & \text{snail} = \text{tree} = \text{butterfly} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{rabbit} + \text{tree} + \text{tree} = 19 \\
 & \text{tree} + \text{tree} + \text{octopus} + \text{tree} + \text{tree} = 29 \\
 & \text{rabbit} + \text{rabbit} + \text{tree} = 20 \\
 & \text{tree} = \text{rabbit} = \text{octopus} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{owl} + \text{octopus} + \text{octopus} = 20 \\
 & \text{snail} + \text{octopus} + \text{snail} + \text{snail} = 33 \\
 & \text{owl} + \text{owl} + \text{owl} + \text{octopus} = 30 \\
 & \text{octopus} = \text{owl} = \text{snail} =
 \end{aligned}$$

# Mathemals Sheet 84

$$\begin{aligned}
 & \text{butterfly} + \text{owl} = 7 \\
 & \text{owl} + \text{owl} + \text{owl} + \text{butterfly} = 19 \\
 & \text{butterfly} + \text{butterfly} + \text{snail} + \text{butterfly} + \text{butterfly} = 13 \\
 & \text{owl} = \text{butterfly} = \text{snail} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{mushroom} + \text{butterfly} = 5 \\
 & \text{butterfly} + \text{butterfly} + \text{cat} + \text{butterfly} + \text{butterfly} = 12 \\
 & \text{cat} + \text{butterfly} + \text{cat} + \text{cat} = 25 \\
 & \text{butterfly} = \text{mushroom} = \text{cat} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{fish} + \text{snail} = 11 \\
 & \text{butterfly} + \text{snail} + \text{butterfly} + \text{butterfly} = 12 \\
 & \text{butterfly} + \text{fish} + \text{butterfly} + \text{butterfly} + \text{butterfly} = 6 \\
 & \text{snail} = \text{fish} = \text{butterfly} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{butterfly} + \text{frog} = 5 \\
 & \text{butterfly} + \text{octopus} + \text{octopus} + \text{butterfly} = 18 \\
 & \text{frog} + \text{frog} + \text{frog} + \text{butterfly} = 7 \\
 & \text{frog} = \text{butterfly} = \text{octopus} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{frog} + \text{frog} + \text{frog} + \text{owl} = 15 \\
 & \text{mushroom} + \text{frog} = 7 \\
 & \text{owl} + \text{mushroom} + \text{owl} + \text{owl} + \text{owl} = 28 \\
 & \text{frog} = \text{mushroom} = \text{owl} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{fish} + \text{fish} + \text{fish} + \text{tree} = 6 \\
 & \text{frog} + \text{fish} + \text{fish} = 4 \\
 & \text{tree} + \text{frog} + \text{frog} + \text{frog} = 9 \\
 & \text{fish} = \text{frog} = \text{tree} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{rabbit} + \text{rabbit} + \text{butterfly} = 18 \\
 & \text{fish} + \text{butterfly} + \text{butterfly} + \text{fish} = 20 \\
 & \text{rabbit} + \text{butterfly} + \text{butterfly} = 21 \\
 & \text{butterfly} = \text{rabbit} = \text{fish} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{tree} + \text{tree} + \text{tree} + \text{rabbit} = 34 \\
 & \text{snail} + \text{tree} = 12 \\
 & \text{tree} + \text{snail} + \text{tree} + \text{tree} + \text{tree} = 39 \\
 & \text{tree} = \text{snail} = \text{rabbit} =
 \end{aligned}$$

# Mathemals Sheet 85

$$\begin{aligned} & \text{cat} + \text{tree} + \text{tree} = 16 \\ \text{butterfly} + \text{tree} + \text{tree} + \text{butterfly} &= 14 \\ \text{butterfly} + \text{butterfly} + \text{cat} &= 6 \\ \text{tree} = \text{cat} = \text{butterfly} &= \end{aligned}$$

$$\begin{aligned} & \text{rabbit} + \text{owl} + \text{owl} = 19 \\ \text{butterfly} + \text{butterfly} + \text{rabbit} + \text{butterfly} &= 10 \\ \text{owl} + \text{owl} + \text{owl} + \text{rabbit} &= 25 \\ \text{owl} = \text{rabbit} = \text{butterfly} &= \end{aligned}$$

$$\begin{aligned} \text{frog} + \text{butterfly} + \text{frog} + \text{butterfly} &= 8 \\ \text{butterfly} + \text{frog} + \text{frog} &= 7 \\ \text{butterfly} + \text{owl} + \text{butterfly} &= 8 \\ \text{frog} = \text{butterfly} = \text{owl} &= \end{aligned}$$

$$\begin{aligned} \text{rabbit} + \text{rabbit} + \text{butterfly} + \text{rabbit} &= 23 \\ \text{rabbit} + \text{butterfly} + \text{butterfly} + \text{butterfly} &= 13 \\ \text{butterfly} + \text{owl} + \text{owl} &= 4 \\ \text{owl} = \text{butterfly} = \text{rabbit} &= \end{aligned}$$

$$\begin{aligned} & \text{octopus} + \text{cat} + \text{cat} = 15 \\ \text{cat} + \text{octopus} + \text{cat} + \text{cat} + \text{cat} &= 27 \\ \text{cat} + \text{snail} + \text{snail} &= 24 \\ \text{cat} = \text{octopus} = \text{snail} &= \end{aligned}$$

$$\begin{aligned} & \text{mushroom} + \text{rabbit} = 11 \\ \text{octopus} + \text{rabbit} + \text{octopus} + \text{octopus} + \text{octopus} &= 27 \\ \text{rabbit} + \text{rabbit} + \text{rabbit} + \text{mushroom} &= 25 \\ \text{rabbit} = \text{mushroom} = \text{octopus} &= \end{aligned}$$

$$\begin{aligned} & \text{tree} + \text{owl} + \text{tree} = 12 \\ \text{octopus} + \text{octopus} + \text{owl} + \text{octopus} + \text{octopus} &= 42 \\ \text{tree} + \text{octopus} + \text{octopus} &= 21 \\ \text{octopus} = \text{tree} = \text{owl} &= \end{aligned}$$

$$\begin{aligned} & \text{mushroom} + \text{mushroom} + \text{tree} = 11 \\ \text{tree} + \text{rabbit} + \text{rabbit} &= 17 \\ \text{tree} + \text{tree} + \text{tree} + \text{rabbit} + \text{tree} &= 19 \\ \text{rabbit} = \text{tree} = \text{mushroom} &= \end{aligned}$$

# Mathemals Sheet 86

$$\text{Octopus} + \text{Fish} + \text{Octopus} + \text{Fish} = 28$$

$$\text{Tree} + \text{Tree} + \text{Fish} = 9$$

$$\text{Fish} + \text{Octopus} + \text{Octopus} = 23$$

$$\text{Octopus} = \text{Fish} = \text{Tree} =$$

$$\text{Mushroom} + \text{Fish} + \text{Fish} = 13$$

$$\text{Butterfly} + \text{Fish} + \text{Fish} = 11$$

$$\text{Mushroom} + \text{Butterfly} + \text{Butterfly} + \text{Mushroom} = 8$$

$$\text{Fish} = \text{Mushroom} = \text{Butterfly} =$$

$$\text{Mushroom} + \text{Mushroom} + \text{Mushroom} + \text{Snail} = 21$$

$$\text{Mushroom} + \text{Snail} + \text{Snail} = 22$$

$$\text{Snail} + \text{Snail} + \text{Snail} + \text{Butterfly} = 28$$

$$\text{Snail} = \text{Mushroom} = \text{Butterfly} =$$

$$\text{Tree} + \text{Frog} = 5$$

$$\text{Frog} + \text{Frog} + \text{Frog} + \text{Rabbit} = 20$$

$$\text{Tree} + \text{Rabbit} + \text{Rabbit} + \text{Tree} = 18$$

$$\text{Frog} = \text{Tree} = \text{Rabbit} =$$

$$\text{Mushroom} + \text{Mushroom} + \text{Mushroom} + \text{Rabbit} = 19$$

$$\text{Octopus} + \text{Mushroom} = 9$$

$$\text{Rabbit} + \text{Mushroom} + \text{Rabbit} + \text{Rabbit} + \text{Rabbit} = 32$$

$$\text{Mushroom} = \text{Octopus} = \text{Rabbit} =$$

$$\text{Frog} + \text{Rabbit} = 9$$

$$\text{Rabbit} + \text{Rabbit} + \text{Rabbit} + \text{Butterfly} = 10$$

$$\text{Rabbit} + \text{Rabbit} + \text{Butterfly} + \text{Rabbit} + \text{Rabbit} = 13$$

$$\text{Rabbit} = \text{Frog} = \text{Butterfly} =$$

$$\text{Tree} + \text{Tree} + \text{Rabbit} = 20$$

$$\text{Mushroom} + \text{Mushroom} + \text{Tree} + \text{Mushroom} + \text{Mushroom} = 32$$

$$\text{Rabbit} + \text{Mushroom} + \text{Mushroom} = 16$$

$$\text{Mushroom} = \text{Rabbit} = \text{Tree} =$$

$$\text{Snail} + \text{Frog} + \text{Frog} = 8$$

$$\text{Tree} + \text{Snail} + \text{Snail} = 5$$

$$\text{Snail} + \text{Tree} + \text{Snail} + \text{Tree} = 6$$

$$\text{Snail} = \text{Tree} = \text{Frog} =$$

# Mathemals Sheet 87

$$\begin{aligned}
 & \text{owl} + \text{cat} + \text{cat} = 22 \\
 & \text{fish} + \text{cat} + \text{cat} = 20 \\
 & \text{cat} + \text{owl} + \text{cat} + \text{cat} + \text{cat} = 38 \\
 & \text{cat} = \quad \text{owl} = \quad \text{fish} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{tree} + \text{butterfly} + \text{tree} + \text{tree} + \text{tree} = 11 \\
 & \text{butterfly} + \text{owl} + \text{butterfly} = 20 \\
 & \text{butterfly} + \text{tree} + \text{tree} = 9 \\
 & \text{tree} = \quad \text{butterfly} = \quad \text{owl} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{fish} + \text{owl} + \text{owl} = 16 \\
 & \text{owl} + \text{snail} + \text{snail} = 24 \\
 & \text{fish} + \text{fish} + \text{fish} + \text{owl} + \text{fish} = 22 \\
 & \text{owl} = \quad \text{fish} = \quad \text{snail} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{fish} + \text{fish} + \text{fish} + \text{rabbit} = 19 \\
 & \text{cat} + \text{fish} + \text{fish} = 16 \\
 & \text{fish} + \text{fish} + \text{fish} + \text{cat} = 20 \\
 & \text{fish} = \quad \text{cat} = \quad \text{rabbit} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{cat} + \text{frog} + \text{frog} = 14 \\
 & \text{snail} + \text{frog} + \text{frog} = 15 \\
 & \text{frog} + \text{cat} + \text{frog} + \text{cat} = 22 \\
 & \text{frog} = \quad \text{cat} = \quad \text{snail} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{octopus} + \text{tree} + \text{tree} = 11 \\
 & \text{cat} + \text{cat} + \text{octopus} = 21 \\
 & \text{tree} + \text{octopus} + \text{tree} + \text{tree} + \text{tree} = 17 \\
 & \text{tree} = \quad \text{octopus} = \quad \text{cat} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{cat} + \text{tree} + \text{tree} = 12 \\
 & \text{tree} + \text{tree} + \text{tree} + \text{cat} = 14 \\
 & \text{octopus} + \text{cat} + \text{cat} + \text{cat} = 29 \\
 & \text{tree} = \quad \text{cat} = \quad \text{octopus} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{frog} + \text{frog} + \text{butterfly} + \text{frog} = 13 \\
 & \text{butterfly} + \text{tree} = 5 \\
 & \text{tree} + \text{butterfly} + \text{tree} + \text{tree} + \text{tree} = 8 \\
 & \text{tree} = \quad \text{butterfly} = \quad \text{frog} =
 \end{aligned}$$

# Mathemals Sheet 88

$$\begin{aligned}
 \text{Octopus} + \text{Octopus} + \text{Octopus} + \text{Cat} &= 12 \\
 \text{Octopus} + \text{Cat} + \text{Cat} &= 14 \\
 \text{Frog} + \text{Frog} + \text{Octopus} + \text{Frog} &= 11 \\
 \text{Cat} &= \text{Octopus} = \text{Frog} =
 \end{aligned}$$

$$\begin{aligned}
 \text{Mushroom} + \text{Tree} + \text{Mushroom} + \text{Mushroom} + \text{Mushroom} &= 9 \\
 \text{Tree} + \text{Mushroom} &= 6 \\
 \text{Owl} + \text{Tree} + \text{Tree} + \text{Tree} &= 21 \\
 \text{Mushroom} &= \text{Tree} = \text{Owl} =
 \end{aligned}$$

$$\begin{aligned}
 \text{Cat} + \text{Rabbit} + \text{Butterfly} + \text{Rabbit} &= 8 \\
 \text{Cat} + \text{Rabbit} + \text{Rabbit} + \text{Cat} &= 30 \\
 \text{Rabbit} + \text{Rabbit} + \text{Rabbit} + \text{Cat} &= 29 \\
 \text{Rabbit} &= \text{Butterfly} = \text{Cat} =
 \end{aligned}$$

$$\begin{aligned}
 \text{Octopus} + \text{Cat} &= 8 \\
 \text{Snail} + \text{Cat} + \text{Cat} + \text{Snail} &= 24 \\
 \text{Snail} + \text{Cat} + \text{Snail} + \text{Snail} &= 30 \\
 \text{Cat} &= \text{Octopus} = \text{Snail} =
 \end{aligned}$$

$$\begin{aligned}
 \text{Cat} + \text{Octopus} + \text{Octopus} &= 18 \\
 \text{Snail} + \text{Octopus} + \text{Snail} + \text{Snail} + \text{Snail} &= 41 \\
 \text{Cat} + \text{Cat} + \text{Octopus} &= 21 \\
 \text{Octopus} &= \text{Cat} = \text{Snail} =
 \end{aligned}$$

$$\begin{aligned}
 \text{Fish} + \text{Tree} + \text{Fish} + \text{Fish} &= 14 \\
 \text{Tree} + \text{Snail} + \text{Tree} + \text{Tree} + \text{Tree} &= 35 \\
 \text{Snail} + \text{Tree} &= 11 \\
 \text{Tree} &= \text{Snail} = \text{Fish} =
 \end{aligned}$$

$$\begin{aligned}
 \text{Owl} + \text{Rabbit} &= 13 \\
 \text{Rabbit} + \text{Rabbit} + \text{Rabbit} + \text{Owl} &= 27 \\
 \text{Octopus} + \text{Owl} + \text{Octopus} + \text{Octopus} + \text{Octopus} &= 26 \\
 \text{Rabbit} &= \text{Owl} = \text{Octopus} =
 \end{aligned}$$

$$\begin{aligned}
 \text{Fish} + \text{Owl} + \text{Owl} &= 14 \\
 \text{Mushroom} + \text{Owl} + \text{Owl} &= 16 \\
 \text{Mushroom} + \text{Mushroom} + \text{Fish} + \text{Mushroom} + \text{Mushroom} &= 18 \\
 \text{Owl} &= \text{Mushroom} = \text{Fish} =
 \end{aligned}$$



# Mathemals Sheet 89

$$\begin{aligned}
 & \text{snail} + \text{snail} + \text{snail} + \text{tree} = 13 \\
 & \text{butterfly} + \text{snail} = 13 \\
 & \text{butterfly} + \text{butterfly} + \text{tree} + \text{butterfly} + \text{butterfly} = 37 \\
 & \text{snail} = \text{butterfly} = \text{tree} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{rabbit} + \text{rabbit} + \text{snail} + \text{rabbit} = 27 \\
 & \text{rabbit} + \text{fish} + \text{rabbit} + \text{rabbit} = 29 \\
 & \text{snail} + \text{fish} + \text{fish} = 22 \\
 & \text{fish} = \text{snail} = \text{rabbit} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{owl} + \text{rabbit} + \text{rabbit} = 19 \\
 & \text{rabbit} + \text{owl} + \text{rabbit} + \text{owl} = 26 \\
 & \text{snail} + \text{snail} + \text{owl} + \text{snail} = 34 \\
 & \text{rabbit} = \text{owl} = \text{snail} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{fish} + \text{snail} + \text{snail} + \text{snail} + \text{fish} = 35 \\
 & \text{fish} + \text{frog} + \text{frog} = 10 \\
 & \text{snail} + \text{frog} = 12 \\
 & \text{frog} = \text{snail} = \text{fish} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{rabbit} + \text{cat} + \text{cat} + \text{cat} + \text{rabbit} = 20 \\
 & \text{fish} + \text{rabbit} + \text{rabbit} = 19 \\
 & \text{cat} + \text{fish} = 7 \\
 & \text{fish} = \text{cat} = \text{rabbit} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{snail} + \text{owl} + \text{snail} + \text{snail} = 32 \\
 & \text{frog} + \text{owl} + \text{owl} = 12 \\
 & \text{snail} + \text{frog} + \text{snail} + \text{snail} + \text{snail} = 38 \\
 & \text{owl} = \text{frog} = \text{snail} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{rabbit} + \text{fish} + \text{fish} + \text{rabbit} = 18 \\
 & \text{fish} + \text{fish} + \text{fish} + \text{rabbit} = 13 \\
 & \text{fish} + \text{fish} + \text{fish} = 8 \\
 & \text{fish} = \text{fish} = \text{rabbit} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{octopus} + \text{octopus} + \text{owl} + \text{octopus} + \text{octopus} = 38 \\
 & \text{owl} + \text{octopus} + \text{owl} + \text{owl} + \text{owl} = 32 \\
 & \text{cat} + \text{octopus} = 17 \\
 & \text{octopus} = \text{cat} = \text{owl} =
 \end{aligned}$$

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$$\begin{aligned}
 & \text{snail} + \text{owl} + \text{owl} = 21 \\
 & \text{butterfly} + \text{owl} + \text{butterfly} + \text{butterfly} = 9 \\
 & \text{snail} + \text{snail} + \text{snail} + \text{owl} + \text{snail} = 42 \\
 & \text{owl} = \text{snail} = \text{butterfly} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{fish} + \text{cat} = 5 \\
 & \text{fish} + \text{cat} + \text{cat} = 7 \\
 & \text{cat} + \text{octopus} + \text{octopus} + \text{cat} + \text{octopus} = 19 \\
 & \text{cat} = \text{fish} = \text{octopus} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{fish} + \text{frog} = 5 \\
 & \text{butterfly} + \text{butterfly} + \text{fish} + \text{fish} + \text{butterfly} = 9 \\
 & \text{butterfly} + \text{frog} + \text{frog} = 5 \\
 & \text{frog} = \text{fish} = \text{butterfly} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{mushroom} + \text{octopus} + \text{mushroom} + \text{mushroom} + \text{mushroom} = 21 \\
 & \text{octopus} + \text{cat} + \text{octopus} + \text{octopus} + \text{octopus} = 28 \\
 & \text{cat} + \text{octopus} = 13 \\
 & \text{octopus} = \text{cat} = \text{mushroom} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{mushroom} + \text{mushroom} + \text{mushroom} + \text{fish} = 21 \\
 & \text{mushroom} + \text{mushroom} + \text{mushroom} + \text{snail} = 24 \\
 & \text{fish} + \text{fish} + \text{fish} + \text{mushroom} = 23 \\
 & \text{mushroom} = \text{fish} = \text{snail} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{owl} + \text{owl} + \text{owl} + \text{butterfly} = 19 \\
 & \text{frog} + \text{owl} + \text{owl} = 15 \\
 & \text{owl} + \text{frog} + \text{owl} + \text{frog} = 18 \\
 & \text{owl} = \text{frog} = \text{butterfly} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{mushroom} + \text{frog} + \text{frog} = 22 \\
 & \text{rabbit} + \text{frog} = 17 \\
 & \text{frog} + \text{frog} + \text{frog} + \text{rabbit} + \text{rabbit} = 43 \\
 & \text{frog} = \text{rabbit} = \text{mushroom} =
 \end{aligned}$$

$$\begin{aligned}
 & \text{cat} + \text{cat} + \text{cat} + \text{octopus} = 31 \\
 & \text{octopus} + \text{cat} + \text{cat} = 22 \\
 & \text{octopus} + \text{fish} + \text{fish} + \text{octopus} = 12 \\
 & \text{cat} = \text{octopus} = \text{fish} =
 \end{aligned}$$

# Mathemals Strategy

A mathemals game gives you 3 equations -- each an expression on the left made of animals and the total value of those animals added up on the right. You have to figure out the value each animal.

Each animal's value is the same across all three equations in that single game, and also each animal has a *different* value. There is exactly one correct answer for each animal. Of course the animals' values can change from one game to the next.

## Tactics

Here are some tactics you can use.

- If all the animals in an equation are the same type, you can use **division** to discover that animal's value.
- If you know one animal's value, you can **substitute** it in any equation. You can even do this with multiple animals. For example, if you know 🐛 plus 🐛 is 17, you can replace a 🐛 and a 🐛, in any equation, with 17 -- even if you don't know the individual values of 🐛 and 🐛.
- It doesn't matter which order you add two things, so you're free to **reorder** animals whenever you want.
- You can always **subtract the same thing from both sides** of an equation. So if you have an 🐛 worth 8 on the left and the number 17 on the right, you can remove the 🐛 from the left and subtract 8 from the right, leaving 9.
- You can **join equations**, adjusting for a known difference in value. For example, if 🐛 plus 🐛 is 4 and 🐛 plus 🐛 is 6 then  $\text{🐛} + \text{🐛} + 2 = \text{🐛} + \text{🐛}$ . Subtracting 🐛 from both sides, you can see that  $\text{🐛} = \text{🐛} + 2$ .
- Some equations can be narrowed down with an **educated guess**. If three 🐛s plus a 🐛 add to 7, then the 🐛s have to be either 1 or 2 and the 🐛 has to be 4 or 1. Anything else would be too large.

# Example

Given this mathemals game:

$$\begin{aligned} \text{🐱} + \text{🐱} + \text{🐹} + \text{🦋} &= 21 \\ \text{🦋} + \text{🦋} + \text{🦋} + \text{🐱} &= 11 \\ \text{🐱} + \text{🦋} + \text{🐹} &= 13 \end{aligned}$$

First, notice that we can **reorder** the animals in the bottom equation so they match the 🐱 + 🐹 + 🦋 in the top equation. Then we can **subtract** the bottom equation from the top.

$$\begin{array}{r} \text{🐱} + \text{🐱} + \text{🐹} + \text{🦋} = 21 \\ \text{🐱} + \text{🐹} + \text{🦋} = 13 \\ \hline \text{🐱} = 8 \end{array}$$

Now we can **substitute** 🐱 = 8 into the middle equation to get:

$$\text{🦋} + \text{🦋} + \text{🦋} + 8 = 11$$

**Subtract** 8 from both sides to get:

$$\text{🦋} + \text{🦋} + \text{🦋} = 3$$

And then **divide** both sides by 3 to get:

$$\text{🦋} = 1$$

Finally, we can **substitute** the two known values into any equation containing 🐹 and then subtract the same amount from both sides to get an equation that contains only 🐹s:

$$\begin{aligned} \text{🐱} + \text{🦋} + \text{🐹} &= 13 \\ 8 + 1 + \text{🐹} &= 13 \\ \text{🐹} &= 4 \end{aligned}$$

Voila! We now have:

$$\text{🐱} = 8, \text{🦋} = 1, \text{🐹} = 4$$