Aiming for the Outer Planets

NAME:

CLASS:

DATE:

## Basic

1) For each question, form an equation using the numbers given and find $\boldsymbol{x}$.
a) Multiply $\boldsymbol{x}$ by 3 then add 7 . The answer is 19 . What is $\boldsymbol{x}$ ?
b) Multiply $\boldsymbol{x}$ by 2 then subtract 10 . The answer is 12 . What is $\boldsymbol{x}$ ?
c) Add 5 to $\boldsymbol{x}$ then multiply that by 3 . The answer is 21 . What is $\boldsymbol{x}$ ?
2) For each of the diagrams below, form an equation and find $\boldsymbol{x}$.


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## Basic

3 ) Kitchen flooring is sold at $£ 7.50$ per metre. Find the cost of:
a) 5 m
b) 60 m
c) 30.5 m
4) Six books cost a total of $£ 19.50$. How much is:
a) one book
b) four books
c) eight books
5) John takes 10 minutes to complete two questions. How long would he take to complete:
a) five questions
b) twenty questions
c) thirteen questions
6) A train takes 2.5 hours to travel 350 km . How long will it take to travel 910 km ?
7) A pile of 500 sheets of paper is 6 cm thick. How thick is a pile of 200 sheets?
8) It takes three men three days to complete a contract. How long will take nine men?

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## Core

1) For each of the diagrams below, form an equation and find $\boldsymbol{x}$.

2) The formula $C=\frac{5}{9}(F-32)$ is used to convert temperature in degrees Fahrenheit to degrees Celsius.
a) If $F=50$, calculate $C$
b) If $F=140$, calculate $C$
c) If $C=25$, calculate $F$
3)The cost (C) of building a brick wall is directly proportional to the length of the wall (L). A wall costs $£ 12,000$ and is 20 m in length.
a) Find the relationship between $C$ and $L$.
b) Find the cost of a wall that is 27 m long.
c) A wall costs $£ 9000$. How long is the wall?

## Aiming for the Outer Planets

## Core

4) A spring stretches when a force is applied to one end of it. The extension, $X$, of the spring is directly proportional to the amount of force applied, F. When the applied force is 30 Newtons $(\mathrm{N})$ the extension is 9 cm . a) Find the relationship between $X$ and $F$.
b) What extension would be produced by a force of 20 Newtons?
c) What force is required to produce an extension of 12 cm ?
5) Complete the table below if $y \propto \frac{1}{x}$

| $x$ | 2 | 5 | 10 |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $y$ |  | 20 |  | 25 | 12.5 |

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## Advanced

1) The formula $C=\frac{5}{9}(F-32)$ is used to convert temperature in degrees Fahrenheit to degrees Celsius.
a) If $F=50$, calculate $C$
b) If $F=140$, calculate $C$
c) If $\mathrm{C}=25$, calculate F
2) A spring stretches when a force is applied to one end of it. The extension, $X$, of the spring is directly proportional to the amount of force applied, F. When the applied force is 30 Newtons ( N ) the extension is 9 cm .
a) Find the relationship between $X$ and $F$.
b) What extension would be produced by a force of 20 Newtons?
c) What force is required to produce an extension of 12 cm ?
3) Complete the table below if $y \propto \frac{1}{x}$

| $\boldsymbol{x}$ | 2 | 5 | 10 |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $\boldsymbol{y}$ |  | 20 |  | 25 | 12.5 |

4) The wavelength of sound waves is inversely proportional to their frequency. When the wavelength is 22 cm the frequency is 1550 Hz .
a) Find the wavelength when the frequency is 1000 Hz .
b) Find the frequency that would result in a wavelength of 25 cm .

## Aiming for the Outer Planets

## ANSWERS

## Basic

1) a) $x=4$
b) $x=11$
c) $x=2$
2) a) $x=20^{\circ}$
b) $x=40^{\circ}$
3) a) $£ 37.50$
b) $£ 450 \mathrm{~m}$
c) $£ 228.75$
4) a) $£ 3.25$
b) $£ 13$
c) $£ 26$
5) a) $\mathbf{2 5}$ minutes
b) $\mathbf{1 0 0}$ minutes
c) $\mathbf{6 0}$ minutes
6) 6.5 hours
7) 2.4 cm
8) 1 day

## Core

1) a) $x=20^{\circ}$
b) $x=40^{\circ}$
2) a) 10
b) 60
c) 77
3) a) $C=600 \mathrm{~L}$
b) $£ 16,200$
c) 15 m
4) a) $X=0.3 \mathrm{~N}$
b) $\mathbf{6 c m}$
c) 40 Newtons
5) | $\boldsymbol{x}$ | 2 | 5 | 10 | 4 | 8 |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $y$ | 50 | 20 | 10 | 25 | 12.5 |

## Advanced

1) a) 10
b) 60
c) 77
2) a) $X=0.3 \mathrm{~N}$
b) 6 cm
c) 40 Newtons
3) | $\boldsymbol{x}$ | 2 | 5 | 10 | 4 | 8 |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $\boldsymbol{y}$ | 50 | 20 | 10 | 25 | 12.5 |
4) a) 34.1 cm
b) $\mathbf{1 3 6 4 H z}$
