Direct & Inverse Proportion

Direct Proportion

1) y is directly proportional to x. When x = 3, y = 27.

   Find y when x = 5.

2) y is directly proportional to x. When x = 4, y = 80.

   Find y when x = 7.

3) y is directly proportional to x. When x = 24, y = 12.

   Find x when y = 17.

4) y is directly proportional to x^2. When x = 2, y = 24.

   Find y when x = 5.

5) y is directly proportional to x^2. When x = 4, y = 32.

Find y when x = 10.

6) y is directly proportional to x^2. When x = 5, y = 100.

Find x when y = 400.

7) y is directly proportional to $\sqrt{x}$. When x = 9, y = 27.

Find y when x = 25.

8) y is directly proportional to $\sqrt{x}$. When x = 81, y = 90.

Find x when y = 40.

Inverse Proportion

1) y is inversely proportional to x. When x = 3, y = 4.

Find y when x = 6.

2) y is inversely proportional to x. When x = 5, y = 8.

Find y when x = 4.

3) y is inversely proportional to x. When x = 10, y = 6.

Find x when y = 15.

4) y is inversely proportional to x. When x = 6, y = 8.

Find x when y = 12.

5) y is inversely proportional to x^2. When x = 2, y = 5.

Find y when x = 6.

6) y is inversely proportional to x^2. When x = 4, y = 3.

Find x when y = 12.

7) y is inversely proportional to √x. When x = 9, y = 8.

Find y when x = 4.

8) y is inversely proportional to √x. When x = 100, y = 5.

Find x when y = 10.

Answers

Direct Proportion

1) y is directly proportional to x. When x = 3, y = 27.

   Find y when x = 5.

   $y \propto x$ $y = kx$ $27 = 3k$ $k = 9$

   $y = 9x$ $y = 9 \times 5$ $\underline{y = 45}$

2) y is directly proportional to x. When x = 4, y = 80.

   Find y when x = 7.

   $y \propto x$ $y = kx$ $80 = 4k$ $k = 20$

   $y = 20x$ $y = 20 \times 7$ $\underline{y = 140}$

3) y is directly proportional to x. When x = 24, y = 12.

   Find x when y = 17.

   $y \propto x$ $y = kx$ $12 = 24k$ $k = 0.5$

   $y = 0.5x$ $17 = 0.5x$ $\underline{x = 34}$

4) y is directly proportional to x². When x = 2, y = 24.

   Find y when x = 5.

   $y \propto x^2$ $y = kx^2$ $24 = 4k$ $k = 6$

   $y = 6x^2$ $y = 6 \times 5^2$ $\underline{y = 150}$

5) y is directly proportional to x^2. When x = 4, y = 32.

Find y when x = 10.

$y \, \alpha \, x^2$　　$y = kx^2$　　　$32 = 16k$　　　$k = 2$

$y = 2x^2$　　$y = 2 \times 10^2$　　$\underline{y = 200}$

6) y is directly proportional to x^2. When x = 5, y = 100.

Find x when y = 400.

$y \, \alpha \, x^2$　　$y = kx^2$　　　$100 = 25k$　　　$k = 4$

$y = 4x^2$　　$400 = 4x^2$　　$\underline{x = 10}$

7) y is directly proportional to $\sqrt{x}$. When x = 9, y = 27.

Find y when x = 25.

$y \, \alpha \, \sqrt{x}$　　　$y = k\sqrt{x}$　　　$27 = 3k$　　　$k = 9$

$y = 9\sqrt{x}$　　$y = 9 \times 5$　　$\underline{y = 45}$

8) y is directly proportional to $\sqrt{x}$. When x = 81, y = 90.

Find x when y = 40.

$y \, \alpha \, \sqrt{x}$　　　$y = k\sqrt{x}$　　　$90 = 9k$　　　$k = 10$

$y = 10\sqrt{x}$　　$40 = 10\sqrt{x}$　　$\underline{x = 2}$

Inverse Proportion

1) y is inversely proportional to x. When x = 3, y = 4.

   Find y when x = 6.

   $y \propto 1/x$ $y = k/x$ $4 = k/3$ $k = 12$

   $y = 12/x$ $y = 12/6$ $\underline{y = 2}$

2) y is inversely proportional to x. When x = 5, y = 8.

   Find y when x = 4.

   $y \propto 1/x$ $y = k/x$ $8 = k/5$ $k = 40$

   $y = 40/x$ $y = 40/4$ $\underline{y = 10}$

3) y is inversely proportional to x. When x = 10, y = 6.

   Find x when y = 15.

   $y \propto 1/x$ $y = k/x$ $6 = k/10$ $k = 60$

   $y = 60/x$ $15 = 60/x$ $\underline{x = 4}$

4) y is inversely proportional to x. When x = 6, y = 8.

   Find x when y = 12.

   $y \propto 1/x$ $y = k/x$ $8 = k/6$ $k = 48$

   $y = 48/x$ $12 = 48/x$ $\underline{x = 4}$

5) y is inversely proportional to x². When x = 2, y = 5.

   Find y when x = 6.

   $y \propto 1/x^2$ $y = k/x^2$ $5 = k/4$ $k = 20$

   $y = 20/x^2$ $y = 20/36$ $\underline{y = 5/9}$

6) y is inversely proportional to x^2. When $x = 4$, $y = 3$.

   Find x when $y = 12$.

   $y \propto 1/x^2$ $y = k/x^2$ $3 = k/16$ $k = 48$

   $y = 48/x^2$ $12 = 48/x^2$ $\underline{x = 2}$

7) y is inversely proportional to $\sqrt{x}$. When $x = 9$, $y = 8$.

   Find y when $x = 4$.

   $y \propto 1/\sqrt{x}$ $y = k/\sqrt{x}$ $8 = k/3$ $k = 24$

   $y = 24/\sqrt{x}$ $y = 24/2$ $\underline{y = 12}$

8) y is inversely proportional to $\sqrt{x}$. When $x = 100$, $y = 5$.

   Find x when $y = 10$.

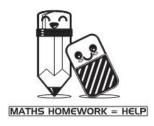 $y \propto 1/\sqrt{x}$ $y = k/\sqrt{x}$ $5 = k/10$ $k = 50$

   $y = 50/\sqrt{x}$ $10 = 50/\sqrt{x}$ $\underline{x = 25}$

Tips and Techniques

1. Read each question slowly. You may find it helpful to underline the numbers and important information that will affect your answer.
 For example: Find 23 more than 57?

2. If you do not understand the question straightaway, try reading it through a couple of times until it makes sense.

3. Make sure you read the question carefully. Often, the words highlighted in bold in the question will be the part you need to pay the most attention to, *e.g. Which country had the **greatest increase** in visitors from 2005 to 2006?*

4. Even if you know the answer to the question without working it out on paper, it is important to always show your working out in the box provided. You will lose marks if you do not do this.

5. Always use a ruler when drawing shapes, symmetry or graphs.

6. Topics that are useful to revise;

* **Time** - 24 hour clock, adding a length of time e.g. 45 minutes to a certain time. An example of a question where time is used is - *"The time is one thirty in the afternoon. Write this as it would be shown on a twenty-four hour clock?"*
* **Money** - find the total amount of shopping items, how much change will you get from a £5, £10 note etc.
* **Number calculations** - times tables, addition, subtraction, multiplication and division methods.
* **Measurement** - how many metres in a kilometre, millilitres in a litre and grams in a kilogram?
* **Percentages and fractions** - 1/2=0.5 or 50%, 1/4=0.25 or 25%, 3/4=0.75 or 75%, 1/3=0.33 or 33%, 1/5=0.2 or 20%

7. Check to see how many marks the question is worth. If it is worth more than one mark, make sure you show your working out.

8. Use everyday objects to help your child practice certain topics. For example; a shopping receipt can be good revision for money questions - adding totals and finding change. Other useful objects that you could use are;

* **Television Guide** - Practice the time a programme starts, what time will it finish? how long does the programme last?
* **Weather Chart** - Change in temperature - *e.g. The temperature fell from 3 degrees celsius to -4 degrees celsius. By how many degrees did the temperature fall?*
* **Measure yourself and other family members to practice height**   (in cm, metres), weight (in grams, kilograms), area of hands and feet. You could also calculate the average family height, weight etc.