Direct Proportion

1. Sarah can run 3 miles in 30 minutes. How long would it take her to go 6 miles?

2. Amin picks his favourite 6 Stripe Music songs and pay £8.40 altogether. How much would 9 Stripe Music songs cost?

3. Isaac buys 6 apples for £7.80. How much would just 5 cost?

4. A plasterer takes 20 minutes to plaster half a wall. How long would it take him to do 4 walls of the same size?

5. 4 large iced cakes weigh 6 kilograms. How much would 7 cakes weigh?

6. A car drives 300 km and uses 40 litres of petrol. How much petrol is needed to travel 420 km?

7. Maggie buys 3 identical pens for £11.97. How many could she buy for £30?

8. Josh has 20 identical books on a shelf. The books take up 70 cm of space on the shelf. Josh removes 7 books. How much space do the remaining books take up?

Extension: write down any assumptions you have made for these questions!

Inverse Proportion

1. 4 friends are going camping and they pack enough water to last for 6 days. Just as they are about to leave they are joined by 4 more people. How long will their water last now?

2. It takes 2 people 4 days to paint a fence. How long would it take if 8 people painted it?

3. The time taken for a kettle to boil water is inversely proportional to the power of the water heater. When the power is 3000 Watts it takes 3 minutes to boil the water. Find the time it takes to boil water when the power is reduced to 1000 Watts.

4. The time taken for passengers to be checked-in for a flight is inversely proportional to the number of staff working. It takes 45 minutes for passengers to be checked-in when 5 staff are working. How long will it take if 15 staff are working?

5. The number of days to complete research is inversely proportional to the number of researchers who are working. The research takes 125 days to complete if 5 people work on it. Find how many people are needed to complete the research in 25 days?

6. The amount of sheep in a field is inversely proportional to the time taken for them to eat all of the grass in the field. When there are 100 sheep in a field it takes them 28 days to eat all of the grass. How many days would it take 20 sheep to eat all of the grass?

7. It takes an aeroplane 5 hours to fly from London to New York at 500 mph. How long would it take if the aeroplane flew at 600 mph?

8. The time required to build a house is inversely proportional to the number of builders, all working at the same rate. If there are 6 builders, it takes 80 days to complete the house.

How many builders must be employed to build the house in just 16 days?

Extension: write down any assumptions you have made for these questions!

Direct Proportion Tables

For each question,

(i) Find $k$, the proportion constant;

(ii) Write down the proportion equation;

(iii) Fill in the table.

1. $s∝r$

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| $$r$$ | 2 | 3 | 5 | 7 |
| $$s$$ |  |  | 30 |  |

2. $z∝w$

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| $$w$$ | 4 | 8 | 9 |  |
| $$z$$ | 28 |  |  | 84 |

3. $y∝x$

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| $$x$$ | 5 | 6 | 7 |  |
| $$y$$ | 17.5 |  |  | 31.5 |

4. $h∝t$

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| $$t$$ | 3 | 4 |  |  |
| $$h$$ | 29.4 |  | 58.8 | 88.2 |

5. $q∝p$

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| $$p$$ |  |  |  | 7 |
| $$q$$ | 19.8 | 26.4 | 38.5 | 77 |

6. $p∝v$

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| $$v$$ |  | 12 |  |  |
| $$p$$ | 1.8 | 4.32 | 6.84 | 10.44 |

Inverse Proportion Tables

For each question,

(i) Find $k$, the proportion constant;

(ii) Write down the proportion equation;

(iii) Fill in the table.

1. $s∝\frac{1}{r}$

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| $$r$$ | 1 | 3 | 5 | 10 |
| $$s$$ |  | 15 |  |  |

2. $b∝\frac{1}{a}$

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| $$a$$ | 0.9 | 2.4 | 4.8 |  |
| $$b$$ |  | 0.6 |  | 0.2 |

3. $h∝\frac{1}{g}$

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| $$g$$ | 1 | 2 | 9 |  |
| $$h$$ |  | 8.1 |  | 0.2 |

4. $v∝\frac{1}{u}$

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| $$u$$ | 2 |  |  |  |
| $$v$$ | 6.8 | 3.4 | 1.7 | 0.8 |

5. $y∝\frac{1}{x}$

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| $$x$$ | 0.2 | 0.3 |  | 1.8 |
| $$y$$ | 9 |  | 3 |  |

6. $q∝\frac{1}{p}$

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| $$p$$ | 4 | 8 | 9 |  |
| $$q$$ |  |  | 16 | 288 |