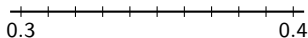


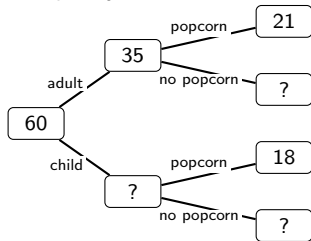
Inequalities: Starters

Starter 1: Inequality Symbols

Number line A



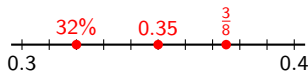
Frequency tree



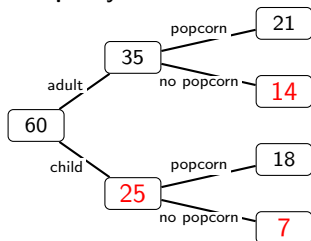
1. Write $\frac{3}{8}$ as a decimal and as a percentage.
2. Write 32 000 in standard form.
3. Mark 32%, 0.35 and $\frac{3}{8}$ on number line A. Write them in order, using $<$.
4. Write $<$ or $>$.
 3.2×10^4 $\underline{\hspace{1cm}}$ 9.8×10^3
 6×10^{-3} $\underline{\hspace{1cm}}$ 2×10^{-2}
5. 60 people watched a film. Complete the frequency tree.
6. An adult is chosen at random. Find the probability that they bought popcorn, as a percentage. Do the same for a child. Write $<$ or $>$ between them.
7. $x > 0.3$ means "x is greater than 0.3". Which of these could x be?
 $\frac{2}{5}$ 0.29 3×10^{-1} 31% $\frac{1}{4}$
8. (Challenge) $0.2 > 0.15$. Is $-0.2 > -0.15$? Explain using a number line.

Starter 1: Inequality Symbols

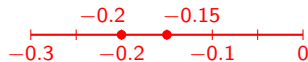
Number line A



Frequency tree



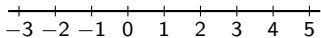
Q8



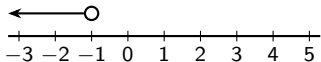
- Write $\frac{3}{8}$ as a decimal and as a percentage.
 $0.375 = 37.5\%$
- Write 32 000 in standard form.
 3.2×10^4
- Mark 32%, 0.35 and $\frac{3}{8}$ on number line A. Write them in order, using $<$.
 $32\% < 0.35 < \frac{3}{8}$
- Write $<$ or $>$.
 $3.2 \times 10^4 > 9.8 \times 10^3$
 $6 \times 10^{-3} < 2 \times 10^{-2}$
- 60 people watched a film. Complete the frequency tree.
- An adult is chosen at random. Find the probability that they bought popcorn, as a percentage. Do the same for a child. Write $<$ or $>$ between them.
 $\frac{21}{35} = 60\%$ and $\frac{18}{25} = 72\%$, so $60\% < 72\%$
- $x > 0.3$ means "x is greater than 0.3". Which of these could x be?
 $\frac{2}{5}$ 0.29 3×10^{-1} 31% $\frac{1}{4}$
 $\frac{2}{5}$ and 31%, but not $3 \times 10^{-1} = 0.3$
- (Challenge) $0.2 > 0.15$. Is $-0.2 > -0.15$? Explain using a number line. No: $-0.2 < -0.15$

Starter 2: Inequalities on a Number Line

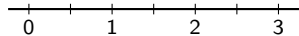
Number line A



Number line B



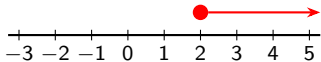
Number line C



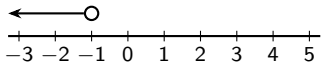
1. Write 0.45 as a fraction and as a percentage.
2. Write 6.1×10^{-3} as an ordinary number.
3. Draw $x \geq 2$ on number line A. Can x be equal to 2?
4. Write the inequality on number line B, and two integers that satisfy it.
5. Draw $y > \frac{3}{2}$ on number line C. Does $y = 150\%$ satisfy it?
6. Which of these satisfy $n > 4 \times 10^3$?
4000 3.9×10^4 0.5×10^4 4.01×10^3
7. A match ends in a win, a draw or a loss.
 $P(\text{win}) = 0.35$ and $P(\text{draw}) = \frac{1}{5}$. Find $P(\text{loss})$ as a percentage. Write $<$ or $>$ between $P(\text{win})$ and $P(\text{loss})$.
8. (Challenge) x is an integer, $x > -3$ and $x \leq 2$. List the values x can take.

Starter 2: Inequalities on a Number Line

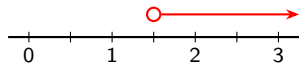
Number line A



Number line B



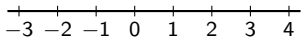
Number line C



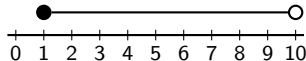
- Write 0.45 as a fraction and as a percentage.
 $\frac{9}{20} = 45\%$
- Write 6.1×10^{-3} as an ordinary number.
0.0061
- Draw $x \geq 2$ on number line A. Can x be equal to 2? **Yes: $\geq$ includes 2, so the circle is filled.**
- Write the inequality on number line B, and two integers that satisfy it. **$x < -1$; for example -2 and -3**
- Draw $y > \frac{3}{2}$ on number line C. Does $y = 150\%$ satisfy it? **No: $150\% = \frac{3}{2}$, not more than $\frac{3}{2}$.**
- Which of these satisfy $n > 4 \times 10^3$?
4000 3.9×10^4 0.5×10^4 4.01×10^3
All except 4000, which equals 4×10^3
- A match ends in a win, a draw or a loss.
 $P(\text{win}) = 0.35$ and $P(\text{draw}) = \frac{1}{5}$. Find $P(\text{loss})$ as a percentage. Write $<$ or $>$ between $P(\text{win})$ and $P(\text{loss})$. **45%, so $P(\text{win}) < P(\text{loss})$**
- (Challenge) x is an integer, $x > -3$ and $x \leq 2$. List the values x can take. **-2, -1, 0, 1, 2**

Starter 3: Double Inequalities

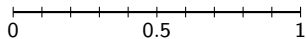
Number line A



Number line B



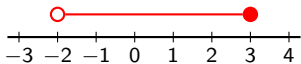
Number line C



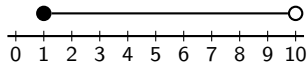
1. Write $\frac{7}{20}$ as a decimal and as a percentage.
2. Work out $(3 \times 10^4) \times (2 \times 10^3)$.
3. Draw $-2 < x \leq 3$ on number line A. List the integers that satisfy it.
4. Standard form is $A \times 10^n$. Number line B shows the values A can take. Write them as a double inequality.
5. Which of these are in standard form?
 0.8×10^3 10×10^2 1×10^5 9.9×10^{-4}
6. Write $\frac{1}{4} < x < 40\%$ using decimals. Does $x = \frac{1}{3}$ satisfy it?
7. Every probability p satisfies $0 \leq p \leq 1$. The probability of rain tomorrow is more than 60%. Show the values p can take on number line C, and write them as a double inequality.
8. (Challenge) $0.6 < P(\text{rain}) \leq 1$. Write a double inequality for $P(\text{no rain})$.

Starter 3: Double Inequalities

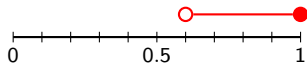
Number line A



Number line B



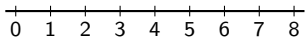
Number line C



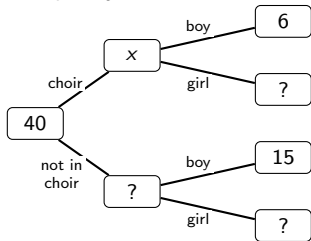
1. Write $\frac{7}{20}$ as a decimal and as a percentage.
 $0.35 = 35\%$
2. Work out $(3 \times 10^4) \times (2 \times 10^3)$.
 6×10^7
3. Draw $-2 < x \leq 3$ on number line A. List the integers that satisfy it. $-1, 0, 1, 2, 3$
4. Standard form is $A \times 10^n$. Number line B shows the values A can take. Write them as a double inequality. $1 \leq A < 10$
5. Which of these are in standard form?
 0.8×10^3 10×10^2 1×10^5 9.9×10^{-4}
 1×10^5 and 9.9×10^{-4} . 0.8 is less than 1, and 10 is not less than 10.
6. Write $\frac{1}{4} < x < 40\%$ using decimals. Does $x = \frac{1}{3}$ satisfy it? $0.25 < x < 0.4$; yes, $\frac{1}{3} = 0.\dot{3}$
7. Every probability p satisfies $0 \leq p \leq 1$. The probability of rain tomorrow is more than 60%. Show the values p can take on number line C, and write them as a double inequality. $0.6 < p \leq 1$
8. (Challenge) $0.6 < P(\text{rain}) \leq 1$. Write a double inequality for $P(\text{no rain})$. $0 \leq P(\text{no rain}) < 0.4$

Starter 4: Solving Inequalities

Number line A



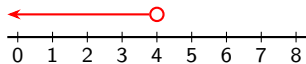
Frequency tree



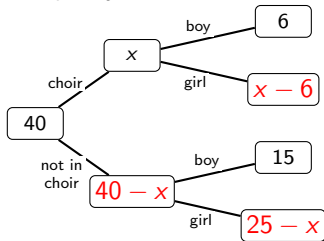
1. Write 12% as a decimal and as a fraction in its simplest form.
2. Work out $(8 \times 10^6) \div (2 \times 10^2)$.
3. Solve $11 > 2x + 3$. Show the solution on number line A.
4. 30% of y is less than 6. Write an inequality and solve it.
5. Solve $3m \leq 1.2 \times 10^5$, giving m in standard form.
6. 40 pupils were asked if they sing in the choir. Complete the frequency tree in terms of x .
7. There are more girls than boys in the choir. Write an inequality in x and solve it.
8. (Challenge) The probability that a pupil chosen at random is in the choir is also less than 0.4. List the values x can take.

Starter 4: Solving Inequalities

Number line A



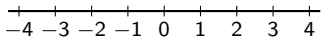
Frequency tree



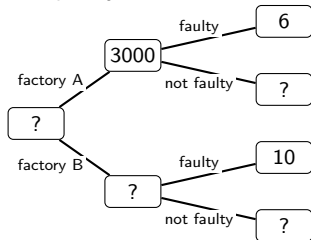
1. Write 12% as a decimal and as a fraction in its simplest form. $0.12 = \frac{3}{25}$
2. Work out $(8 \times 10^6) \div (2 \times 10^2)$. 4×10^4
3. Solve $11 > 2x + 3$. Show the solution on number line A. $8 > 2x$, so $4 > x$, which is $x < 4$
4. 30% of y is less than 6. Write an inequality and solve it. $0.3y < 6$, so $y < 20$
5. Solve $3m \leq 1.2 \times 10^5$, giving m in standard form. $m \leq 4 \times 10^4$
6. 40 pupils were asked if they sing in the choir. Complete the frequency tree in terms of x .
7. There are more girls than boys in the choir. Write an inequality in x and solve it. $x - 6 > 6$, so $x > 12$
8. (Challenge) The probability that a pupil chosen at random is in the choir is also less than 0.4. List the values x can take. $0.4 \times 40 = 16$, so $12 < x < 16$: $x = 13, 14$ or 15

Starter 5: Solving Double Inequalities

Number line A



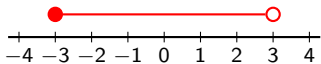
Frequency tree



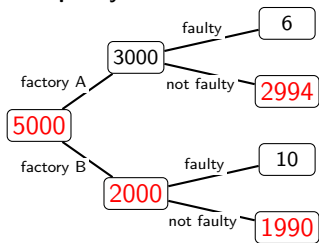
1. Write $\frac{1}{8}$ as a decimal and as a percentage.
2. Write 0.0032 in standard form.
3. Solve $5x - 3 \leq 2x + 9$.
4. A company made 5×10^3 phones. Complete the frequency tree.
5. Write the probability that a phone from factory A is faulty in standard form. Do the same for factory B. Write $<$ or $>$ between them.
6. Solve $-5 \leq 2x + 1 < 7$. Show it on number line A, and list the integers that satisfy it.
7. A biased spinner lands on red with probability $2x - 0.4$. Use $0 \leq P(\text{red}) \leq 1$ to find the values x can take.
8. (Challenge) A bag holds 4 red and n blue counters. $P(\text{red}) < 20\%$. Find the smallest value n can take.

Starter 5: Solving Double Inequalities

Number line A



Frequency tree



1. Write $\frac{1}{8}$ as a decimal and as a percentage.
 $0.125 = 12.5\%$
2. Write 0.0032 in standard form.
 3.2×10^{-3}
3. Solve $5x - 3 \leq 2x + 9$.
 $3x \leq 12$, so $x \leq 4$
4. A company made 5×10^3 phones. Complete the frequency tree.
5. Write the probability that a phone from factory A is faulty in standard form. Do the same for factory B. Write $<$ or $>$ between them.
 $\frac{6}{3000} = 2 \times 10^{-3} < \frac{10}{2000} = 5 \times 10^{-3}$
6. Solve $-5 \leq 2x + 1 < 7$. Show it on number line A, and list the integers that satisfy it.
 $-3 \leq x < 3$; $-3, -2, -1, 0, 1, 2$
7. A biased spinner lands on red with probability $2x - 0.4$. Use $0 \leq P(\text{red}) \leq 1$ to find the values x can take.
 $0.4 \leq 2x \leq 1.4$, so $0.2 \leq x \leq 0.7$
8. (Challenge) A bag holds 4 red and n blue counters. $P(\text{red}) < 20\%$. Find the smallest value n can take.
 $0.2(4 + n) > 4$, so $4 + n > 20$ and $n > 16$; $n = 17$