

F Michaelmas Inequalities

1. Solve the following inequalities.

(a) $2x - 3 < 5x + 7.$

$$x > -\frac{10}{3}$$

(o) $\frac{x-1}{2} + 1 > x - 3.$

$$x < 7$$

(b) $3 - 7x \geq 9x + 1.$

$$x \leq \frac{1}{8}$$

(p) $5x - 1 - \frac{3x-2}{3} \geq 5x.$

$$x \leq -\frac{1}{3}$$

(c) $5x + 17 > 2 - 7x.$

$$x > -\frac{5}{4}$$

(q) $\frac{x}{-2} > 7x - 3.$

$$x < \frac{6}{11}$$

(d) $\frac{1}{2}x - 3 \leq 4x - 11.$

$$x \geq \frac{16}{7}$$

(r) $3r - \frac{3}{5} \leq \frac{r-2}{-5}.$

$$r \leq \frac{5}{16}$$

(e) $0.6 - 0.2y > 1.2y - 0.1.$

$$y < \frac{1}{2}$$

(f) $\frac{2}{3} - 2x \geq -\frac{1}{3}x + 4.$

$$x \leq -2$$

(s) $x - \frac{x-2}{-2} > 4x - 1.$

$$x < 0$$

(g) $5(x-3) > 2(5-2x).$

$$x > \frac{25}{9}$$

(t) $3x - 1 + \frac{x-4}{3} \geq \frac{x+1}{2} - x.$

$$x \geq \frac{17}{23}$$

(h) $-2(2x+4) \leq 6(3-2x).$

$$x \leq \frac{13}{4}$$

(u) $\frac{x-2}{3} + \frac{4-x}{-2} > 3x + \frac{2x-5}{2}.$

$$x < -\frac{1}{19}$$

(i) $2 - (3z-5) > -4(9-2z).$

$$z < \frac{43}{11}$$

(v) $\frac{x-1}{0.5} + 0.3(x-1) \leq \frac{x-4}{-3}.$

$$x \leq \frac{109}{79}$$

(j) $2(x-a) \geq -3(x+b).$

$$x \geq \frac{2a-3b}{5}$$

(k) $2(x-3a) + 3(x-4a) > -a - 3(x-b).$

$$x > \frac{17a+3b}{8}$$

(w) $0.1(2x-1) - 0.2(3-x) > \frac{x}{-2} - 5.$

$$x > -\frac{43}{9}$$

(l) $(x-3)(x-4) \leq (6-x)(7-x).$

$$x \leq 5$$

(x) $\frac{x}{4} - x - \frac{4x}{-3} \geq 3 - 2x.$

$$x \geq \frac{36}{31}$$

(m) $(2x+1)(2x-5) \geq (4x-3)(x+8).$

$$x \leq \frac{19}{37}$$

(y) $\frac{x-1}{-2} - \frac{3x-1}{3} \leq \frac{x+2}{2} - x.$

$$x \geq -\frac{1}{6}$$

(n) $3u^2 - (u-5)(u-1) < (u-10)(2u+3).$

$$u < -\frac{25}{23}$$

(z) $\frac{\frac{3-x}{-2} + 1}{-3} > x - 6.$

$$x < \frac{37}{7}$$

2. Solve the following triple inequalities.

(a) $11 < 2x + 5 < 27$. $3 < x < 11$ $x > \frac{163}{13}$

(b) $-11 < 3x + 1 \leq 100$. $-4 < x \leq 33$ (i) $x - \frac{3-2x}{3} \leq 2x + 3 < \frac{5-4x}{-2}$. No solutions

(c) $2x - 1 \leq 3x < 2x + 3$. $-1 \leq x < 3$ (j) $1 - \frac{x-1}{4} < 2x + 1 < \frac{x-1}{2} + 3$. $\frac{1}{9} < x < 1$

(d) $4 + y \leq 3y + 7 \leq 2y + 15$. $-\frac{3}{2} \leq y \leq 8$ (k) $5 + x + \frac{x+4}{-3} < \frac{3-x}{-2} \leq \frac{x}{3} + \frac{x-3}{4}$. No solutions

(e) $5 \leq x - 6 < 7x + 8$. $x \geq 11$ (l) $5 - x < \frac{x}{-3} + x < \frac{3-x}{2} + 5x$. $x > 3$

(f) $2x + 7 \leq 8 \leq 15x + 2$. $\frac{2}{5} \leq x \leq \frac{1}{2}$ (g) $\frac{x-3}{2} \leq \frac{x-4}{3} \leq 8x - 7$. $\frac{17}{23} \leq x \leq 1$

(h) $\frac{2x-3}{-7} + 5 < \frac{x-4}{3} - 1 < x - \frac{2x+1}{-2}$. $-\frac{4}{3} < x \leq \frac{43}{15}$ (m) $2(x-5) - \frac{x+1}{4} \leq \frac{4x-1}{-2} < x - \frac{x-5}{2}$.