

Playoff Clinch Inequalities

Hockey and football teams are racing for playoff spots, and a playoff race is really a list of inequalities: at least this many points, at most that many players. Write, solve and graph them. Every team and player on this sheet is made up.

Name _____

Date _____

INEQUALITY TOOLKIT

$< >$
less than,
greater than

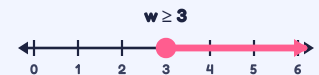
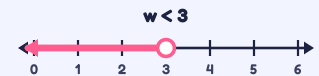
$\leq \geq$
at most,
at least

$\circ \bullet$
open: not included
closed: included

$\times \text{ or } \div (-)$
flip the sign when
you use a negative

Check it
plug a number back
into the original

GRAPH IT



CLOSED DOT = INCLUDED

REAL RULES ON THIS SHEET · STANDINGS POINTS AND SEASONS

NHL WIN

2 points

OT / SHOOTOUT LOSS

1 point

REGULATION LOSS

0 points

NFL SEASON

17 games

An NHL season is 82 games. "At least" means $\geq$ and "at most" means $\leq$. Answers about games, wins and players must be whole numbers.

ROOKIE

- 1 An NHL team can have **at most 23 players** on its active roster. Write an inequality for r , the number of players on the roster.

WORK SPACE

ROOKIE

- 2 Each NHL win is worth 2 points. Is $w = 41$ a solution of $2w \geq 80$? Show the check, then circle YES or NO.

WORK SPACE

YES / NO

STARTER

- 3 The Harbor Hawks have **37 points**. They want **at least 96**. Solve $p + 37 \geq 96$ to find how many more points p they need.

WORK SPACE

p _____

STARTER

- 4 An NFL team can have **at most 53 players** on its active roster. The Riverton Rams have **47**. Write and solve an inequality for n , the players they can still add.

WORK SPACE

PRO

- 5 The Glacier Bay Owls need **at least 30 more points**. If they earn points from wins (2 each), write and solve an inequality for w , the wins they need.

WORK SPACE

PRO

- 6 The Owls have **54 points** and **12 games** left. They want at least **76**. Solve $2w + 54 \geq 76$. Can they still lose a game and make it?

WORK SPACE

ALL-STAR

- 7 Defenseman Eli Mercer has a plus-minus of **+10**. If he goes **-2** in each of the next g games, solve $10 - 2g > 2$. What is the most games this can happen and he still stays above +2?

WORK SPACE

_____ games

CHALLENGE ★

- 8 Challenge: The Rams are **6-5** in a 17-game season (no ties). A winning record means more wins than losses. Let w = wins in their last 6 games. Write a compound inequality and list every value of w that works.

WORK SPACE

A Solve It, Graph It

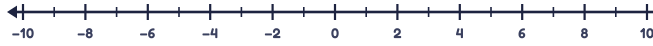
Solve each inequality and write the answer with the variable first. Then graph it: open or closed dot at the boundary, arrow the right way. Remember to flip the sign when you multiply or divide by a negative.

INEQUALITY

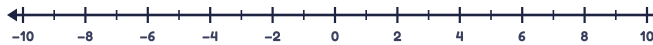
SOLUTION

GRAPH

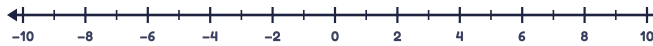
a. $x + 6 > 9$



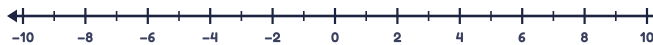
b. $n - 4 \leq -6$



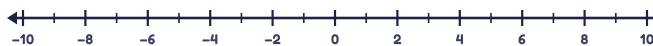
c. $3y \geq -12$



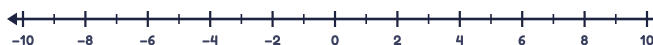
d. $-2k > 10$



e. $t \div 4 + 1 \leq 3$



f. $5 - 3m < -7$



B The Final Eight Games

The made-up North Division standings with 8 games to go. Use inequalities to see who can still get in.

TEAM	GP	W	L	OTL	PTS
Harbor Hawks	74	44	22	8	<input type="text"/>
Glacier Bay Owls	74	41	25	8	<input type="text"/>
Iron Range Moose	74	40	28	6	<input type="text"/>
Cedar Falls Lynx	74	36	30	8	<input type="text"/>

GP = games played, OTL = overtime or shootout losses, PTS = $2 \times W + 1 \times \text{OTL}$. Each team has 8 games left in its 82-game season. Fill in the PTS column first.

- 1 Experts think it will take **at least 100 points** to make the playoffs. Write and solve an inequality for w , the wins the Owls need. (Assume they get no OTL points.)

- 2 Use an inequality to show the Lynx cannot reach 100 points, even if they win every game left. What is the most points they can finish with?

- 3 Suppose the Owls earn **8 more points**. How many of their 8 games must the Moose win to finish with **more** points than the Owls?

CHALLENGE ★ FIND THE MISTAKE

The Owls' booster club has \$600. They already spent \$150 on practice pucks, and team jackets cost \$45 each. Kai wrote $45j + 150 \geq 600$ and said "they need at least 10 jackets." Fix Kai's inequality, solve it, and find the most jackets they can buy.

Inequality Most jackets

✓ **Answer Key** (for teachers & parents)

Answers for **Playoff Clinch Inequalities**. Print pages 1 and 2 for students and keep this page for checking. Accept equivalent forms such as $3 < x$ or $x > 3$. Give credit for a correct graph even if the arrow is drawn from a slightly different spot.

Page 1 Problems

- Answer: $r \leq 23$**
"At most" means less than or equal to.
- Answer: YES**
 $2 \times 41 = 82$, and $82 \geq 80$ is true.
- Answer: $p \geq 59$**
Subtract 37 from both sides: $96 - 37 = 59$.
- Answer: $47 + n \leq 53$, so $n \leq 6$**
They can add 6 players or fewer.
- Answer: $2w \geq 30$, so $w \geq 15$**
Divide both sides by 2.
- Answer: $w \geq 11$ · yes, they can lose 1**
 $2w \geq 22$, so $w \geq 11$. They have 12 games, so 11 wins still works.
- Answer: $g < 4$ · at most 3 games**
 $-2g > -8$. Divide by -2 and flip: $g < 4$. Check $g = 3$: $10 - 6 = 4 > 2$.
- Answer: $3 \leq w \leq 6$ · $w = 3, 4, 5, 6$**
Need 9+ wins of 17 (more than 8.5), so $6 + w \geq 9$, and only 6 games are left.

B · The Final Eight Games

Answer: PTS: Hawks 96 · Owls 90 · Moose 86 · Lynx 80

Example: Hawks $2 \times 44 + 8 = 96$

- Answer: $2w + 90 \geq 100$, so $w \geq 5$**
They need 5 wins out of 8.
- Answer: $80 + 2w \geq 100$ needs $w \geq 10$ · max 96 pts**
Only 8 games are left, and $80 + 16 = 96 < 100$.
- Answer: $86 + 2w > 98$, so $w > 6$ · 7 wins**
Check: 7 wins gives $100 > 98$, but 6 wins gives only 98, a tie.

Quick score

Page 1 problems	_____ / 8
A · Solve & graph (2 each)	_____ / 12
B · Final Eight Games (4 PTS + 3)	_____ / 7
Challenge	_____ / 2
Total	_____ / 29

Skills practiced

- Writing inequalities
- One-step inequalities
- Two-step inequalities
- Graphing on a number line
- Flipping the sign
- Compound inequalities
- Checking solutions

Teaching tip: Before solving A4, have students test $k = 0$ and $k = -6$ in $-2k > 10$. Seeing that -6 works and 0 doesn't shows why the sign must flip when dividing by -2 .

A · Solve It, Graph It

- Answer: $x > 3$**
open dot, arrow right at 3
- Answer: $n \leq -2$**
closed dot, arrow left at -2
- Answer: $y \geq -4$**
closed dot, arrow right at -4
- Answer: $k < -5$**
open dot, arrow left at -5
- Answer: $t \leq 8$**
closed dot, arrow left at 8
- Answer: $m > 4$**
open dot, arrow right at 4

Challenge · Find the Mistake

- Answer: $45j + 150 \leq 600$ · $j \leq 10$ · 10 jackets**
The club can spend at most \$600, so use $\leq$. $45j \leq 450$. Check: $45 \times 10 + 150 = 600$, but 11 jackets cost \$645.