nexamind EDUCATION

Name _____ Date _____

2.6 Inequalities — worksheet

Understand and use inequalities, and show them on a number line. · 56 questions · Show your working.

Remember

- **<** means “is less than”, **>** means “is greater than”. The wide end always faces the larger quantity.
- x > 5 means x is bigger than 5. The smallest **integer** is 6, because 5 itself is not allowed.
- y < 2 means y is smaller than 2. The largest integer is 1.
- On a number line use an **open circle** at the boundary, because that value is not included.
- The arrow points **right** for > and **left** for <.
- You cannot list every solution — there are infinitely many — so list the first few and write “…”.
- Two inequalities together trap a value: x > 2 and x < 7 gives the integers 3, 4, 5, 6.
- You solve an inequality just like an equation: 3x + 1 > 16 → 3x > 15 → x > 5.

A · Fluency — Read inequalities and find the extreme integers.

1 Write in words what **x < 10** means.

2 Write in words what **x > 10** means.

3 Write in words what **x < −4** means.

4 Write in words what **x > −4** means.

5 Write in words what **y > 0** means.

6 Write in words what **n < 1** means.

7 What is the smallest integer that satisfies **x > 5**?

8 What is the smallest integer that satisfies **x > 12**?

9 What is the smallest integer that satisfies **x > −3**?

10 What is the smallest integer that satisfies **x > −1**?

11 What is the smallest integer that satisfies **x > 0**?

12 What is the smallest integer that satisfies **x > 99**?

13 What is the largest integer that satisfies **y < 2**?

14 What is the largest integer that satisfies **y < 10**?

15 What is the largest integer that satisfies **y < −4**?

16 What is the largest integer that satisfies **y < 0**?

17 What is the largest integer that satisfies **y < −9**?

18 What is the largest integer that satisfies **y < 100**?

19 List the first five integer values that satisfy **x > 5**, starting from the closest one.

20 List the first five integer values that satisfy **y < 2**, starting from the closest one.

21 List the first five integer values that satisfy **x > −2**, starting from the closest one.

22 List the first five integer values that satisfy **n < 4**, starting from the closest one.

23 List the first five integer values that satisfy **m > 0**, starting from the closest one.

24 List the first five integer values that satisfy **k < −5**, starting from the closest one.

B · Reasoning — Number lines, testing values and counting.

25 On a number line, what does an **open circle** show?
- ☐ The value is included
- ☐ The value is not included
- ☐ The line stops there
- ☐ The value is zero

26 To show x > 5 on a number line, which way does the arrow point?
- ☐ Left
- ☐ Right

27 To show y < 2 on a number line, which way does the arrow point?
- ☐ Left
- ☐ Right

28 Which inequality means “n is greater than −3”?
- ☐ n < −3
- ☐ n > −3
- ☐ −3 > n
- ☐ n = −3

29 Does x = −2 satisfy x > −5?
- ☐ Yes
- ☐ No

30 Does $x = -7$ satisfy $x > -5$?

- ☐ Yes
- ☐ No

31 Does $x = 5$ satisfy $x > 5$?

- ☐ Yes
- ☐ No

32 How many integers satisfy both $x > 2$ and $x < 7$?

33 How many integers satisfy both $x > -3$ and $x < 3$?

34 List all the integers that satisfy both $x > -2$ and $x < 4$.

35 Why can you not list every integer that satisfies $x > 5$?

- ☐ Because there are none
- ☐ Because the list goes on forever
- ☐ Because x must be positive
- ☐ Because 5 is included

36 x is an integer and $x > 7$. What is the smallest possible value of $2x$?

C · Challenge — Solving inequalities and combining them.

37 x is an integer, $x > 3$ and $x < 9$. What is the largest possible value of x?

38 n is an integer with $n > -4$ and $n < 1$. What is the sum of all the possible values of n?

39 Solve the inequality $2x > 10$ and write the smallest integer value of x.

40 Solve $3x + 1 > 16$ and write the smallest integer value of x.

41 Solve $x - 4 < 2$ and write the largest integer value of x.

42 x is an integer with $x > -10$ and $x < -5$. How many values are possible?

43 A number x satisfies $x > 2$. What is the smallest possible value of x^2 if x is an integer?

44 Write an inequality for: “y is greater than −1”. Use the > symbol.

D · Word problems — Limits and conditions in real situations.

45 A lift can carry fewer than 12 people. Write an inequality for the number of people p.

46 You must be more than 140 cm tall to ride. Write an inequality for the height h, in cm.

47 A lift can carry fewer than 12 people. What is the greatest number of people allowed?

48 You must be more than 140 cm tall to ride. What is the shortest whole number of centimetres that is allowed?

49 A freezer must stay below −18 °C. What is the highest whole number of degrees allowed?

50 A game needs more than 4 players. What is the smallest number of players?

51 A parcel must weigh less than 30 kg. What is the greatest whole number of kilograms allowed?

52 A car park has spaces for fewer than 250 cars. What is the greatest number of cars?

53 A shop gives a discount when you spend more than $80. What is the smallest whole number of dollars that earns the discount?

54 A pool is deeper than 1 m everywhere. The depth d is a whole number of centimetres. What is the smallest possible depth, in cm?

55 A bus route takes fewer than 45 minutes. What is the longest whole number of minutes it could take?

56 A rollercoaster requires riders to be more than 12 years old. What is the youngest whole number of years allowed?