

# NAMAGUNGA PRIMARY BOARDING SCHOOL

## PRIMARY FIVE/SIX MATHEMATICS WORK, 2021/2022

Name: ..... Stream: .....

TOPIC: INTEGERS

### Lesson one

#### Multiplication of integers without using a number line (mind maps)

#### Examples

Work out the following.

a)  $+8 \times +4$

$$\begin{aligned} +8 \times +4 &= 8 \times 4 \\ &= 32 \end{aligned}$$

+	x	+	=	+
-	x	-	=	+
+	x	-	=	-
-	x	+	=	-

b)  $-16 \times -9 =$

$$\begin{aligned} -16 \times -9 &= 16 \times 9 \\ &= 144 \end{aligned}$$

+	x	+	=	+
-	x	-	=	+
+	x	-	=	-
-	x	+	=	-

c)  $-8 \times +6 =$

$$\begin{aligned} -8 \times +6 &= -8 \times 6 \\ &= -48 \end{aligned}$$

+	x	+	=	+
-	x	-	=	+
+	x	-	=	-
-	x	+	=	-

### **Activity**

Multiply the following integers correctly.

a)  $+5 \times +2 =$

(e)  $+13 \times +6 =$

b)  $-7 \times -6 =$

(f)  $-14 \times -10 =$

c)  $-11 \times +7 =$

(g)  $-15 \times +5 =$

d)  $+9 \times -21 =$

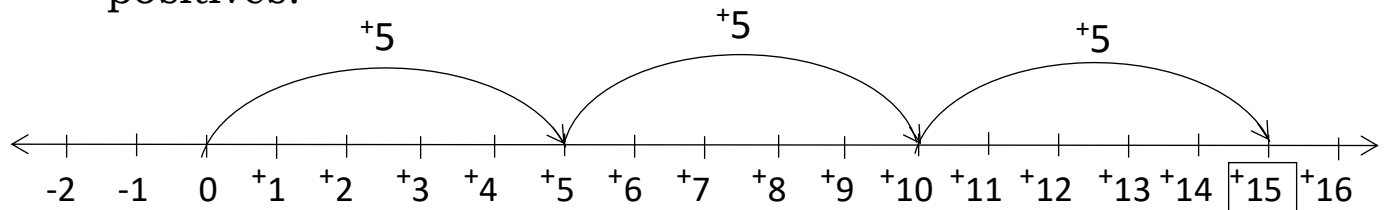
(h)  $+7 \times -20 =$

## Multiplication of integers using a number line

### Examples

1. Multiply  $+3 \times +5$  using a number line.

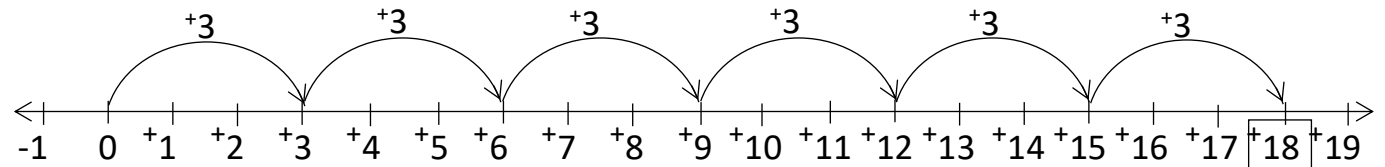
$+3 \times +5$  means make 3 jumps each covering 5 steps to the positives.



$$\therefore +3 \times +5 = +15$$

2. Multiply  $-6 \times -3$  using a number line.

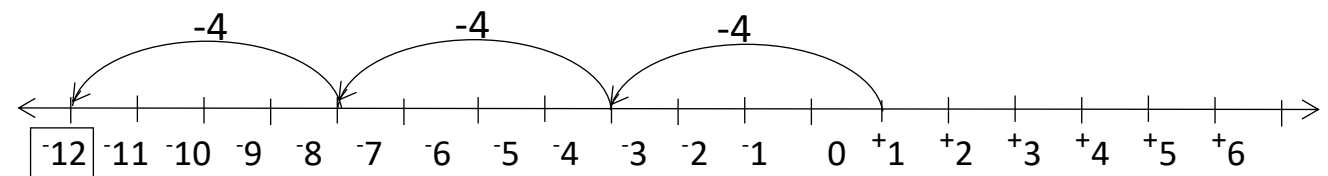
**Note:** Here, we first get the result of a negative multiplied by a negative  $(- \times -) = +$   
 Since the product is a positive, make 6 jumps each covering 3 steps to the positives.



$$\therefore -6 \times -3 = +18$$

3. Multiply  $+3 \times -4$  using a number line.

$+3 \times -4$  means make 3 jumps each covering 4 negative steps or to the negative direction.



$$\therefore +3 \times -4 = -12$$

**Activity**

Using a number line, multiply each of the following.

a)  $+5 \times +2$

b)  $2 \times -6$

c)  $-3 \times -4$

d)  $+2 \times -7$

## Lesson three

### Division of integers

**Note:** When dividing integers the following must be followed;

+	÷	+	=	+
-	÷	-	=	+
+	÷	-	=	-
-	÷	+	=	-

### Examples

1. Divide  $+20 \div +5$   $+ \div + = +$

$$\begin{aligned}
 &+20 \div +5 \\
 &= \left( \begin{array}{c} + \\ + \end{array} \right) \frac{20}{5} \\
 &= +4
 \end{aligned}$$

2. Divide  $-10 \div -2$   $- \div - = +$

$$\begin{aligned}
 &-10 \div -2 \\
 &= \left( \begin{array}{c} - \\ - \end{array} \right) \frac{10}{2} \\
 &= +5
 \end{aligned}$$

(3) Work out:  $+18 \div -3$   $(+ \div - = -)$

$$\begin{aligned}
 &= \left( \begin{array}{c} - \\ + \\ - \end{array} \right) \frac{18}{3} \\
 &= -6
 \end{aligned}$$

(4) Work out:  $-35 \div +5$   $- \div + = -$

$$\begin{aligned}
 &= \left( \begin{array}{c} - \\ - \\ + \end{array} \right) \frac{35}{5} \\
 &= -7
 \end{aligned}$$

### Activity

Work out the following correctly.

a)  $+24 \div +4$

(b)  $-25 \div -5$

c)  $-8 \div +2$

(f)  $-96 \div -12$

d)  $-30 \div +6$

(g)  $+81 \div -9$

e)  $+33 \div +11$

(h)  $+51 \div -3$

## Lesson four

### Application of integers

**Note:** Integers are used in our day to day life as follows;

### Examples

1. Nakato borrowed sh.1000 but paid back sh.300. How much money does Nakato have?

***Borrowing means Negative***

***Paid means Positive***

$$\begin{aligned} & -\text{sh.}1000 + +\text{sh.}300 \\ & = -\text{sh.}1000 + \text{sh.}300 \\ & = -\text{sh.}700 \end{aligned}$$

**∴ Nakato has a debt of sh.700**

2. The temperature was 20°F but dropped by 23°F. What is the temperature now?

$$\begin{aligned} & 20^{\circ}\text{F} - 23^{\circ}\text{F} \\ & = -3^{\circ}\text{F} \end{aligned}$$

**∴ The temperature now is -3°F**

3. The temperature on top of Mt Kilimanjaro in the morning was  $-15^{\circ}\text{C}$  then  $5^{\circ}\text{C}$  in the afternoon. Find the temperature range.

***Temperature range = Temp. after – Temp. before***

$$\begin{aligned} & = 5^{\circ}\text{C} - -15^{\circ}\text{C} \\ & = 5^{\circ}\text{C} - (-15^{\circ}\text{C}) \\ & = 5^{\circ}\text{C} + 15^{\circ}\text{C} \\ & = \mathbf{20^{\circ}\text{C}} \end{aligned}$$

## **Activity**

Work out the following using the idea of integers.

1. A motorist moved 100km forward and reversed 150km.  
How far is she from the starting point?
  
  
  
  
  
  
  
  
  
  
2. A frog jumped 3 steps four times before diving into the swimming pool. Calculate the distance covered by the frog.
  
  
  
  
  
  
  
  
  
  
3. The man is 4 years older than the wife who is 30 years.  
Calculate the man's age.
  
  
  
  
  
  
  
  
  
  
4. Ninsiima's weight dropped by 10kg from 60kg. Find Ninsiima's weight now.
  
  
  
  
  
  
  
  
  
  
5. Yoko has sh.10,000. His daughter requires sh.15,000 for school fees from him. Find what Yoko remains with after.



8. The temperature of the ice cream was  $-80^{\circ}\text{C}$  and when it was exposed to heat, the temperature rose to  $70^{\circ}\text{C}$ . Calculate the temperature rise.

## Solution sets

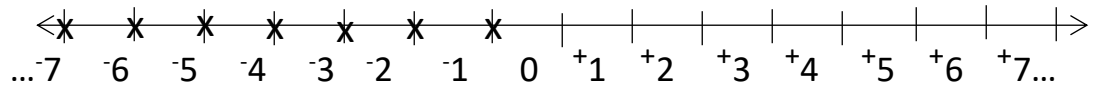
Solution set can be represented on a number line.

1.  $x = \{\text{a set of positive integers}\}$



$$\therefore x = \{\underline{1, 2, 3, 4, 5, 6, 7, 8, \dots}\}$$

2.  $M = \{\text{a set of negative integers}\}$

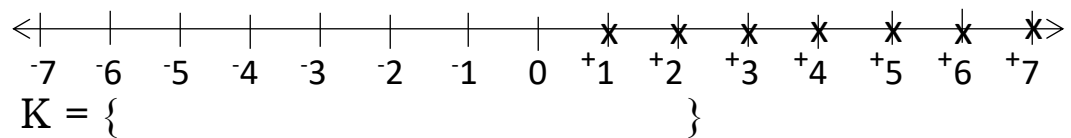


$$\therefore \underline{M = \{-1, -2, -3, -4, -5, -6, -7, -8, \dots\}}$$

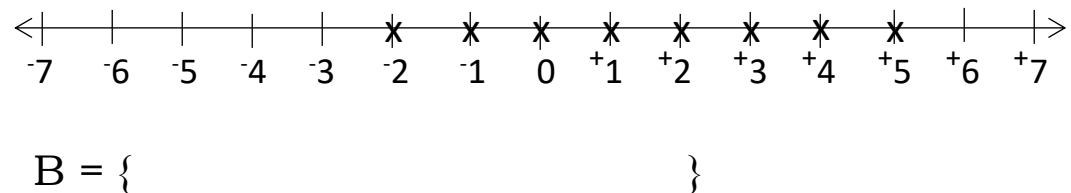
### **Activity**

What are the possible values represented on each number line?

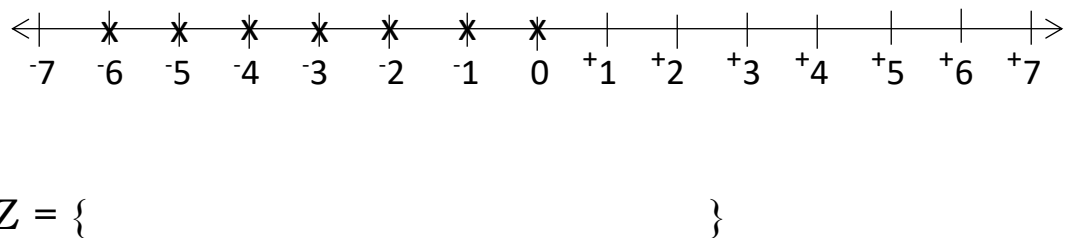
1.

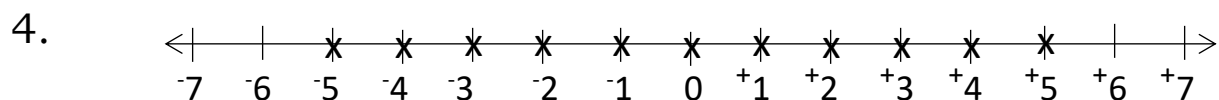


2.

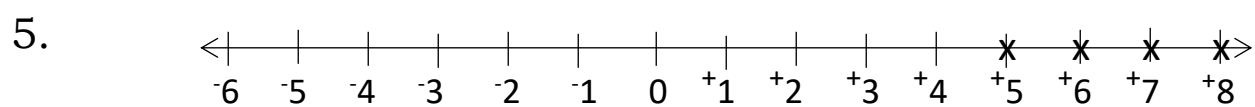


3.





$$P = \{ \quad \quad \quad \}$$



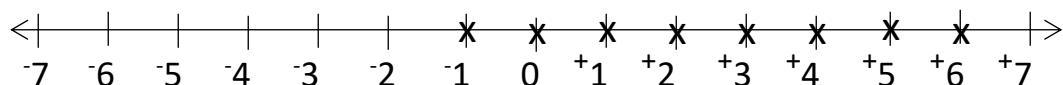
$$Q = \{ \quad \quad \quad \}$$

## Lesson six

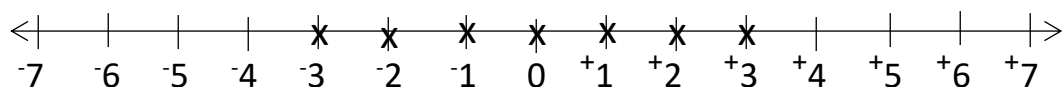
### Representing members of a given set on a number line

#### Examples

1. If  $x = \{-1, 0, 1, 2, 3, 4, 5, 6\}$ , show members of set  $x$  on a number line.



2. If  $P = \{-3, -2, -1, 0, 1, 2, 3\}$ , show the members of set  $P$  on a number line.



### **Activity**

Show each of these sets below on a number line.

1.  $A = \{0, 1, 2, 3, 4\}$

2.  $B = \{-6, -5, -4, -3, -2\}$

3.  $N = \{3, 4, 5, 6, 7, 8\}$

4.  $R = \{-4, -3, -2, -1, 0, 1, 2, 3, 4, 5\}$

5.  $H = \{-2, -1, 0, 1, 2, 3, 4\}$

## Lesson seven

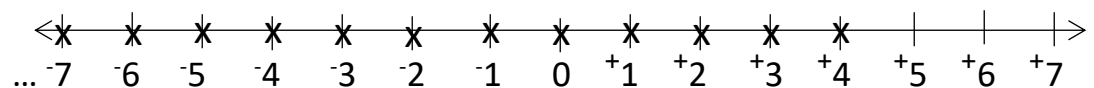
### Solution sets (Inequalities)

**Note:** Inequalities are comparative mathematical statements that use  $>$ ,  $<$ ,  $\geq$ , or  $\leq$  instead of the equal sign(s).

### Examples

1. Find the solution set for  $P < 5$

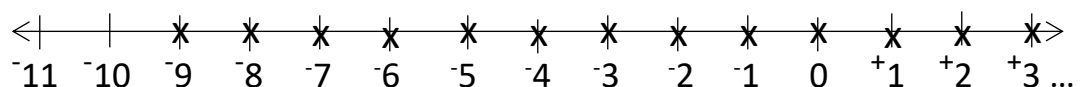
*$P < 5$  means that all the possible values of  $P$  are less than 5*



$\therefore$  **Set  $P = \{4, 3, 2, 1, 0, -1, -2, -3, -4, -5, -6, -7, \dots\}$**

2. Find the solution set for  $m > -10$

*$m > -10$  means that all the possible values of  $m$  are greater than -10*



**$\therefore \text{Set } m = \{-9, -8, -7, -6, -5, -4, -3, -2, -1, 0, 1, \dots\}$**

### **Activity**

Use a number line to find the solution set for the following inequalities.

1.  $k > 2$

2.  $y < +3$

3.  $R < 14$

4.  $w > -4$

5.  $x < -1$

6.  $q > 8$

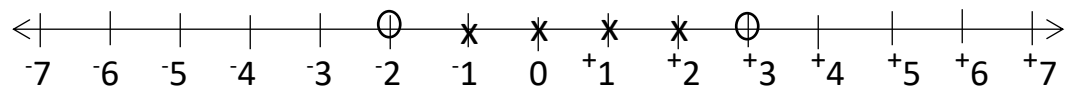
## Lesson eight

### Solution sets (Inequalities)

#### Examples

1. Find the solution set for  $-2 < x < +3$

$-2 < x < +3$  represents values of  $x$  between  $-2$  and  $+3$

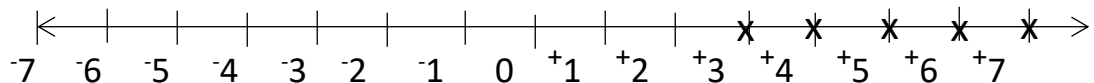


$$x = \{-1, 0, 1, 2\}$$

**$\therefore$  The solution set for  $x = \{-1, 0, 1, 2\}$**

2. Find the solution set for  $8 > k > 2$

$8 > k > 2$  represents values of  $k$  between  $+8$  and  $+2$

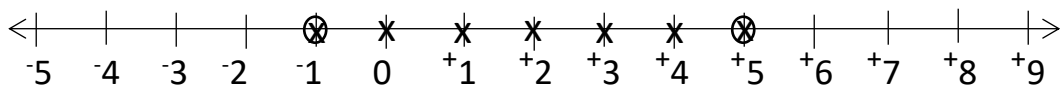


$$k = \{3, 4, 5, 6, 7\}$$

**$\therefore$  The solution set for  $k = \{3, 4, 5, 6, 7\}$**

3. Find the solution set for  $-1 \leq y \leq +5$

$-1 \leq y \leq +5$  represents values of  $y$  from  $-1$  to  $+5$

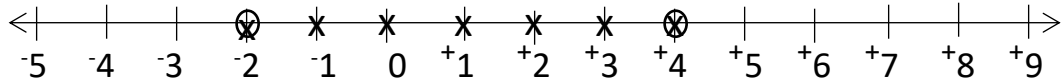


$$m = \{-2, -1, 0, +1, +2, +3, +4\}$$

**$\therefore$  The solution set for  $m = \{-2, -1, 0, +1, +2, +3, +4\}$**

4. Find the solution set for  $4 \geq m \geq -2$

$4 \geq m \geq -2$  represents values of  $m$  from  $-2$  to  $+4$  or from  $+4$  to  $-2$



$$m = \{-2, -1, 0, 1, 2, 3, 4\}$$

$\therefore$  **The solution set for  $m = \{-2, -1, 0, 1, 2, 3, 4\}$**

### **Activity**

Find the solution set for the following

1.  $-2 < q < +6$

2.  $-5 < m < 0$

3.  $0 > w > -8$



4.  $5 > n > -5$

5.  $3 > q > -8$

6.  $-7 \leq k \leq -2$

7.  $5 \geq r \geq 0$

8.  $11 \leq y < 17$

## Solving inequalities and finding solution sets

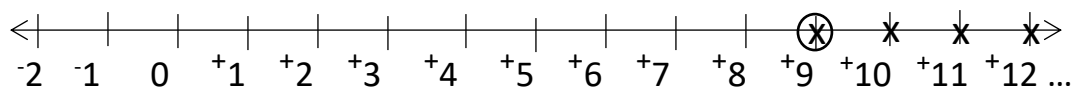
### Examples

1. Solve and find the solution set for  $2p \geq 18$

$$\frac{2p}{2_1} \geq \frac{18}{2_1}$$

$$**p \geq 9**$$

$p \geq 9$  represents values of  $p$  that are equal to or greater than +9



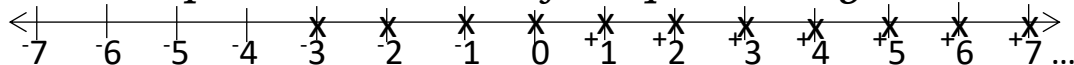
$$\therefore \underline{\underline{p = \{9, 10, 11, 12, \dots\}}}$$

2. Solve and find the solution set for  $-4n \leq 12$

$$\frac{-4n}{-4_1} \geq \frac{12}{-4_1}$$

$$**n \geq -3**$$

$n \geq -3$  represents values of  $n$  equal to or greater than -3



$$\therefore \underline{\underline{n = \{-3, -2, -1, 0, +1, +2, +3, +4, +5, +6, +7, \dots\}}}$$

### Activity

Solve and find the solution set for the following.

1.  $3x \geq 9$

2.  $5p \leq 15$

3.  $7m \geq -14$

4.  $14y \geq 42$

5.  $3h \leq -24$

6.  $-6c \leq 18$

## Solving inequalities and finding solution sets

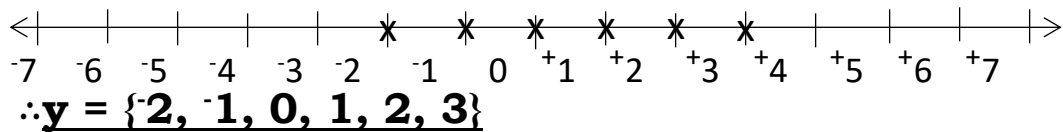
### Examples

1. Solve and find the solution set for  $-4 \leq 2y \leq 6$

$$\frac{-4}{2_1} \leq \frac{2y}{2_1} \leq \frac{6}{2_1}$$

$$-2 \leq y \leq 3$$

$-2 \leq y \leq 3$  represents values of  $y$  from  $-2$  to  $+3$  ( $-2$  and  $+3$  inclusive)

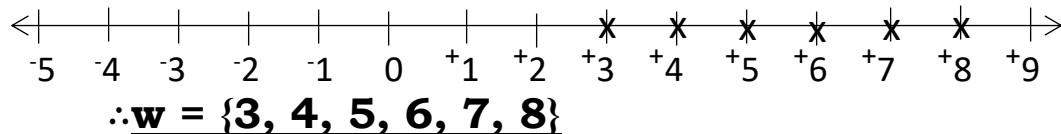


2. Solve and find the solution set for  $4 < 2w \leq 16$

$$\frac{4}{2_1} < \frac{2w}{2_1} \leq \frac{16}{2_1}$$

$$2 < w \leq 8$$

$2 < w \leq 8$  represents values of  $w$  from  $+3$  to  $+8$



### Activity

Solve and find the solution set for the following.

1.  $-8 \leq 2x \leq 10$

$$2. \quad 6 \geq 2m \geq -4$$

$$3. \quad -4 \leq 2p \leq 8$$

$$4. \quad 12 \geq 4y \geq -4$$

$$5. \quad -3 \leq 3n \leq 6$$

$$6. \quad -17 \geq k \geq -20$$

## Lesson eleven

### **Solving inequalities and finding solution sets**

#### **Examples**

1. Solve the inequality and find the solution set for  $x$  :

$$x + 3 > 5.$$

$$x + 3 - 3 > 5 - 3$$

$$\underline{\mathbf{x > 2}}$$

$x > 2$  represents values of  $x$  greater than 2

$$\therefore \underline{x = \{3, 4, 5, 6, 7, \dots\}}$$

2. Rose added 8 to a number and the result was less than 13. Find the solution set for the number if it is less than 10.

*Let the number be m*

$$m + 8 < 13$$

$$m + 8 - 8 < 13 - 8$$

$$\mathbf{m < 5}$$

m < 5 represents values of m less than 5

$$\therefore \underline{\mathbf{m = \{4, 3, 2, 1, 0, -1, -2, \dots\}}}$$

### **Activity**

Solve and find the solution set for the inequalities below.

1.  $y + 2 > 4$

(2)  $n + 5 < 12$

3.  $r + 7 > 11$

(4)  $p + 4 < 9$

5. When 2 is added to a whole number, the result is greater than 5. What are the possible values of a number?
6. Bwambale added 10 to a number and his result was less than 15, find any possible value of the number if it is a counting number.
7. If 3 is added to a counting number ( $x$ ), the result is less than 5. Find all the possible values of  $x$ .



8. When 4 is added to an integer ( $n$ ), the result is greater than zero. Find the possible values of  $n$ .

## Lesson twelve

### Solving inequalities and finding solution sets

#### Examples

1. When 4 is subtracted from  $p$ , the result is less than 2. If  $p$  is a whole number, find the possible values of  $p$ .

$$p - 4 < 2$$

$$p - 4 + 4 < 2 + 4$$

$$\mathbf{p < 6}$$

$$\therefore \mathbf{p = \{5, 4, 3, 2, 1, 0\}}$$

2. When 6 is subtracted from a number, the result is greater than 1. If  $n$  is a counting number less than 12, find the solution set for  $n$ .

$$n - 6 > 1$$

$$n - 6 + 6 > 1 + 6$$

$$\mathbf{n > 7}$$

$n > 7$  represents values of  $n$  greater than 7 but less than 12

$$\therefore \mathbf{n = \{8, 9, 10, 11\}}$$

#### Activity

Find the solution set for the given inequality.

1.  $p - 4 > 3$

(2)  $x - 1 < 4$

3.  $y - 4 > 0$

(4)  $k - 10 < 15$

5. A pupil subtracted 1 from  $m$ , the result was greater than 9.  
Find the solution set for  $m$  given that  $m$  is less than 15.

6. When 3 is subtracted from  $h$ , the result is less than 5. Find the possible values of  $h$  ( $h$  is a whole number)
7. Mwesigwa subtracted 4 from a number and the result is greater than 3. Find the solution set for the number. (the number is less than 10)
8. When 2 is subtracted from  $x$ , the result is less than 6. Find the solution set for  $x$  ( $x$  is a whole number)

**E N D**