

# Math Projects: Arithmetic Worksheets Answer Key

with Robo Wunderkind Robotics Kit



# Project 1: Robo Sends Light Signals



## Robo's Story:

Some robots can speak and some cannot, but there are many different types of communication between robots, such as different light signals, secret codes or ciphers. Can our Robo speak? Can we teach it to create a cipher using the light signals?



## Project Goal: *Build and program Robo-Encoder*

**Keywords** *Cipher, encoder; even and odd numbers*

### 1 Robo -Encoder

**Modules** *Main Block, (RGB) Light*

### 2 Program different light signals

= *2, 4, 6, 8, 10 => even numbers*

= *1, 3, 5, 7, 9 => odd numbers*

### 3 / Create a code with light signals

= only even numbers

= only odd numbers

• Reverse the code

• How did you do that?

• Red, blue, = Even numbers

• Yellow, green = Odd numbers

→ → →

→ → →

→ → →

→ → →

## 4 Encode a message

### Cipher Key

- |                                 |                                  |
|---------------------------------|----------------------------------|
| 1 How are you?                  | 2 Hi!                            |
| 3 What is your name?            | 4 I am Robo!                     |
| 5 Do you want to play together? | 6 I want to be friends with you! |
| 7 What kind of robot are you?   | 8 I want to play together!       |
| 9 Do you want to learn math?    | 10 I am a very friendly robot.   |

### Messages

1. Hi! I am Robo! What is your name?

2 → 4 → 3

2. How are you? What is your name? I want to play together! Do you want to learn math?

1 → 3 → 8 → 9

3. I am a very friendly robot. I want to be friends with you! Do you want to play together?

10 → 6 → 5

4. I am Robo. I am a very friendly robot. What is your name? What kind of robot are you?

4 → 10 → 3 → 7

5. Your message Hi! How are you?  
Do you want to play together?

2 → 1 → 5

## 5 Create own cipher

### Cipher Key

- |                            |                    |
|----------------------------|--------------------|
| 1 do you like icecream?    | 2 I love icecream! |
| 3 Let's grab an icecream?! |                    |

### Messages

2 → 1 → 3

## What did I learn?

How to create a cipher.  
Even and odd numbers



# Project 2: Robo Decodes a Secret Message



## Robo's Story:

Robo received a cipher – a message from the other robots. There is a key for decoding it but Robo will need our help to do it.



**Project Goal:** *Build and program Robo-Decoder*

**Keywords** *Decoder, cipher, addition, subtraction*

## 1 Robo -decoder

**Modules** *Main Block, RGB Light*

## 2 Number of blinks

$1+3 = 4$

$7+1 = 8$

$10-1 = 9$

$2-1 = 1$

$2+3 = 5$

$4+2 = 6$

$9-3 = 6$

$7-4 = 3$

## 3 / Calculate and program

$\text{Target icon} \quad 4 \text{ times} + 2 \text{ times} + 1 \text{ time} + 3 \text{ times} =$

4 6 7 10

$\text{Light icon} \quad 10 \text{ times} - 3 \text{ times} - 2 \text{ times} - 2 \text{ times} =$

10 7 5 3

$\text{Target icon} \quad 4 \text{ times} + 1 \text{ time} - 2 \text{ times} + 5 \text{ times} + 2 \text{ times} - 5 \text{ times} =$

4 5 3 8 10 5

$\text{Target icon} \quad \text{each Action} + 2 \text{ sec} =$

1 3 5 7 9

$\text{Light icon} \quad \text{each Action} - 2 \text{ sec} =$

10 8 6 4 2

$\text{Light icon} = 3 + 1 + 6 - 1 = 3 \rightarrow 4 \rightarrow 10 \rightarrow 9$

$\text{Target icon} = 7 - 3 - 1 - 2 = 7 \rightarrow 4 \rightarrow 3 \rightarrow 1$

## 4 Decode a message

### Cipher Key

- 2 We are friendly robots.
- 4 Do you like traveling?
- 6 Visit us in Robot City!
- 8 Can you drive?
- 10 Do you know other robots?

- 1 We live in Robot City.
- 3 Do you want to be our new friend?
- 5 Hello Robo!
- 7 We want to be your new friends.
- 9 We hope to see you soon!

### Messages

1.  $2+3 = 5$     $1+1 = 2$     $6-5 = 1$  →

*Hello Robo! We are friendly robots.  
We live in Robot City.*

2.  $3+4 = 7$     $10-7 = 3$     $3+3 = 6$  →

*We want to be your new friends. Do you want  
to be our new friend? Visit us in Robot City!*

3.  $10-7+1 = 4$     $3+4-1 = 6$     $10-1-1 = 8$  →

*Do you like traveling? Visit us in Robot City!  
Can you drive?*

4.  $2+2-2 = 2$     $1+1+8 = 10$     $5-1+5 = 9$  →

*We are friendly robots. Do you know other  
robots? We hope to see you soon!*

5. **Your message**  $4 + 1 = 5$     $10-8 = 2$  →  
 $6 + 4 - 3 = 7$     $2 + 2 + 2 = 6$

*Hello Robo! We are friendly robots.  
Visit us in Robot City.*

## 5 / Create own cipher

- Cipher Key
- ① I will visit you in Robot City!
  - ② I want to be your friend!
  - ③ I am Robo
  - ④ Hi Robots!

### Messages

$10 - 6 = 4$     $1 + 2 = 3$

$10 - 2 - 6 = 2$     $6 + 2 - 7 = 1$

## What did I learn?

*What is decoder, cipher.  
Addition, subtraction*



# Project 3: Robo Decodes a Secret Map



## Robo's Story:

Robo received a secret message from the other robots - it's a map to Robot City. It is written in a special cipher and Robo needs to decode it.



**Project Goal:** *build and program Robo to decode a map*

**Keywords** *decode, code, multiplication*

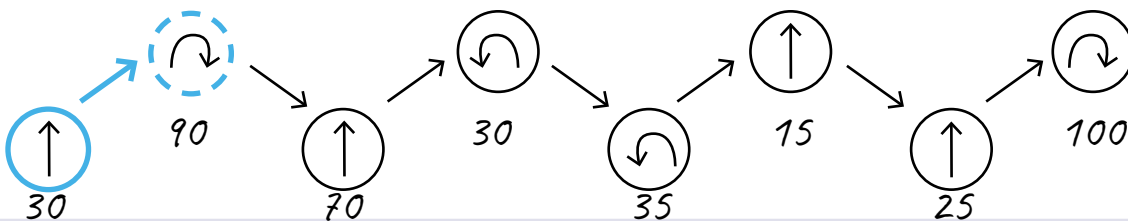
**1** **Robo** *-vehicle*

**Modules** *Main Block, 2 DC Motors, 2 Big Wheels, 1 Small Wheel*

**2** **Distance** **Angle**

$3 \times 5 =$ <b>15</b>	$5 \times 5 =$ <b>25</b>	$5 \times 6 =$ <b>30</b>	$7 \times 5 =$ <b>35</b>
$7 \times 10 =$ <b>70</b>	$10 \times 3 =$ <b>30</b>	$10 \times 9 =$ <b>90</b>	$10 \times 10 =$ <b>100</b>

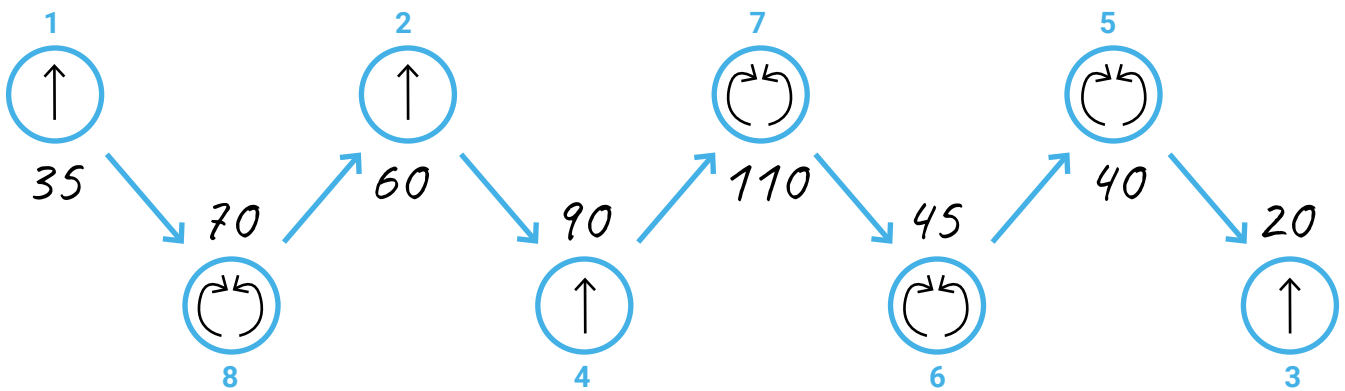
• **Connect** all Movement Actions into one code, draw a code



**3** / **Decode a map**

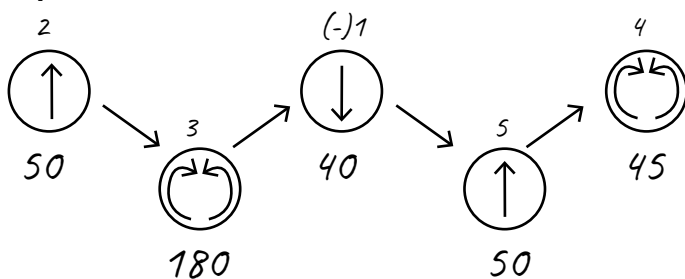
$7 \times 5 =$ <b>35</b> 1	$10 \times 6 =$ <b>60</b> 3	$5 \times 8 =$ <b>40</b> 5	$9 \times 5 =$ <b>45</b> 7
$5 \times 4 =$ <b>20</b> 2	$9 \times 10 =$ <b>90</b> 4	$11 \times 10 =$ <b>110</b> 6	$10 \times 7 =$ <b>70</b> 8

**4**  Draw a map you decoded, program a Robo-vehicle to perform it



**5**  /  Create own map

Map



Cipher

- ①  $20 \times 2 = 40$
- ②  $90 \times 2 = 180$
- ③  $25 \times 2 = 50$
- ④  $4 \times 5 = 20$
- ⑤  $10 \times 5 = 50$

 **What did I learn?**

*How to decode a map.  
Multiplication*



# Project 4: Robo Travels to Robot City



## Robo's Story:

Robo wants to travel to Robot City and meet other robots



**Project Goal:** *build and program Robo to travel to Robot City*

**Keywords** *map, code, division*

1



**Robo** *-traveller*

*Main Block, 2 DC Motors, 2 Big Wheels,*

**Modules** *1 Small Wheel, RGB Light*

2



**Distance**



**Angle**



$80 \div 2 =$

40

$180 \div 3 =$

60



$90 \div 3 =$

30

$280 \div 4 =$

60

$100 \div 5 =$

20

$1200 \div 60 =$

20

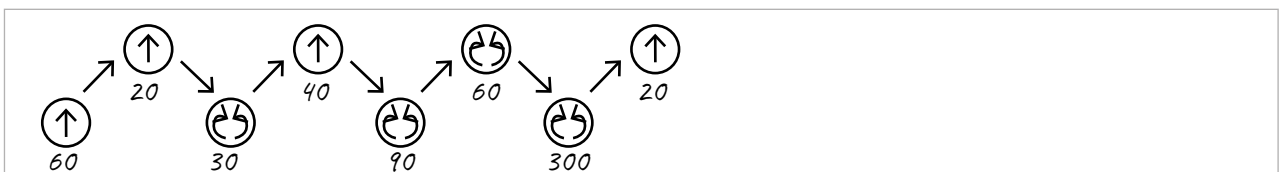
$180 \div 2 =$

90

$6000 \div 20 =$

300

• **Connect** all Movement Actions into one code, draw a code



3



**Decode a map and travel**



$70 \div 2 =$

35

$1400 \div 20 =$

70



$80 \div 8 =$

10

$1800 \div 30 =$

60

$100 \div 4 =$

20

$9000 \div 100 =$

90

$90 \div 2 =$

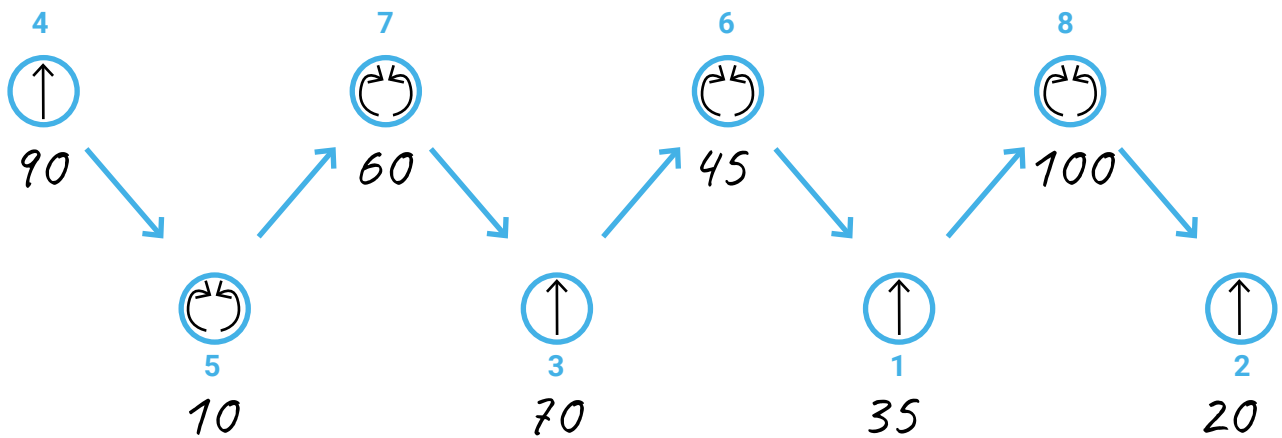
45

$1000 \div 10 =$

100

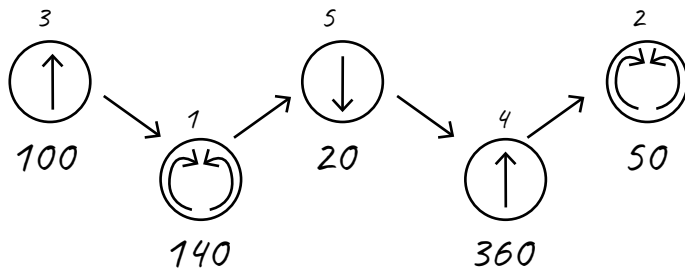


**4**  Draw a map you decoded, program your Robo to perform it



**5**  /  Create your own map

Map



Cipher

- ①  $280 : 2 = 140$
- ②  $200 : 4 = 50$
- ③  $300 : 3 = 100$
- ④  $720 : 2 = 360$
- ⑤  $100 : 5 = 20$

 **What did I learn?**

*Map code, division*



# Project 5: Robo Travels to Robot City



## Robo's Story:

Robo arrives in Robot City, ready to meet other robots. It will need to make different light signals, sounds and movements to decode and encode ciphers and communicate with other robots.



**Project Goal:** *build and program Robo to communicate with other robots*

## Keywords

*communication, signals, addition, subtraction, multiplication, division*

1



**Robo** *can communicate*

*Main Block, 2 DC Motors, 2 Big Wheels,*

**Modules** *1 Small Wheel, RGB Light*

2



= Ordinal Number



= Lifespan



= Distance



= Angle



$3+4 = 7$



$7+1 = 8$



$50+30 = 80$



$10+60 = 70$

$15-6 = 9$

$18-17 = 1$

$100-40 = 60$

$90-75 = 15$

$2 \times 2 = 4$

$3 \times 3 = 9$

$11 \times 5 = 55$

$10 \times 10 = 100$

$15 \div 5 = 3$

$45 \div 7 = 5$

$90 \div 9 = 10$

$150 \div 3 = 50$

• **Connect** all Actions into one code.

3



**Solve all challenges and complete Robo cipher**



$6+1 = 7$

1



$6+4-1 = 9$

5



$90-5-5 = 80$

9



$50+20+20 = 90$

13

$10-5 = 5$

2

$3-2+6 = 7$

6

$45+5+25 = 75$

10

$300-40+20 = 280$

14

$1 \times 1 = 1$

3

$2 \times 2 \times 2 = 8$

7

$4 \times 5 \times 2 = 40$

11

$12 \div 2 \times 10 = 60$

15

$16 \div 2 = 8$

4

$90 \div 3 \div 10 = 3$

8

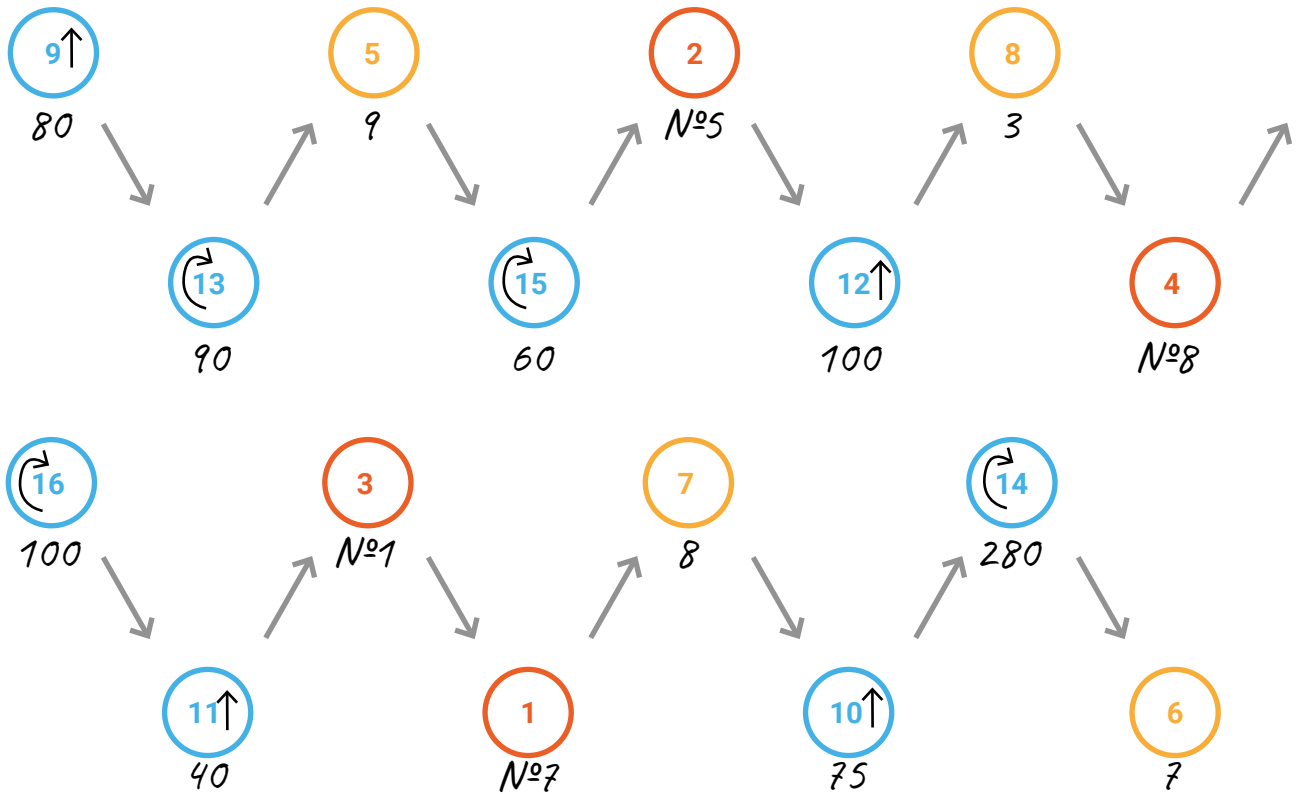
$600 \div 3 \div 2 = 100$

12

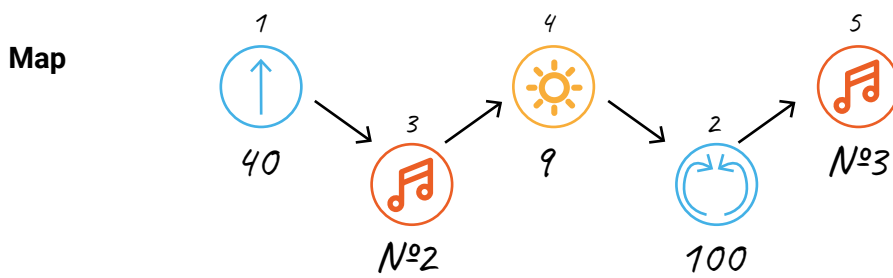
$150 \times 2 \div 3 = 100$

16

#### 4 Complete the Robo cipher and program your Robo to perform it



#### 5 / Create your own map



Cipher

①	$280 : 2 = 140$	④	$720 : 2 = 360$
②	$200 : 4 = 50$	⑤	$100 : 5 = 20$
③	$300 : 3 = 100$		

#### What did I learn?

How to communicate with different robots.  
Addition, subtraction, multiplication, division.

