CMS
FIRST Tech Challenge

電機課程

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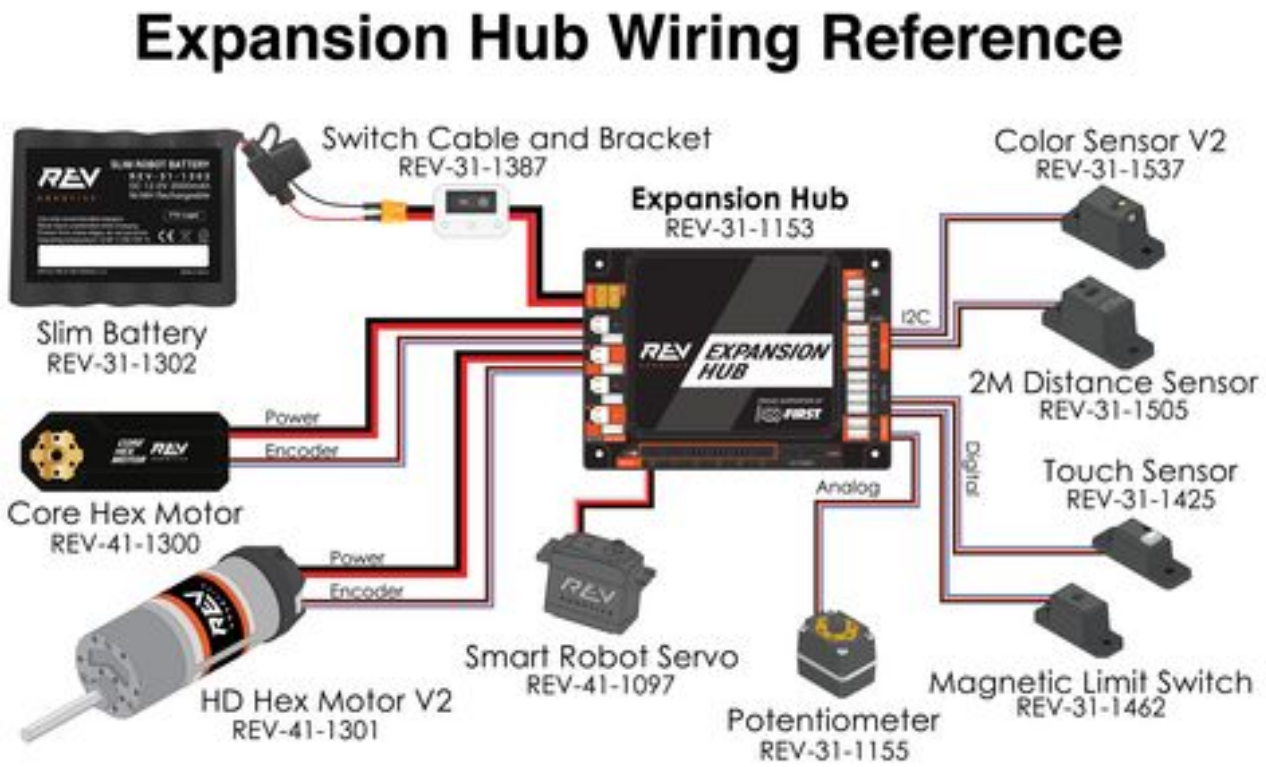
什麼是電機?

- 機械與程式之間的橋樑
- 機器人套件、遙控套件

REV主機


Expansion Hub Wiring Reference
Switch Cable and Bracket
REV-31-1387
Expansion Hub
REV-31-1153
Color Sensor V2
REV-31-1537
Slim Battery
REV-31-1302
I2C
2M Distance Sensor
REV-31-1505
Power
Encoder
Core Hex Motor
REV-41-1300
Digital
Touch Sensor
REV-31-1425
Analog
Power
Encoder
Smart Robot Servo
REV-41-1097
HD Hex Motor V2
REV-41-1301
Potentiometer
REV-31-1155
Magnetic Limit Switch
REV-31-1462

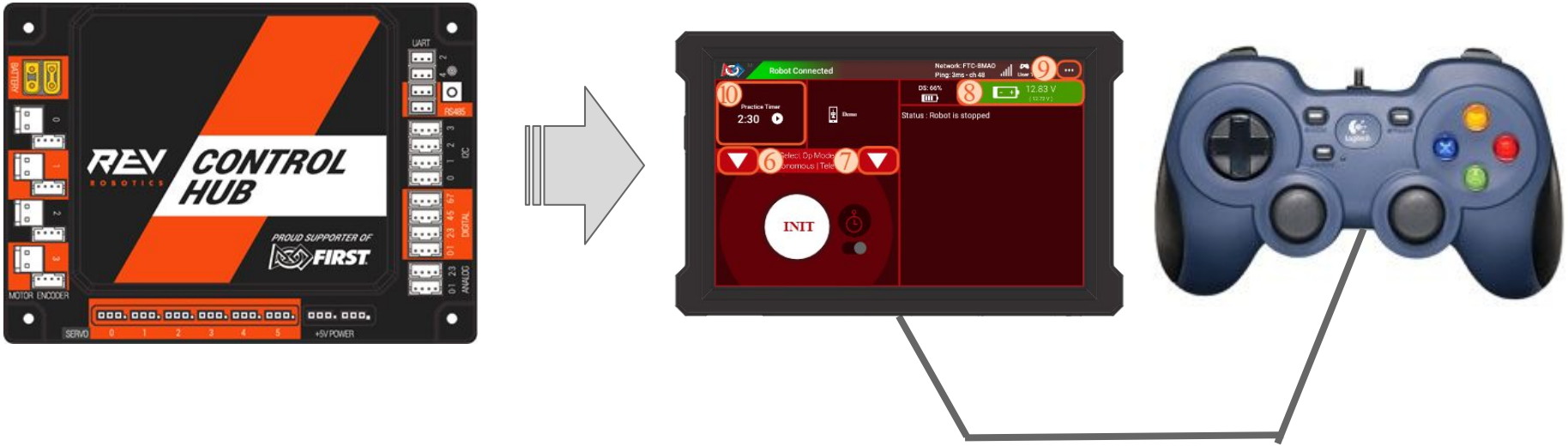
三代電機組合－第一代

三代電機組合－第二代

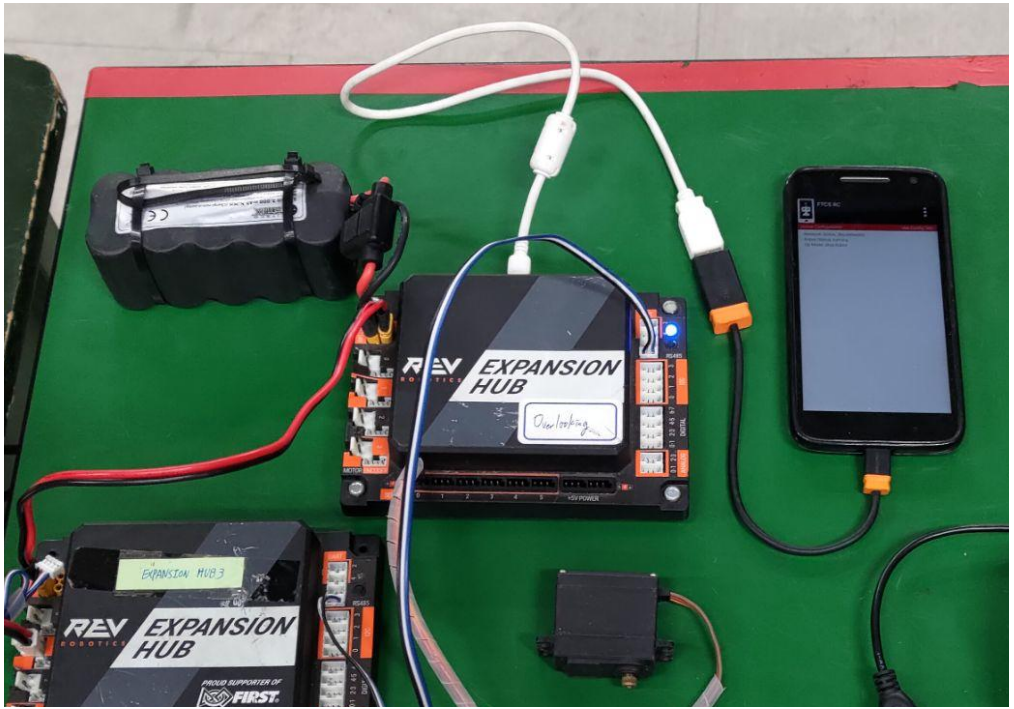
REV
ROBOTICS
CONTROL HUB
PROUD SUPPORTER OF
FIRST
UART
RS485
I2C
DIGITAL
ANALOG
BATTERY
MOTOR ENCODER
SERVO
+5V POWER

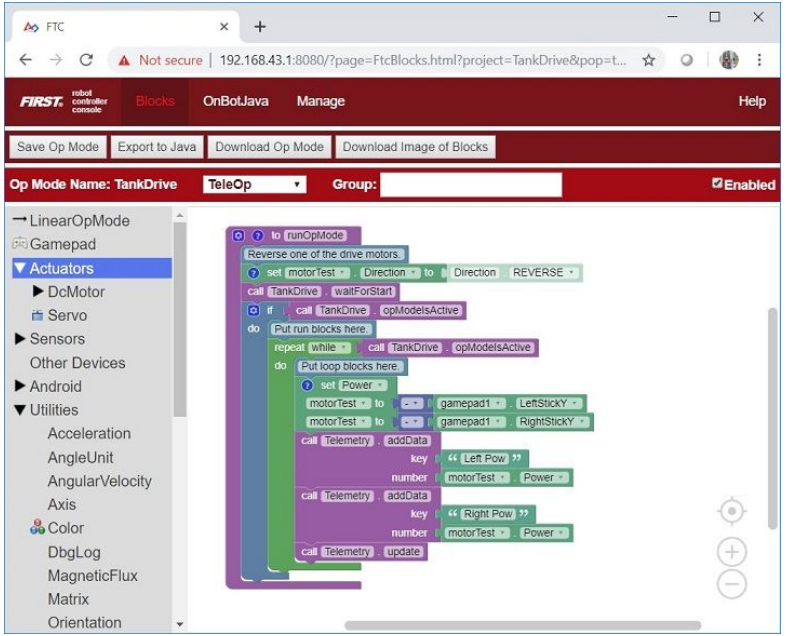
INIT

三代電機組合－第三代

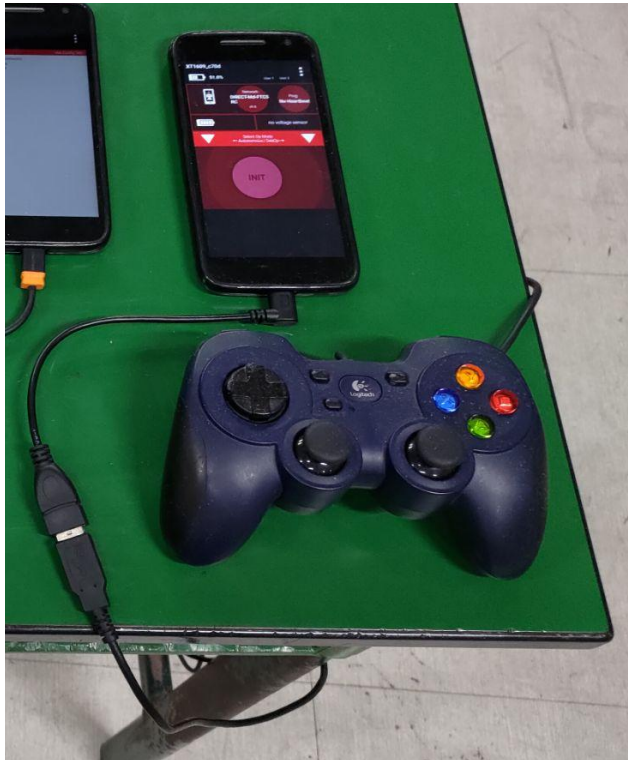

REV ROBOTICS
CONTROL HUB
PROUD SUPPORTER OF FIRST
Robot Connected
Practice Timer
2:30
INIT
Status : Robot is stopped
12.83 V

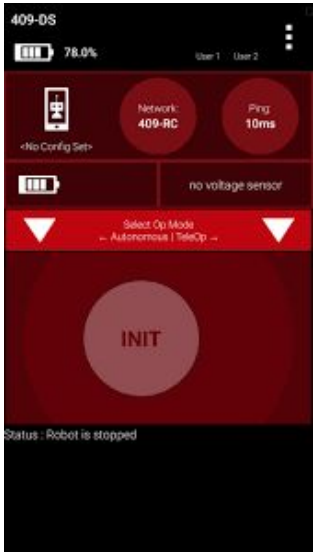
機器人套件 連線教學


REV
EXPANSION
HUB
REV
EXPANSION
HUB


FTC
Not secure | 192.168.43.1:8080/?page=FtcBlocks.html?project=TankDrive&pop=t...
FIRST robot controller console
Blocks
OnBotJava
Manage
Help
Save Op Mode
Export to Java
Download Op Mode
Download Image of Blocks
Op Mode Name: TankDrive
TeleOp
Group:
Enabled
LinearOpMode
Gamepad
Actuators
DcMotor
Servo
Sensors
Other Devices
Android
Utilities
Acceleration
AngleUnit
AngularVelocity
Axis
Color
DbgLog
MagneticFlux
Matrix
Orientation
to runOpMode
Reverse one of the drive motors.
set motorTest Direction to Direction REVERSE
call TankDrive waitForStart
if call TankDrive opModeIsActive
do Put run blocks here.
repeat while call TankDrive opModeIsActive
do Put loop blocks here.
set Power
motorTest to - gamepad1 LeftStickY
motorTest to - gamepad1 RightStickY
call Telemetry addData
key "Left Pow"
number motorTest Power
call Telemetry addData
key "Right Pow"
number motorTest Power
call Telemetry update

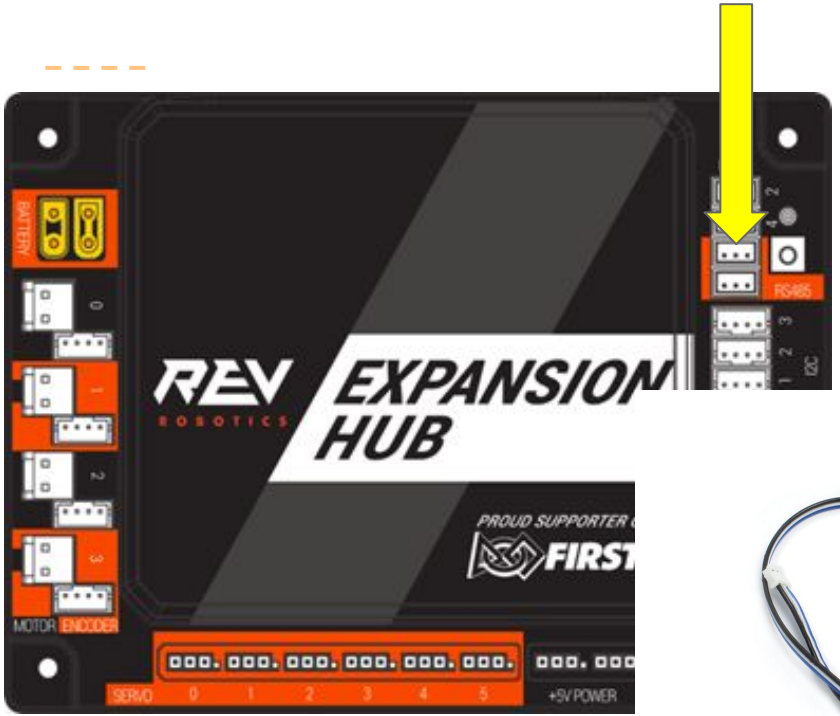
遙控套件 連線教學

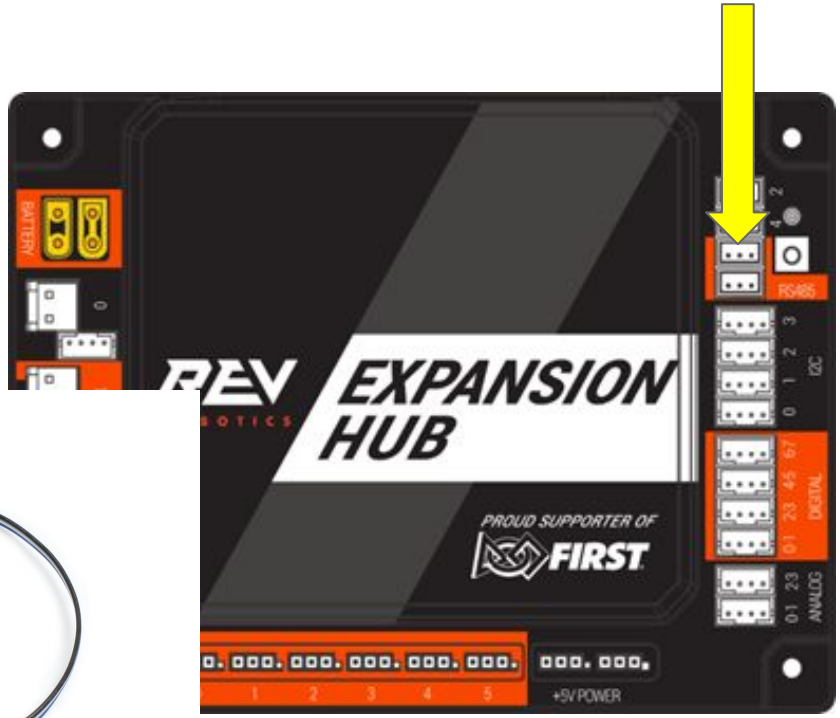



409-DS
78.0%
User 1
User 2
Network:
409-RC
Ping:
10ms
<No Config Set>
no voltage sensor
Select Op Mode
← Autonomous | TeleOp →
INIT
Status : Robot is stopped

ZTF-041
Wifi Direct
ZTF-042
Ping
3ms
55.0%
no voltage sensor
30
Status: Robot is stopped

10247-B-DS
89.0%
User 1
User 2
esky
Network:
10247-B-RC
Ping:
1ms
1.0%
no voltage sensor
Loop Timer 1
Warning: unable to open Modern Robotics USB DC Motor Controller [AL00VW69]
Status : 0.089 msecs





JST PH 3-pin Communication Cable

Driver Station

Team 1
Driver 1

Team 1
Driver 2

WiFi Direct Connection

Robot Controller

Expansion Hub

Set up Phone and Control HUB, then link them.

Laptop

Wi-Fi Direct

Robot Controller

CONFIGURING AND PROGRAMMING THE STARTER BOT

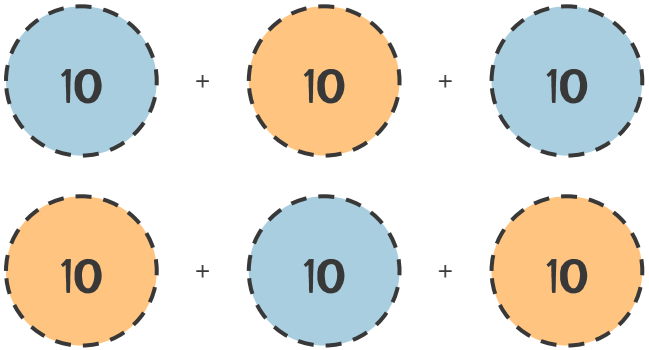
REV ROBOTICS

PROBLEM SOLVING AND MATHEMATICAL REASONING

Useful tip

Add the first number by the times the second number indicates

Example: 10 x 6

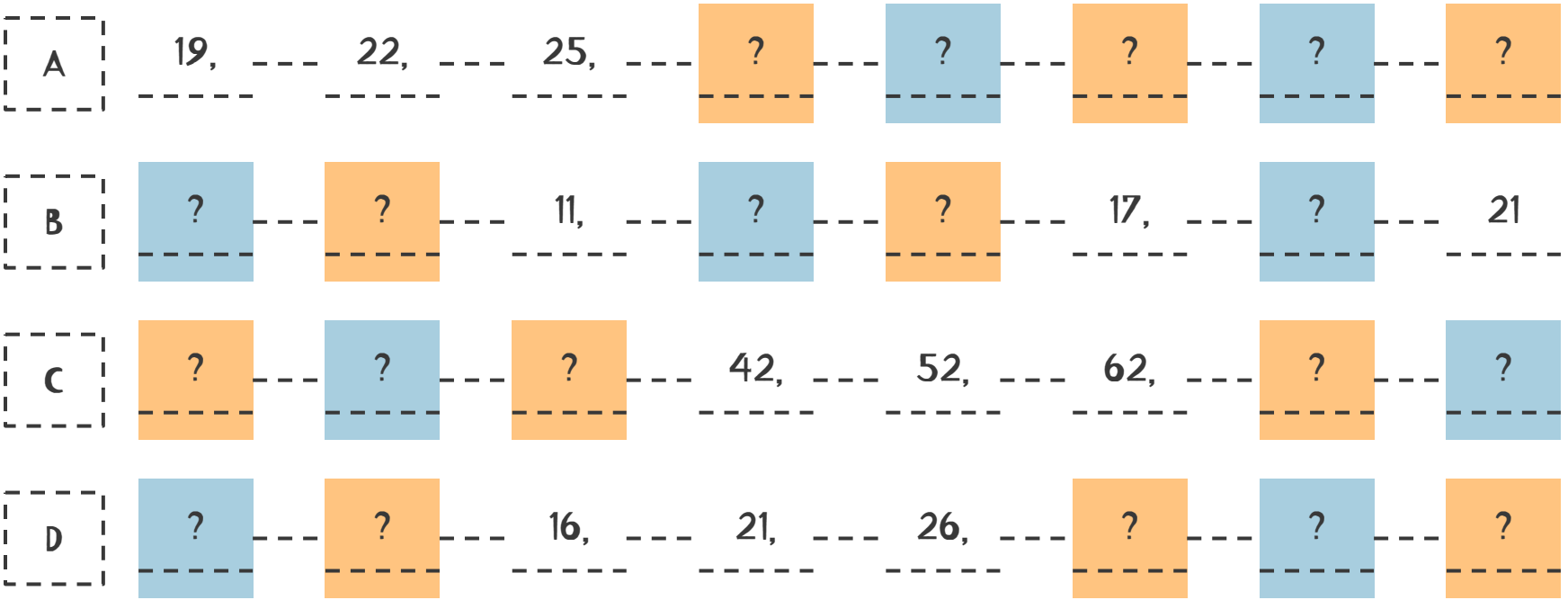


Instructions: answer correctly the following multiplications

1. 10 x 7 = Answer
2. 3 x 5 = Answer
3. 7 x 1 = Answer
4. 7 x 2 = Answer

PROBLEM SOLVING AND MATHEMATICAL REASONING

Instructions: complete the skip counting series



PROBLEM SOLVING AND MATHEMATICAL REASONING

Problem

The Sun is the star at the center of the Solar System

Try out A

Jupiter is the biggest planet in the Solar System

Try out B

Saturn is a gas giant and has several rings

Try out C

Neptune is the farthest planet from the Sun

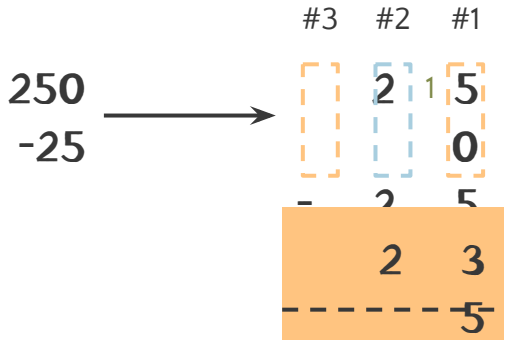
PROBLEM SOLVING AND MATHEMATICAL REASONING

Instructions: complete the exercises

36 +4	26 -11	187 +17	232 +13	8 +4
Xx	Xx	Xx	Xx	Xx
30 +3	13 -6	10 +19	152 +8	30 -3
Xx	Xx	Xx	Xx	Xx

Read this if you need help!

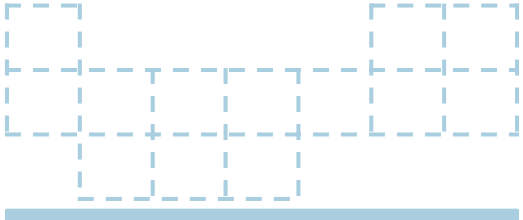
When subtracting any number, do it by rows. If there is a "0", add an imaginary "1" in front of it



PROBLEM SOLVING AND MATHEMATICAL REASONING

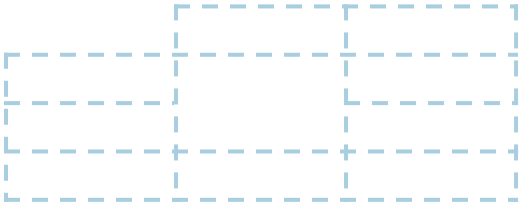
Instructions: find the area of the shapes below. Write your answer on the line

Your answer here



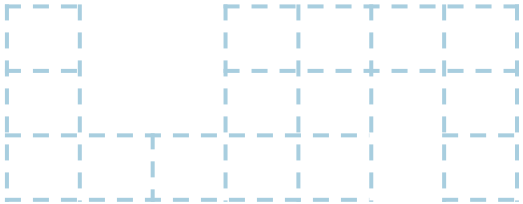
Your answer here

Your answer here



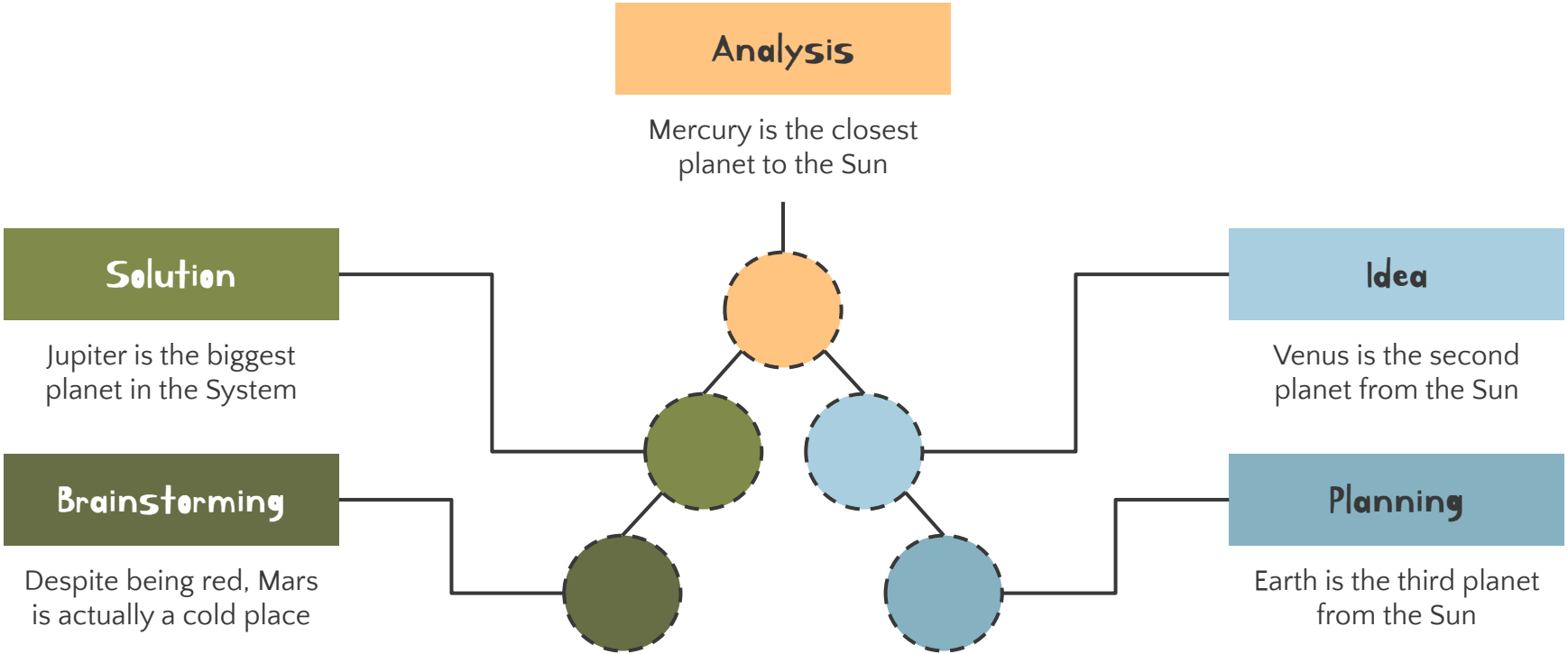
Your answer here

Your answer here



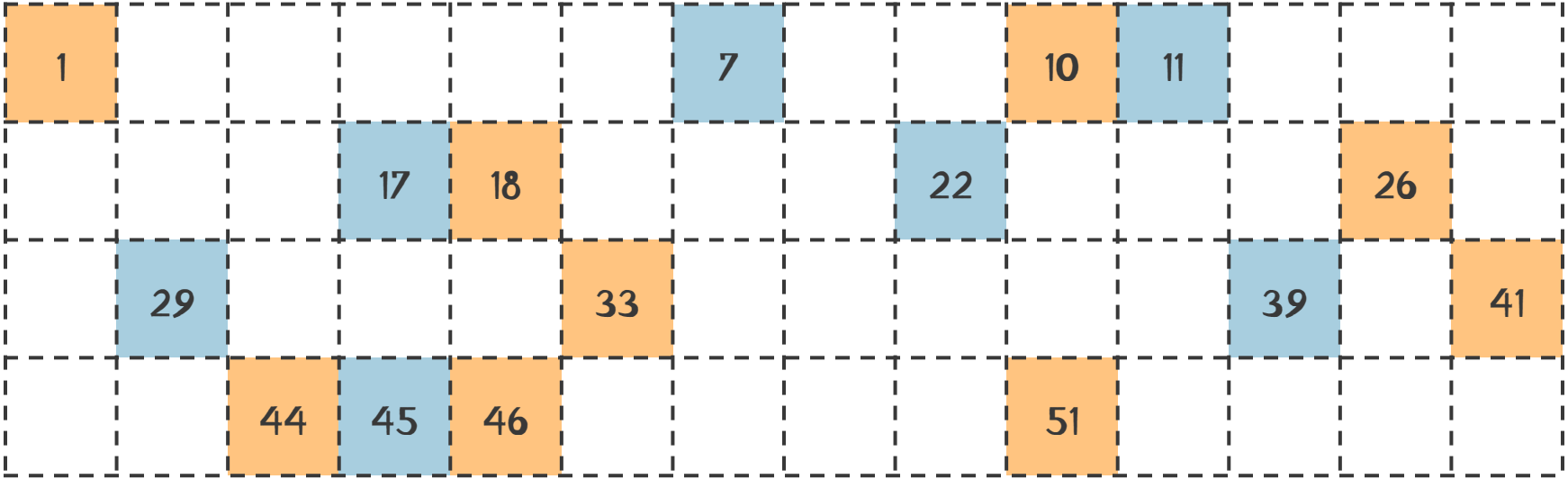
Your answer here

PROBLEM SOLVING AND MATHEMATICAL REASONING



PROBLEM SOLVING AND MATHEMATICAL REASONING

Instructions: starting at 1, fill in the missing numbers

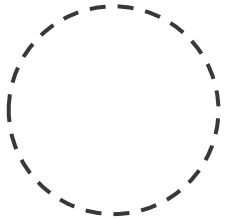


Tip: remember to count the numbers and fill in the spaces, one by one

PROBLEM SOLVING AND MATHEMATICAL REASONING

Before you start, count the sides of each object

Instructions: name correctly the following shapes

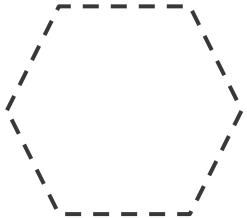


Your answer here

Mercury is the smallest one in the Solar System

Your answer here

Venus is the second planet from the Sun



Your answer here

Earth is the only planet that harbors life

PROBLEM SOLVING AND MATHEMATICAL REASONING

Instructions: make your calculations and find the answer

(+19) + (+11) =

Answer

(+15) – (–5) =

Answer

(+3) + (+12) =

Answer

(–15) + (+7) =

Answer

(+6) + (+21) =

Answer

(–10) + (+33) =

Answer

(–18) – (–6) =

Answer

(–10) – (+22) =

Answer

(+20) + (+12) =

Answer

Remember always

Equal signs result in the same sign. If one is positive and the other negative, the answer will be negative

Equal signs

(+4) + (+4) = 8

(–4) + (–4) = –8

Different signs

(+4) + (–4) = 0

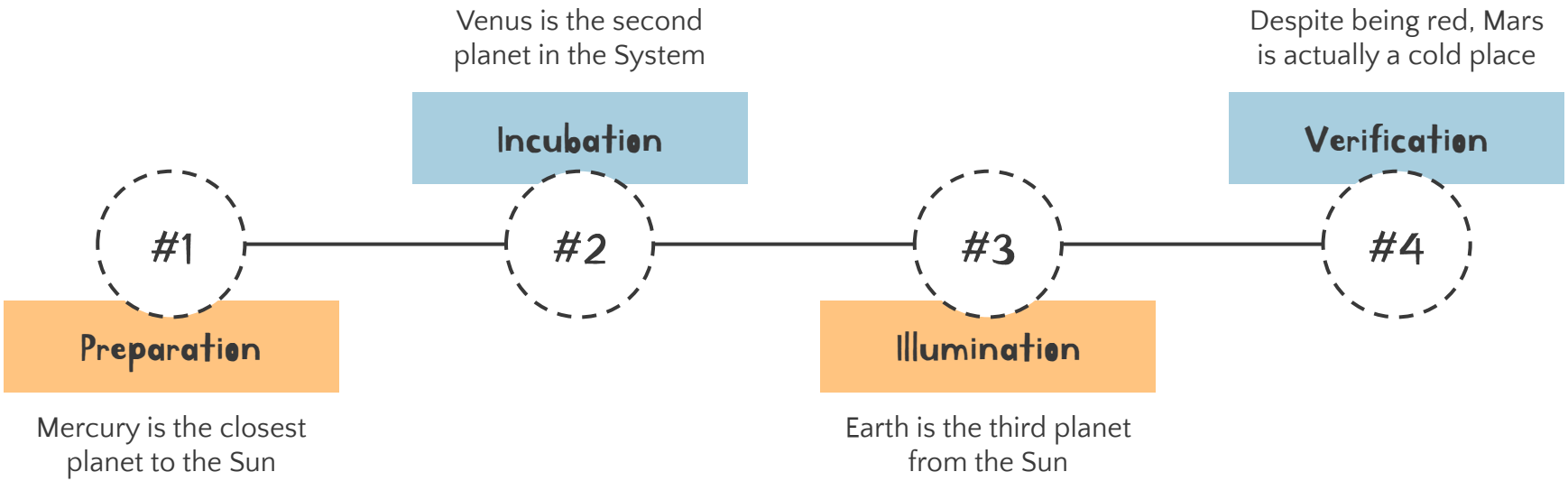
(+4) – (–8) = –4

PROBLEM SOLVING AND MATHEMATICAL REASONING

Instructions: multiply the following numbers

Problem	2 x 1	3 x 30	3 x 6	1 x 7
Answer	3 x 10	3 x 1	3 x 4	1 x 5
Problem	2 x 4	2 x 7	1 x 1	2 x 5
Answer	1 x 4	2 x 2	1 x 7	10 x 10
Problem	3 x 5	5 x 6	3 x 2	2 x 4
Answer	8 x 8	9 x 6	3 x 3	5 x 10

PROBLEM SOLVING AND MATHEMATICAL REASONING



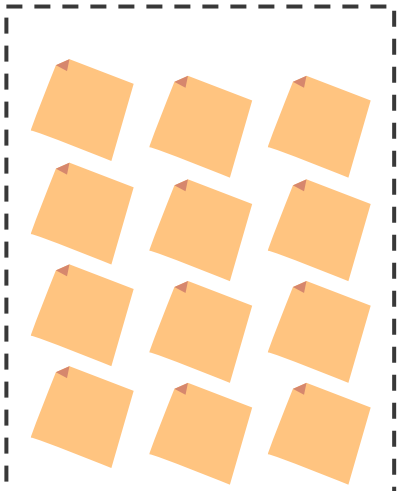
PROBLEM SOLVING AND MATHEMATICAL REASONING

Instructions: Add the pictures and write your answer in the placeholder

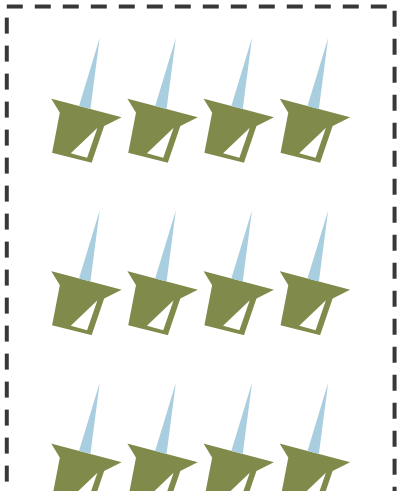
Checklist

Use this checklist to add the pictures correctly

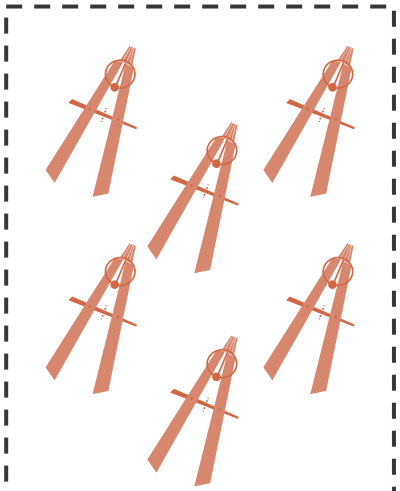
1. Count the images shown
2. Recount and make sure of it
3. Write your correct answer



Answer



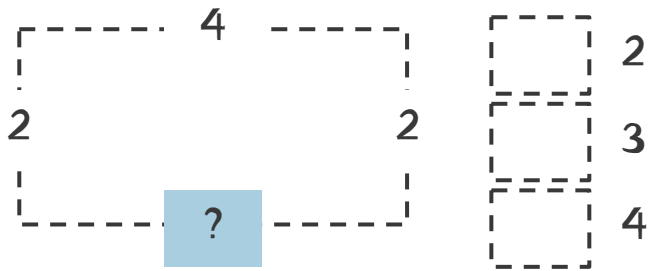
Answer

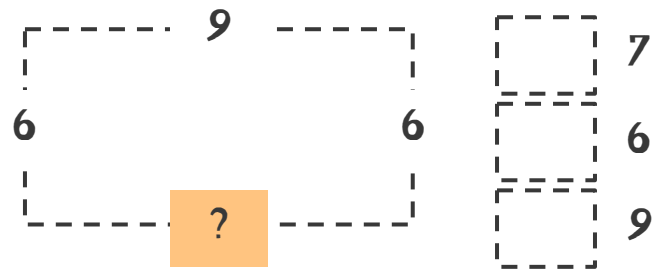


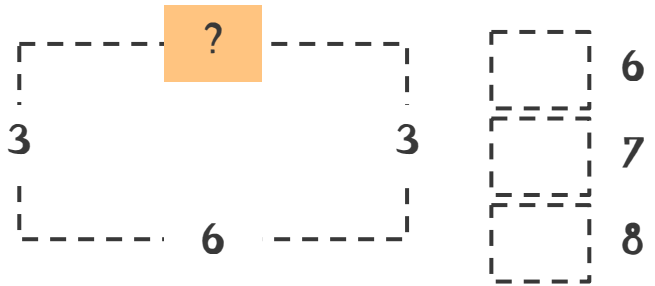
Answer

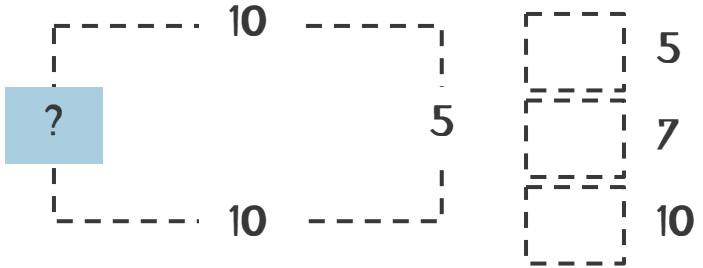
PROBLEM SOLVING AND MATHEMATICAL REASONING

Instructions: look at the picture and check the box for the missing length



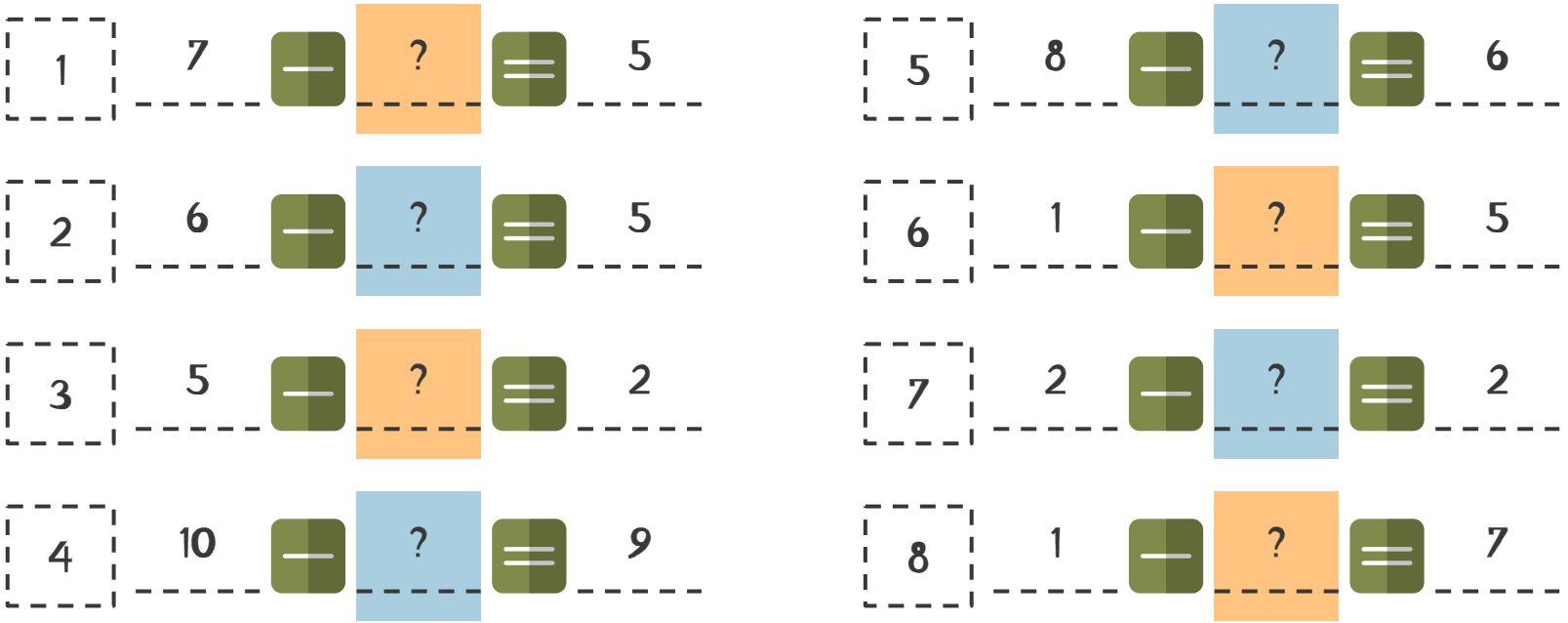






PROBLEM SOLVING AND MATHEMATICAL REASONING

Instructions: locate missing adding numbers



PROBLEM SOLVING AND MATHEMATICAL REASONING

Instructions: find the correct answer and have fun!

1	10+10 =	Answer
2	30+30 =	Answer
3	20+20 =	Answer
4	50+50 =	Answer
5	60+60 =	Answer
6	70+70 =	Answer
7	80+80 =	Answer

Useful tip for mathletics

For quicker results, remove the “0” in the numbers, add them, and add the “0” you removed in your answer

100 + 100
~~100~~ + ~~100~~
1 + 1

200

90 + 90
~~90~~ + ~~90~~
9 + 9

180

PROBLEM SOLVING AND MATHEMATICAL REASONING

Instructions: use place value to understand how to add the numbers

1. 42 + 3 = ? + 3

   ? = ?

2. 29 + 50 = ? + 9

   ? = ?

3. 67 + 23 = ? + 10

   ? = ?

4. 19 + 38 = ? + 17

   ? = ?

PROBLEM SOLVING AND MATHEMATICAL REASONING

Remember to: (+) is “add” or “more than” and (–) is “subtract” or “less than”

1. What is 100 more than 64?

Answer

2. What is 100 less than 79?

Answer

2. Write down in words “120”

Answer

3. Count in steps of 8 from 32

Answer

4. Count in steps of 5 from 50

Answer

5. What is six hundred in digits?

Answer

PROBLEM SOLVING AND MATHEMATICAL REASONING

Instructions: find a 2x5 lego cube, 1 ball of cotton and 1 leaf. Then, answer the questions

	Lego block	Ball cotton	Leaf
Small pencil case	10	40	80
Medium pencil case	30	80	100
Large pencil case	100	200	500

PROBLEM SOLVING AND MATHEMATICAL REASONING

Something that may be useful for you

The formula for a rectangle's area is *A = length x width*

Instructions: work out the area of the following rectangles. They are not to scale

1.

Area = ? square cm

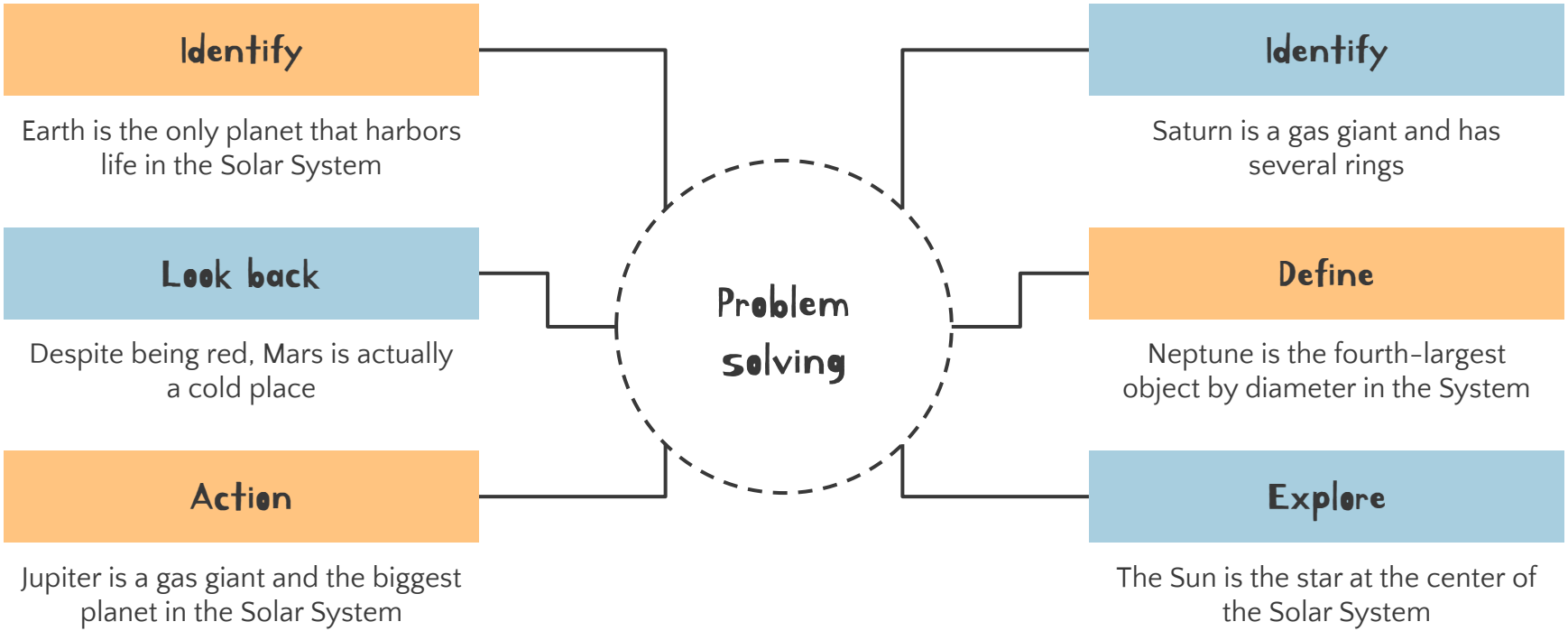
2.

Area = ? square cm

3.

Area = ? square cm

PROBLEM SOLVING AND MATHEMATICAL REASONING



PROBLEM SOLVING AND MATHEMATICAL REASONING

Instructions: find the path from 1 to 10

4	5	6	7	8	5
3	10	7	9	10	6
2	9	8	8		
1	2	3	7		
1	2	5	6		
2	3	4	5		
2	1				

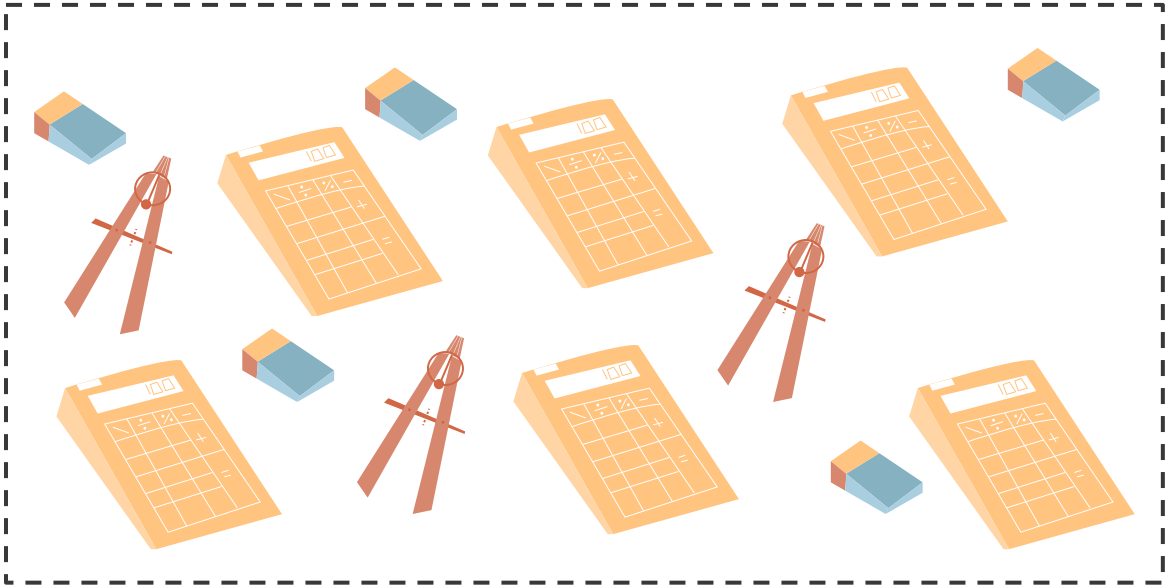
PROBLEM SOLVING AND MATHEMATICAL REASONING

Instructions: color in blue the group of numbers that add up to 10

7	8	2	1	4	4	2	4	8	9	7	0	1	7	2	4
7	3	7	8	9	1	5	7	3	4	1	7	3	4	7	7
3	2	3	2	7	8	4	3	4	6	9	1	0	7	1	2
3	4	3	6	7	8	9	0	1	2	3	4	5	1	8	9
0	0	0	8	6	1	3	4	2	2	8	9	7	6	2	2
1	2	3	4	5	6	7	3	5	9	7	8	6	3	4	5
7	8	7	8	7	8	7	3	7	2	0	1	2	3	1	1

PROBLEM SOLVING AND MATHEMATICAL REASONING

Instructions: count the elements of the box



? Compass

? Calculator

? Eraser

Count each object separately and then fill in the boxes with the question mark

PROBLEM SOLVING AND MATHEMATICAL REASONING

Mercury is the smallest planet in the Solar System

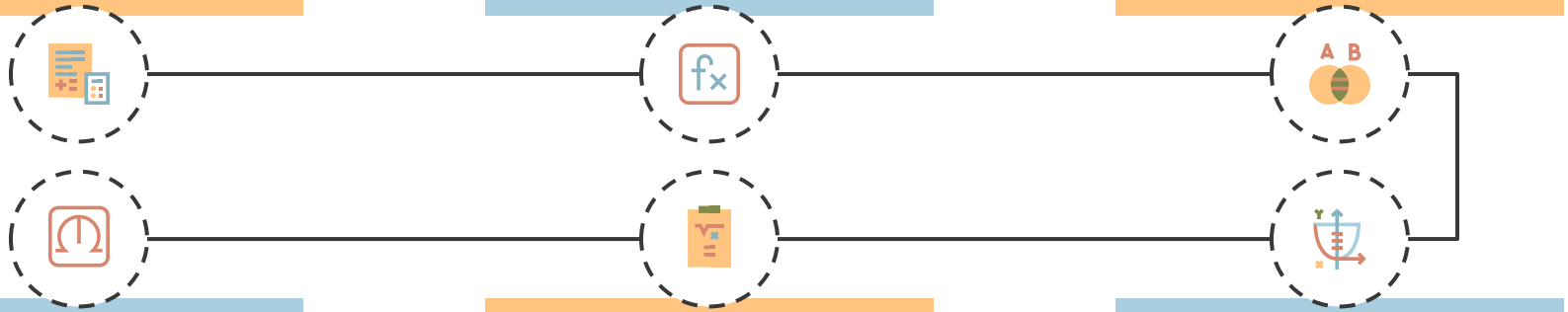
Orientation

Venus is the second planet from the Sun

Preparation

Earth is the only planet that harbors life

Analysis



Verification

Saturn is a gas giant and has several rings

Synthesis

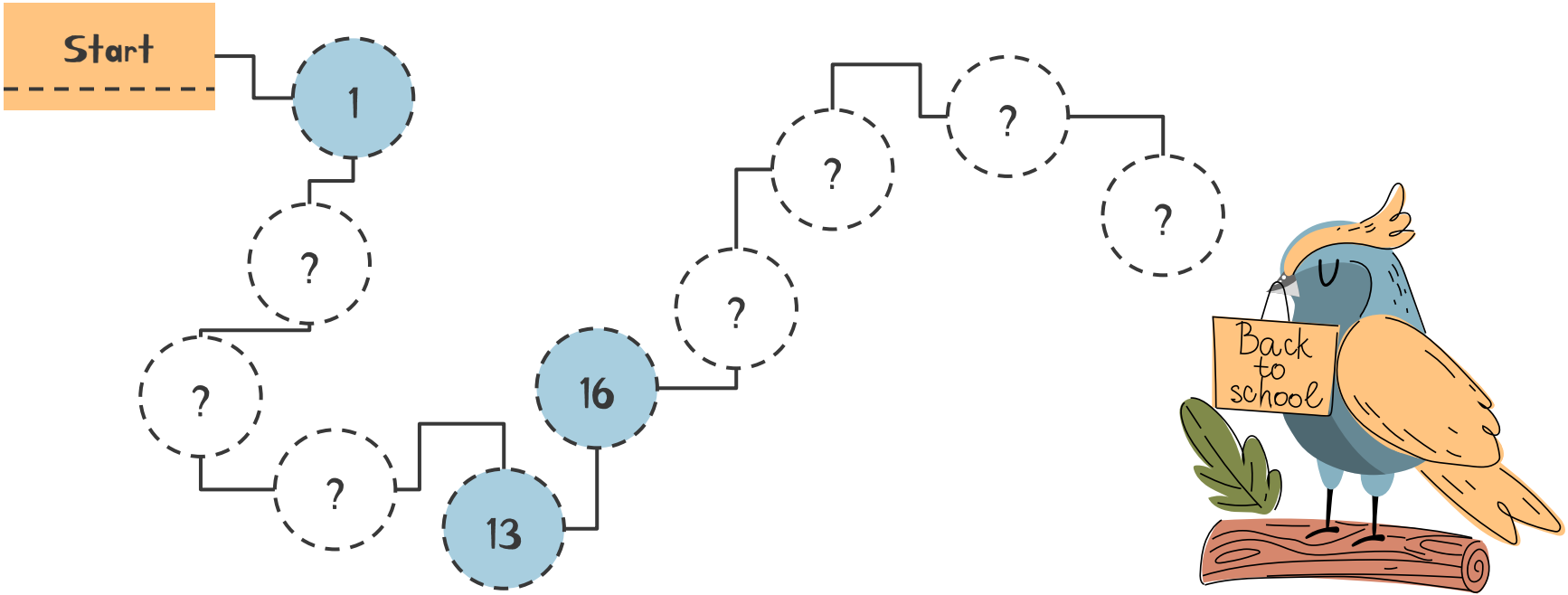
Jupiter is a gas giant and the biggest planet in the System

Hypothesis

Despite being red, Mars is actually a cold place

PROBLEM SOLVING AND MATHEMATICAL REASONING

Instructions: write the missing numbers



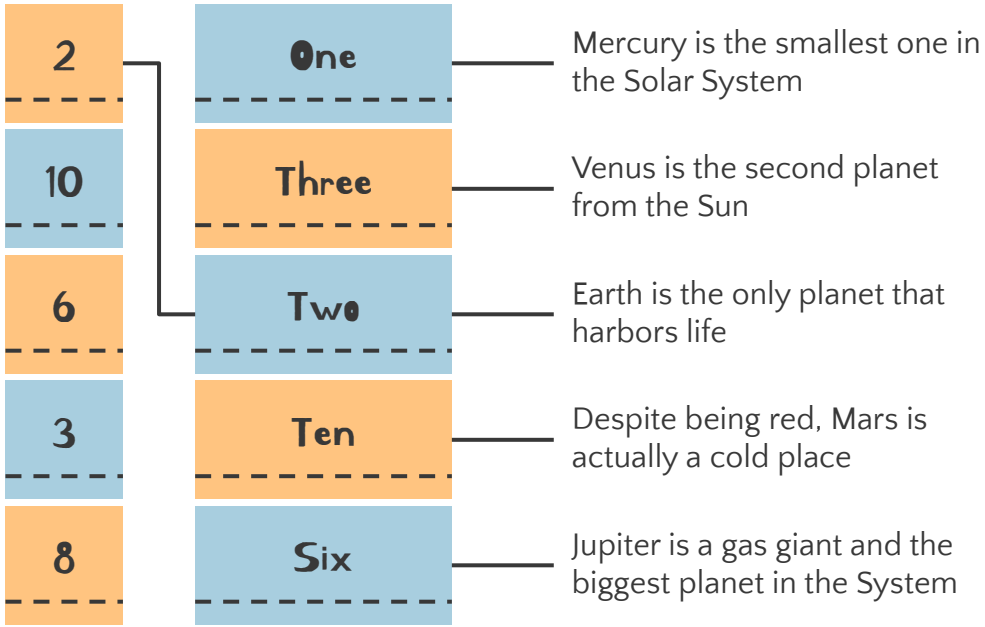
PROBLEM SOLVING AND MATHEMATICAL REASONING

Useful tip

Prepare a sheet of paper with digit and written numbers

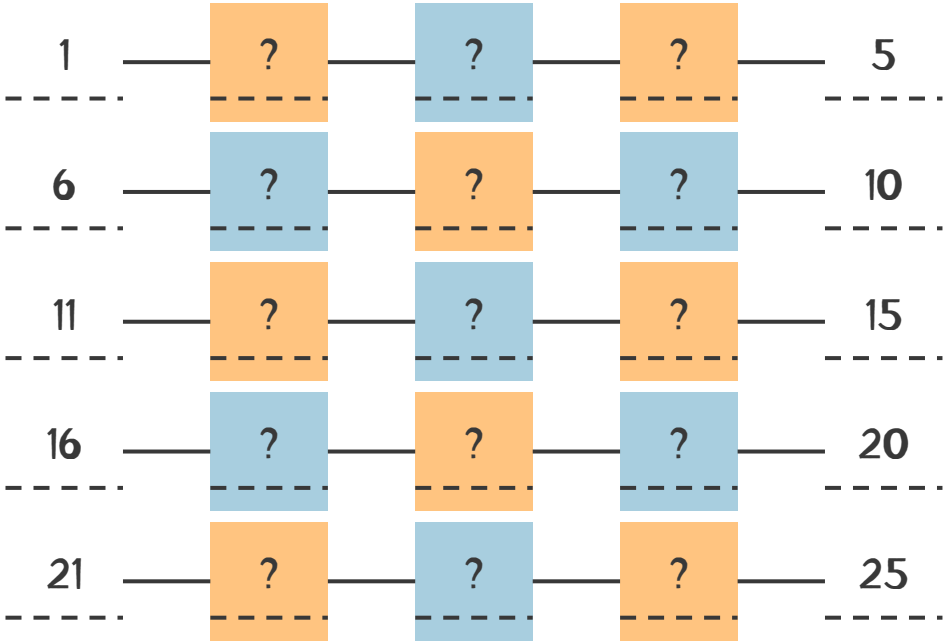
#20	Twenty
#21	Twenty one
#22	Twenty two

Instructions: match the correct number to its text box



PROBLEM SOLVING AND MATHEMATICAL REASONING

Instructions: write each missing number



PROBLEM SOLVING AND MATHEMATICAL REASONING

Instructions: true or false? Color the box with its corresponding color!

1.	10 < 8	?	2.	7 = 8	?	3.	2 = 2	?
4.	4 < 5	?	5.	4 > 2	?	6.	8 > 7	?
7.	1 < 0	?	8.	4 < 3	?	9.	1 = 1	?

PROBLEM SOLVING AND MATHEMATICAL REASONING

Cheat sheet: “>” means greater than | “<” means less than | “=” means equal to

Color >, <, or =		
36	<	40
	>	
	=	
19	<	11
	>	
	=	

Circle >, <, or =		
32	<	21
	>	
	=	
52	<	22
	>	
	=	

PROBLEM SOLVING AND MATHEMATICAL REASONING

Instructions: find the number 2 and color it

Something that may be useful for you

Remove the circles with other numbers to find the “2” more easily!

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- **Change the color** by clicking on the paint bucket.
- Then **resize** the element by clicking and dragging one of the square-shaped points of its bounding box (the cursor should look like a double-headed arrow). Remember to hold Shift while dragging to keep the proportions.
- **Group** the elements again by selecting them, right-clicking and choosing “Group”.
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