Spark of Math

Answer Key

Book 3

Dar
CHAD AL AJYAL
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Spark of Math

Answer Key
Book 3

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Contents

Unit 1 Working with 4-Digit Numbers

(1-1) 4-Digit Numbers	6
(1-2) Numbers in Words	11
(1-3) Comparing Numbers	12
(1-4) Problem Solving	15
Show Your Turn	16

Unit 2 Mathematical Operations

(2-1) Addition	20
(2-2) Subtraction	24
(2-3) Multiplication	27
(2-4) Division	31
(2-5) Problem Solving	34
Show Your Turn	35

Unit 3 Fractions

(3-1) Identifying Fractions	38
(3-2) Adding Fractions with Like Denominators	41
(3-3) Subtracting Fractions with Like Denominators	43
(3-4) Problem Solving	45
Show Your Turn	46

Unit 4 Measurement

(4-1) Mass	50
(4-2) Volume	52
(4-3) Time	54
(4-4) The Islamic Calendar	57
(4-5) Money	58
(4-6) Problem Solving	59
Show Your Turn	60

Unit 5 Geometry and Patterns

(5-1) Shapes	64
(5-2) Solid Shapes	67
(5-3) Geometric Patterns	70
(5-4) Number Patterns	71
(5-5) Problem Solving	73
Show Your Turn	74

Unit 1

Working with 4-Digit Numbers

Vocabulary

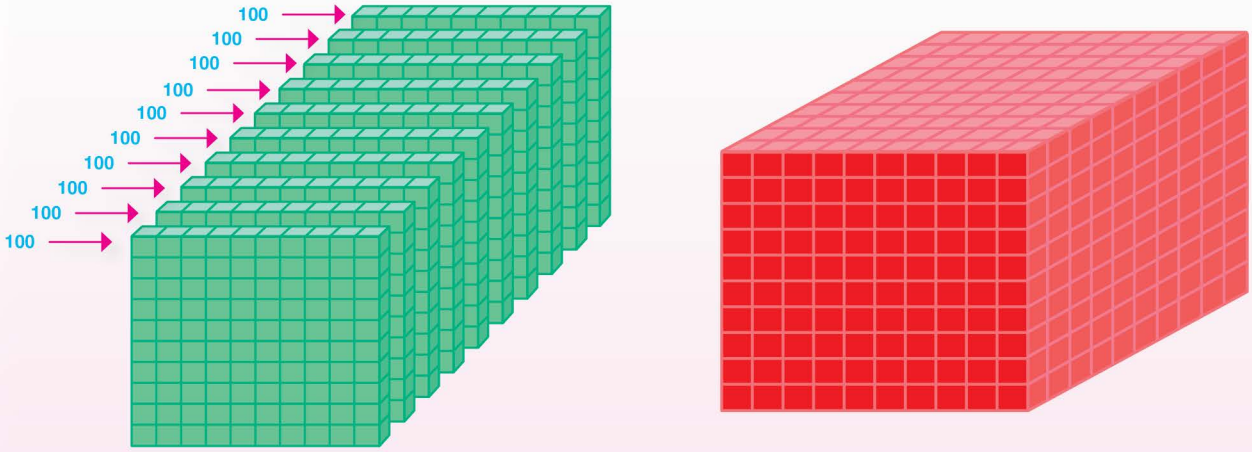
- ones
- tens
- hundreds
- thousands
- expanded form
- ascending
- descending

Objectives

Upon completion of this unit, you will be able to:

- Read and write down 4-digit numbers.
- Analyze numbers up to 4 digits.
- Write down numbers in words.
- Write down 4-digit numbers in expanded form.
- Arrange numbers in ascending and descending order.

(1-1) 4-Digit Numbers



10 Hundred = 1 Thousand

A thousand is written as 1000 or 1,000.

The comma is used to separate the "1" from the other three digits, making it easier to read.

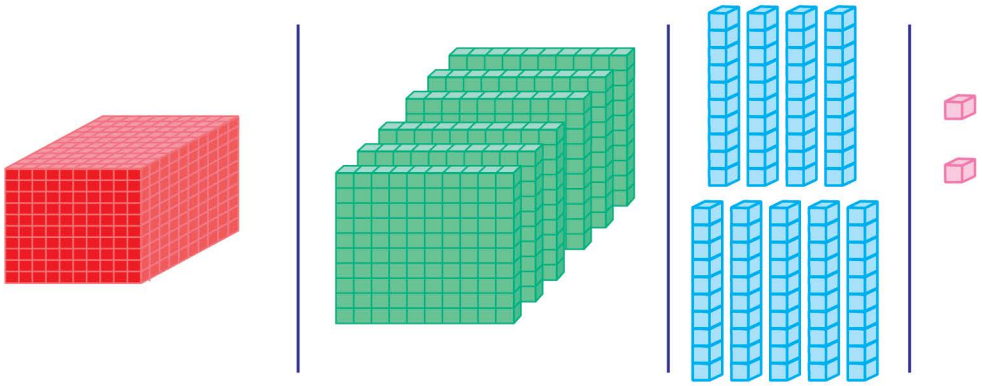
Thousands	Hundreds	Tens	Ones
1	4	5	9

One thousand, four hundred and fifty-nine

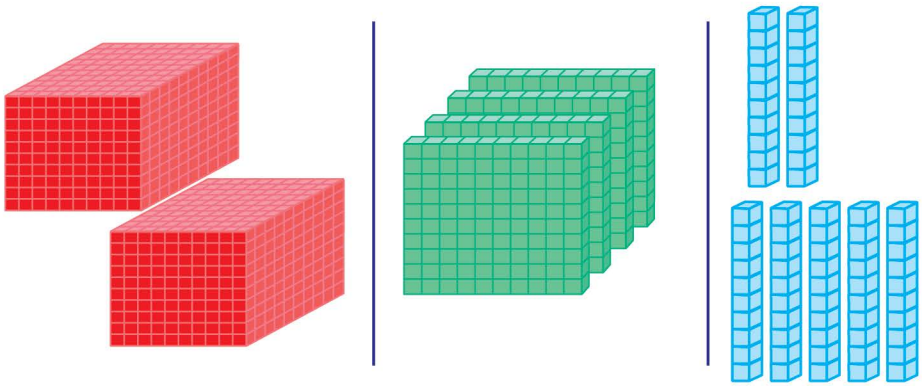
Thousands	Hundreds	Tens	Ones
2	0	4	8

Two thousand and forty-eight

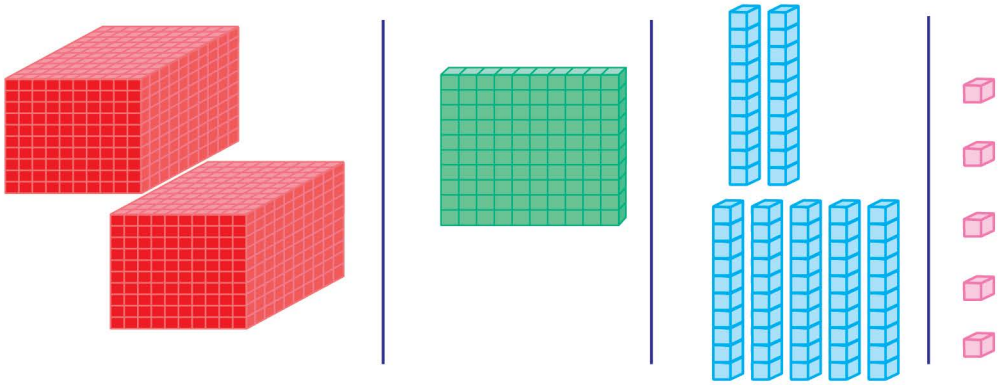
1. Write down the numbers.

A 

= 1,692

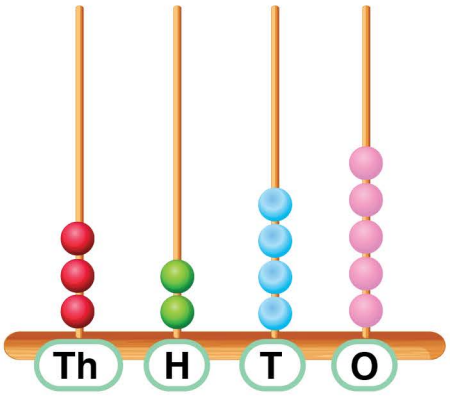
B 

= 2,470

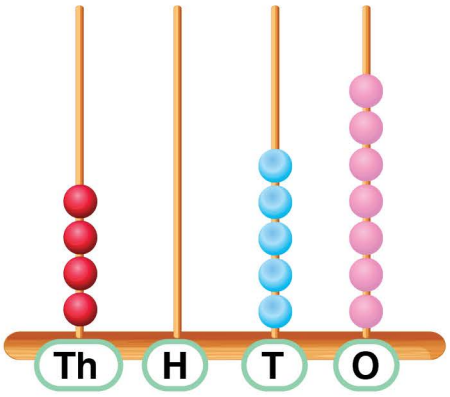
C 

= 2,175

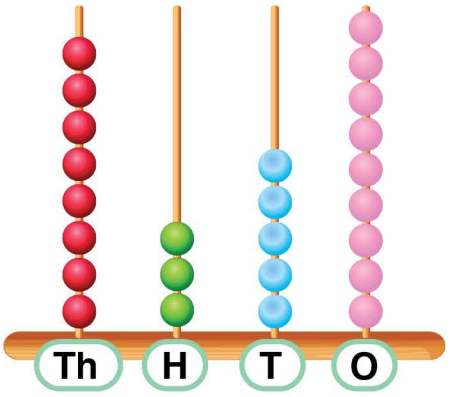
2. Count the beads in each abacus and write down the number.



3,245



4,057



8,359

3. Write down the numbers.

(A) Two thousand, three hundred and fourteen

2,314

(B) Five thousand and sixty-four

5,064

(C) One thousand and twenty-one

1,021

(D) Three thousand and twelve

3,012

Expanded Forms

Each digit in a number has a value.

The value of a digit depends on its place in the number.

Thousands		Hundreds	Tens	Ones
6	,	5	3	8

The expanded form of a number is written as a sum, showing the place values.

6,538 = 6000 + 500 + 30 + 8

1. Write down each digit in the correct place.

3,452 = 3 Thousands 4 Hundreds 5 Tens 2 Ones

2,731 = 2 Thousands 7 Hundreds 3 Tens 1 Ones

6,429 = 6 Thousands 4 Hundreds 2 Tens 9 Ones

8,740 = 8 Thousands 7 Hundreds 4 Tens 0 Ones

2. Write down the value of the digit according to the specified place value.

5,421	731	649	8,502	1,204
Thousands	Tens	Hundreds	Ones	Tens
5,000	30	600	2	0

3. Write down each number in standard form.

(A) 4,000 + 300 + 60 + 8 = 4,368

(B) 3,000 + 40 + 5 = 3,045

(C) 2,000 + 30 + 2 = 2,032

(D) 3,000 + 90 = 3,090

4. Circle the expanded form of the number 6847.

(A) 7,000 + 400 + 80 + 6

(B) 6,000 + 400 + 80 + 7

(C) 6,000 + 800 + 40 + 7

(D) 6,000 + 800 + 70 + 4

Your Work

1. Use the digits 2, 7, 6, and 3 to write down the greatest possible number.

(A) The greatest digit 7 will be in the thousands place.

(B) The smallest digit 2 will be in the ones place.

(C) The greatest possible number using the digits 2, 7, 6, and 3 is 7,632 .

(1-2) Numbers in Words

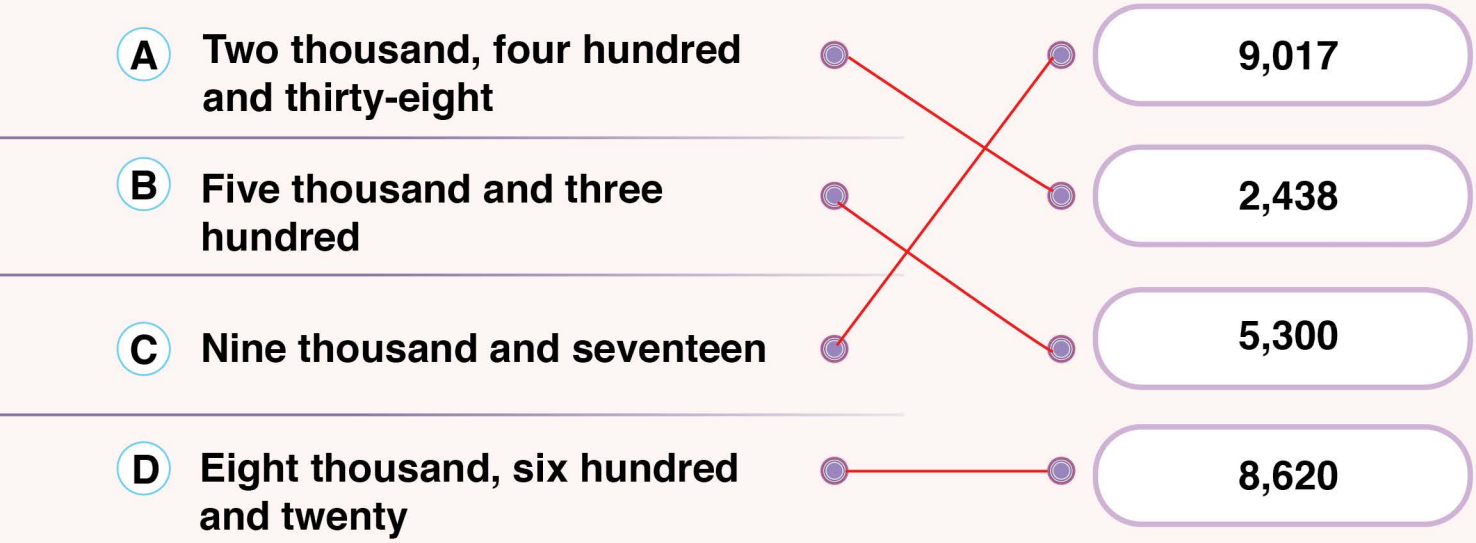
A good way to help with reading large numbers is to break the numbers into smaller parts.

4,687

We can break this number into two parts.
The first three digits from the right compose the first part.
Then, start reading from left to right.
So we read the number as:

Four thousand, six hundred and eighty-seven

1. Match.



2. Write down the numbers in words.

4,312 Four thousand, three hundred and twelve

2,653 Two thousand, six hundred and fifty-three

7,008 Seven thousand and eight

(1-3) Comparing Numbers

To compare the numbers 2,340 and 2,670, first line up the digits of each number, then compare starting from the left. If the first digits are the same, move to the next digit and continue until you find different digits.

Thousands	Hundreds	Tens	Ones
2	3	4	0
2	6	7	0

In this case, the thousands digits are the same. Therefore, look at the hundreds place; since 3 hundred is less than 6 hundred, 2,340 is less than 2,670.

2,340 < 2,670

1. Write down the correct sign (>, <, or =).

4,200 < 4,300	1,900 > 1,524	5,555 < 9,550
2,670 < 8,500	3,211 < 4,609	7,320 > 7,310
2,543 > 2,244	8,705 > 8,700	3,000 = 3,000

2. Circle the smallest numbers.

A	4,000	400	**4**	B	**602**	620	623
C	512	**215**	251	D	3,142	**1,328**	2,645

3. Arrange the following numbers in ascending order:

A

9,435	7,435	9,600	8,236
7,435	8,236	9,435	9,600

B

2,500	2,660	1,900	2,600
1,900	2,500	2,600	2,660

C

2,660	2,830	2,740	3,800	2,650
2,650	2,660	2,740	2,830	3,800

D

7,350	5,350	9,350	8,350	6,350
5,350	6,350	7,350	8,350	9,350

4. Arrange the following numbers in descending order:

A

7,772	6,550	8,500	5,690
8,500	7,772	6,550	5,690

B

3,900	1,346	4,930	1,727
4,930	3,900	1,727	1,346

C

8,420	5,640	9,760	3,909	7,650
9,760	8,420	7,650	5,640	3,909

D

5,505	2,350	9,464	6,678	6,654
9,464	6,678	6,654	5,505	2,350

Your Work

Taim has 9 bills of tens and 3 bills of ones.

Ali has 7 bills of tens and 13 bills of ones.

Sara has 8 bills of tens and 3 bills of ones.

Which two have the same amount of money?

Ali and Sara have the same amount of money.

(1-4) Problem Solving

1. This table shows the vital statistics of some Roosters Football Club players.

Name	Height	Mass
• Zaid	206 cm	99 kg
• Ward	196 cm	110 kg
• Kareem	173 cm	78 kg
• Osama	184 cm	88 kg
• Rami	181 cm	79 kg
• Said	201 cm	118 kg

A Who is the tallest? Who is the shortest?

Zaid is the tallest and Kareem is the shortest.

B Sort these players from lightest to heaviest: Kareem, Rami, and Osama.

Kareem, Rami and Osama.

C Who do you want to throw the ball? Why?

Zaid because he is the tallest.

D Who would you least like to stop you in the game? Why?

Said because he is the heaviest.

Show Your Turn

1. Write down the numbers.

(A) Seven thousand, four hundred and sixty-eight 7,468

(B) Two thousand and seventeen 2,017

(C) Five thousand, nine hundred and one 5,901

2. Write down each number in standard form.

(A) 3,000 + 200 + 8 = 3,208

(B) 4,000 + 500 + 7 = 4,507

(C) 7,000 + 9 = 7,009

(D) 5,000 + 800 + 10 + 5 = 5,815

3. Write down the value for each underlined digit.

(A) 6,300 6,000

(B) 9,340 300

(C) 7,590 0

(D) 2,485 80

4. Write down the correct sign (>, <, or =).

A	1,525	>	1,255
B	1,120	<	2,121
C	5,002	=	5,002
D	9,919	>	4,491
E	2,011	>	2,010
F	4,006	<	4,060

5. Arrange the following numbers in descending order:

6,499	2,988	5,377	4,300	3,566
6,499	5,377	4,300	3,566	2,988

6. Arrange the following numbers in ascending order:

7,864	2,009	6,012	1,293	7,009
1,293	2,009	6,012	7,009	7,864

Unit 2

Mathematical Operations

Vocabulary

- add
- addition
- addend
- sum
- subtract
- subtraction
- minuend
- subtrahend
- difference
- regrouping

Objectives

Upon completion of this unit, you will be able to:

- Add numbers up to 4 digits.
- Subtract numbers up to 4 digits.
- Multiply numbers up to 10 ×10.
- Divide 2-digit numbers by 1-digit numbers.
- Solve problems within contexts.

(2-1) Addition

When performing addition, it's important to arrange the numbers according to their place value.

Adding Numbers without Regrouping

$$\begin{array}{r} 7263 \\ +\ 2415 \\ \hline \square \end{array}$$

7263 → addend

2415 → addend

□ → sum

Add the ones.	Add the tens.	Add the hundreds.	Add the thousands.
7 2 6 3 + 2 4 1 5 8	7 2 6 3 + 2 4 1 5 7 8	7 2 6 3 + 2 4 1 5 6 7 8	7 2 6 3 + 2 4 1 5 9 6 7 8

1. Find the sum.

$$\begin{array}{r} 1054 \\ +\ 7421 \\ \hline 8475 \end{array}$$

$$\begin{array}{r} 1010 \\ +\ 3864 \\ \hline 4874 \end{array}$$

$$\begin{array}{r} 2243 \\ +\ 2721 \\ \hline 4964 \end{array}$$

$$\begin{array}{r} 4702 \\ +\ 1253 \\ \hline 5955 \end{array}$$

Adding Numbers with Regrouping

$$\begin{array}{r} 4258 \\ +\ 3906 \\ \hline \end{array}$$

4258 → addend

+ 3906 → addend

☐ → sum

Add the ones.

$$\begin{array}{r} {\scriptstyle 1} \\ 4258 \\ +\ 3906 \\ \hline 4 \end{array} \qquad \begin{array}{r} 8 \\ +\ 6 \\ \hline 14 = 10 + 4 \end{array}$$

Add the tens.

$$\begin{array}{r} {\scriptstyle 1} \\ 4258 \\ +\ 3906 \\ \hline 64 \end{array}$$

Add the hundreds.

$$\begin{array}{r} {\scriptstyle 1} \\ 4258 \\ +\ 3906 \\ \hline 164 \end{array} \qquad \begin{array}{r} 2 \\ +\ 9 \\ \hline 11 = 10 + 1 \end{array}$$

Add the thousands.

$$\begin{array}{r} {\scriptstyle 1} \\ 4258 \\ +\ 3906 \\ \hline 8164 \end{array}$$

So

$$\begin{array}{r} 4258 \\ +\ 3906 \\ \hline 8164 \end{array}$$

1. Add.

$$\begin{array}{r} 7324 \\ +\ 2273 \\ \hline 9597 \end{array}$$

$$\begin{array}{r} 4266 \\ +\ 2110 \\ \hline 6376 \end{array}$$

$$\begin{array}{r} {\scriptstyle 1\ 1} \\ 6113 \\ +\ 2890 \\ \hline 9003 \end{array}$$

$$\begin{array}{r} {\scriptstyle 1\ \ 1} \\ 4622 \\ 0348 \\ +\ 4406 \\ \hline 9376 \end{array}$$

$$\begin{array}{r} {\scriptstyle 1\ 1} \\ 3571 \\ 4250 \\ +\ 1371 \\ \hline 9192 \end{array}$$

$$\begin{array}{r} {\scriptstyle 1\ 2\ 2} \\ 0499 \\ 1584 \\ +\ 457 \\ \hline 2540 \end{array}$$

2. Add.

To find the horizontal addition, arrange the numbers vertically according to their place value, then add.

(A) 6024 + 517 =

$$\begin{array}{r} {\scriptstyle 1} \\ 6024 \\ +\ 517 \\ \hline 6541 \end{array}$$

(B) 2324 + 2273 =

$$\begin{array}{r} 2324 \\ +\ 2273 \\ \hline 4597 \end{array}$$

(C) 4266 + 2110 =

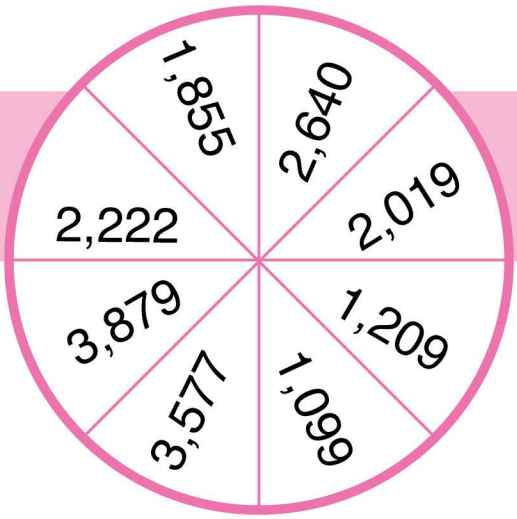
$$\begin{array}{r} 4266 \\ +\ 2110 \\ \hline 6376 \end{array}$$

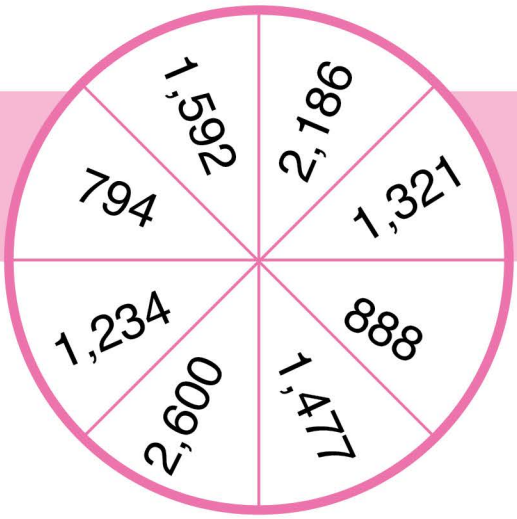
(D) 4622 + 2348 =

$$\begin{array}{r} {\scriptstyle 1} \\ 4622 \\ +\ 2348 \\ \hline 6970 \end{array}$$

Your Work

1. Look at the addition wheels and answer the following questions:





A Choose one number from each wheel.

B Add the numbers together.

C Do this three times with three different pairs of numbers.

Students' own answers

e.g,

A

2,222
1,477

B

2,222+1,477= 3,699

C

1,099+888 = 1,987

2,019+794 = 2,813

3,577+1,321 = 4,898

2. Choose two numbers from 5237, 3046, or 2960 whose sum is the greatest.

The two numbers are 5237 and 3046 because

5237 + 3046 = 8,283 .

(2-2) Subtraction

When performing subtraction, it's important to arrange the numbers according to their place value.

Subtracting Numbers without Regrouping

```
  5896   → minuend
- 3276   → subtrahend
--------
        → difference
```

Subtract the ones.	Subtract the tens.	Subtract the hundreds.	Subtract the thousands.
5896	5896	5896	5896
- 3276	- 3276	- 3276	- 3276
0	20	620	2620

1. Subtract.

A	B	C	D
6,397	5,058	5,673	7,059
- 3,227	- 3,047	- 3,422	- 3,038
3,170	2,011	2,251	4,021

2. Subtract.

A 3,348 - 2,137 =

```
 3,348
-2,137
------
 1,211
```

B 4,589 - 4,288 =

```
 4,589
-4,288
------
 0,301
```

To find the horizontal subtraction, arrange the numbers vertically according to their place value, then subtract.

Subtracting Numbers with Regrouping

Subtract the ones.

$$\begin{array}{r} 6\,1\,8\,2 \\ -\;3\,5\,6\,7 \\ \hline \end{array}$$

Regroup "8 tens and 2 ones" as "7 tens and 12 ones," then subtract the ones.

$$\begin{array}{r} {\scriptstyle 7\ \ 12} \\ 6\,1\,\not{8}\,\not{2} \\ -\;3\,5\,6\,7 \\ \hline 5 \end{array}$$

Subtract the tens.

$$\begin{array}{r} {\scriptstyle 7\ \ 12} \\ 6\,1\,\not{8}\,\not{2} \\ -\;3\,5\,6\,7 \\ \hline 1\,5 \end{array}$$

Subtract the hundreds.

$$\begin{array}{r} {\scriptstyle 7\ \ 12} \\ 6\,1\,\not{8}\,\not{2} \\ -\;3\,5\,6\,7 \\ \hline 1\,5 \end{array}$$

Regroup "6 thousand and 1 hundred" as "5 thousand and 11 hundred," then subtract the hundreds.

$$\begin{array}{r} {\scriptstyle 5\ \ 11\ \ 7\ \ 12} \\ \not{6}\,\not{1}\,\not{8}\,\not{2} \\ -\;3\,5\,6\,7 \\ \hline 6\,1\,5 \end{array}$$

Subtract the thousands.

$$\begin{array}{r} {\scriptstyle 5\ \ 11\ \ 7\ \ 12} \\ \not{6}\,\not{1}\,\not{8}\,\not{2} \\ -\;3\,5\,6\,7 \\ \hline 2\,6\,1\,5 \end{array}$$

So

$$\begin{array}{r} 6\,1\,8\,2 \\ -\;3\,5\,6\,7 \\ \hline 2\,6\,1\,5 \end{array}$$

1. Subtract.

$$\begin{array}{r} {\scriptstyle 3\ \ 17\ 5\ 14} \\ \not{4}\,\not{7}\,\not{6}\,\not{4} \\ -\;2,805 \\ \hline 1,959 \end{array}$$

$$\begin{array}{r} 9,377 \\ -\;8,344 \\ \hline 1,033 \end{array}$$

2. Subtract.

(A) 7,765 - 6,591 = 1,174

$$\begin{array}{r} 7{,}765 \\ -\ 6{,}591 \\ \hline 1{,}174 \end{array}$$

(B) 5,065 - 4,250 = 0,815

$$\begin{array}{r} {\scriptstyle 4\ 10} \\ 5{,}\not{0}\not{6}5 \\ -\ 4{,}250 \\ \hline 0{,}815 \end{array}$$

(C) 9,342 - 7,212 = 2,130

$$\begin{array}{r} 9{,}342 \\ -\ 7{,}212 \\ \hline 2{,}130 \end{array}$$

Your Work

Students' own answers

1. Write down two numbers with a difference of 2,734.

$$\begin{array}{r} 7{,}956 \\ -\ 5{,}222 \\ \hline 2{,}734 \end{array}$$

2. Write down two numbers with a difference of an even number. 7,234 - 5,210 = 2,024

3. Subtract.

$$\begin{array}{r} {\scriptstyle 814} \\ 8{,}\not{9}\not{4}4 \\ -\ 7{,}253 \\ \hline 1{,}691 \end{array}$$

6,321 - 3,638 =

$$\begin{array}{r} {\scriptstyle 1211} \\ {\scriptstyle 5\ \not{2}\not{1}11} \\ \not{6}{,}\not{3}\not{2}1 \\ -\ 3{,}638 \\ \hline 2{,}683 \end{array}$$

6,574 - 4,882 =

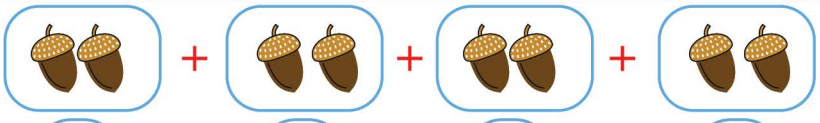
$$\begin{array}{r} {\scriptstyle 14} \\ {\scriptstyle 5\ \not{4}17} \\ \not{6}{,}5\not{7}4 \\ -\ 4{,}882 \\ \hline 1{,}692 \end{array}$$

8,733 - 6,605 =

$$\begin{array}{r} {\scriptstyle 213} \\ 8{,}7\not{3}\not{3} \\ -\ 6{,}605 \\ \hline 2{,}128 \end{array}$$

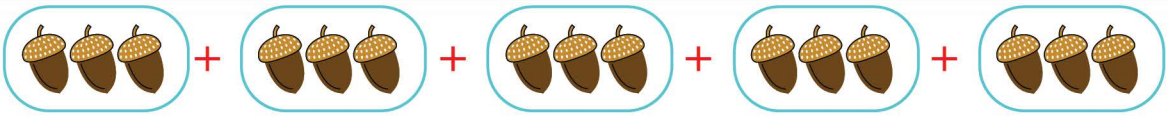
(2-3) Multiplication

Multiplication is a repeated addition.



2 + 2 + 2 + 2 = 8

or 4 × 2 = 8

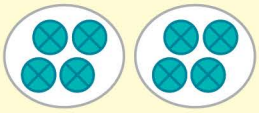


3 + 3 + 3 + 3 + 3 = 15

or 5 × 3 = 15

$\begin{array}{r} 1 \\ \times\ 6 \\ \hline 6 \end{array}$

$\begin{array}{r} 2 \\ \times\ 4 \\ \hline 8 \end{array}$



Add: 2 + 2 + 2 = 6

Multiply: $3 \times 2 = 6$

Factors: 3, 2 — Product: 6

The numbers we multiply are called **factors.** The answer is called the **product.**

The Multiplication Table

You can memorize the multiplication facts for any number by studying the multiplication table.

6 ← Locate the 6th row.

× 7 ← Locate the 7th column.

42 ← The product is where the 6th row and the 7th column meet.

×	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

1. Find.

$3 \times 6 = 18$

$6 + 6 = 18$

$4 \times 5 = 20$

$5 + 5 + 5 = 20$

$2 \times 9 = 18$

$9 + 9 = 18$

$7 \times 4 = 28$

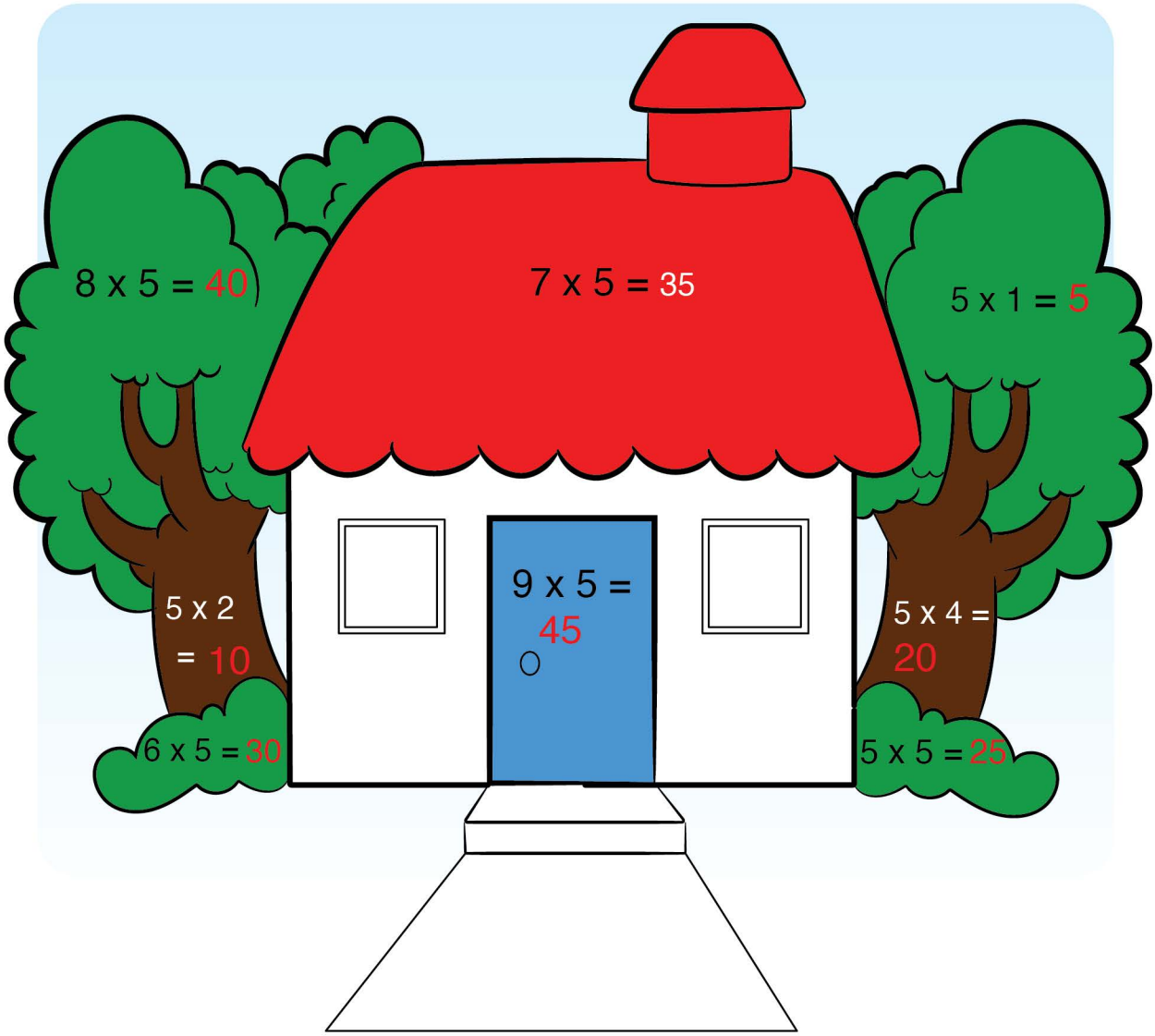
$4 + 4 + 4 + 4 + 4 + 4 + 4 = 28$

2. Multiply.

$3 \times 5 =$ 15	$8 \times 4 =$ 32	$9 \times 7 =$ 63
$6 \times 2 =$ 12	$10 \times 2 =$ 20	$5 \times 1 =$ 5
$4 \times 4 =$ 16	$2 \times 8 =$ 16	$7 \times 3 =$ 21
$8 \times 7 =$ 56	$4 \times 5 =$ 20	$6 \times 9 =$ 54
$9 \times 9 =$ 81	$7 \times 8 =$ 56	$8 \times 5 =$ 40
$5 \times 7 =$ 35	$4 \times 9 =$ 36	$7 \times 2 =$ 14

Your Work

1. Multiply and color.

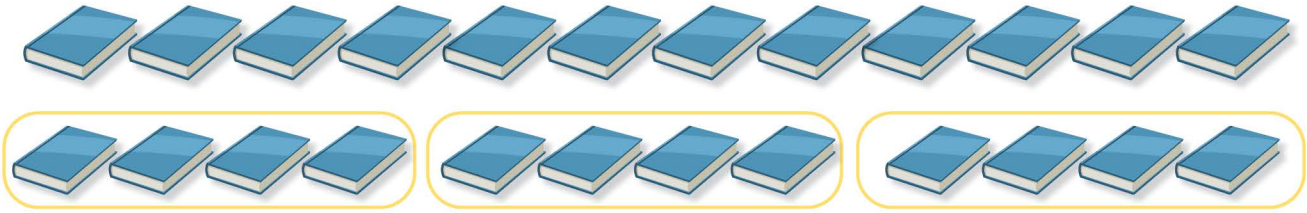


5 = green	30 = green
10 = brown	40 = green
35 = red	45 = blue
20 = brown	25 = green

(2-4) Division

In division, we break a number into smaller, equal groups.

1. Sara wants to share 12 books with her sister and her brother equally. How many books will each one take? 4



2. Find.

A How many groups of 2 are there? 8

B How many groups of 4 are there? 2

C How many groups of 5 are there? 3

D How many groups of 10 are there? 1

Division is the inverse operation of multiplication.
That means that you can use multiplication facts to find division facts.

$6 \overline{)24}$ (×)

$6 \times ? = 24 \longrightarrow 6 \times 4 = 24$

So $24 \div 6 = 4$

---

3. Complete.

$9 \overline{)18}$ (×)

$9 \times 2 = 18$ So $18 \div 9 = 2$

$7 \overline{)35}$ (×)

$7 \times 5 = 35$ So $35 \div 7 = 5$

$9 \overline{)63}$ (×)

$9 \times 7 = 63$ So $63 \div 9 = 7$

$8 \overline{)56}$ (×)

$8 \times 7 = 56$ So $56 \div 8 = 7$

$1 \overline{)12}$ (×)

$12 \times 1 = 12$ So $12 \div 1 = 12$

4. Divide.

14 ÷ 2 = 7	30 ÷ 5 = 6	49 ÷ 7 = 7
18 ÷ 6 = 3	9 ÷ 9 = 1	20 ÷ 4 = 5
15 ÷ 5 = 3	28 ÷ 4 = 7	81 ÷ 9 = 9
72 ÷ 8 = 9	21 ÷ 3 = 7	42 ÷ 7 = 6

Your Work

1. How many 8s are in 32? 32 ÷ 8 = 4

2. How many 4s are in 32? 32 ÷ 4 = 8

3. How many 2s are in 32? 32 ÷ 2 = 16

(2-5) Problem Solving

1. **Adam's school had a cookout day. The parents helped cook the food. They cooked 3,305 pizzas. In one hour, 1,722 pizzas were eaten.**
   How many pizzas were left?

   3,305 - 1,722 = 1,583 pizzas

2. **Omar scored 8,776 points in a fighting game.**
   Ali scored 2,550 less points than Omar.
   How many points did Ali score?

   8,776 - 2,550 = 6,226 points

3. **Sara had 24 cookies. She gave an equal number of cookies to 4 friends.**
   How many cookies did each friend get?

   24 ÷ 4 = 6 cookies

4. **Tala had 9 books. She put them into 3 equal stacks.**
   How many books were in each stack?

   9 ÷ 3 = 3 books

Show Your Turn

1. Find.

1 1 2,350 + 4,689 7,039	1 1 1,608 + 2,917 4,525
5 12 7,~~6~~25 - 6,574 1,051	12 9 8 ~~2~~ 1010 ~~9~~,300 - 6,714 2,586
3 × 7 = 21 8 × 4 = 32	5 × 6 = 30 9 × 9 = 81
12 ÷ 3 = 4 63 ÷ 7 = 9	30 ÷ 5 = 6 10 ÷ 10 = 1

Unit 3

Fractions

Vocabulary

- fraction
- part of a whole
- set
- part of a set
- numerator
- denominator
- adding fractions
- subtracting fractions

Objectives

Upon completion of this unit, you will be able to:

- Identify the fraction as a part of a whole.
- Identify the fraction as a part of a set.
- Write down the fraction's numerator and denominator.
- Add fractions with the same denominator.
- Subtract fractions with the same denominator.

(3-1) Identifying Fractions

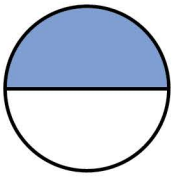
A fraction is a part of a whole when we divide the whole into equal parts.

$= \frac{2}{3}$ → numerator (parts shaded of the whole)
→ denominator (total parts of the whole)

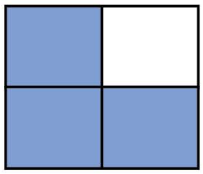
A fraction can also be a part of a set.

$= \frac{2}{3}$ → numerator (parts shaded of the set)
→ denominator (total parts of the set)

1. Circle the fraction that is shaded.

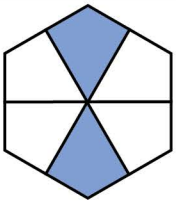


(1/2) 1/3 1/4

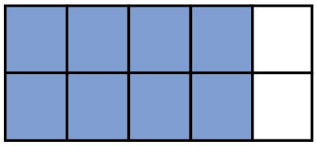


1/4 2/4 (3/4)

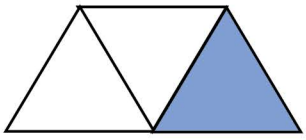
1/5 2/5 (4/5)



1/6 (2/6) 4/6

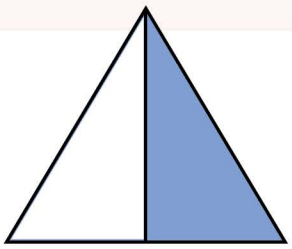


2/10 5/10 (8/10)

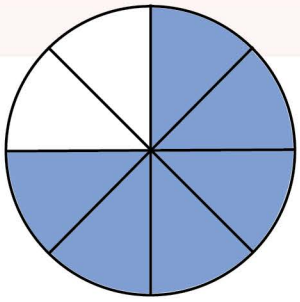


(1/3) 2/3 3/3

2. Write down the fraction of the shaded area.



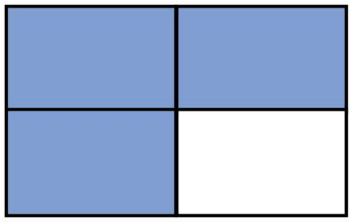
$\frac{1}{2}$



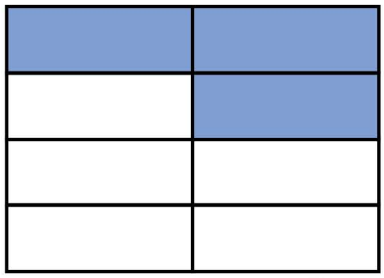
$\frac{6}{8}$

(A) The numerator is 1 and the denominator is 2.

(B) The numerator is 6 and the denominator is 8.



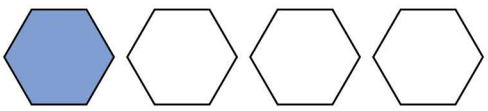
$\frac{3}{4}$



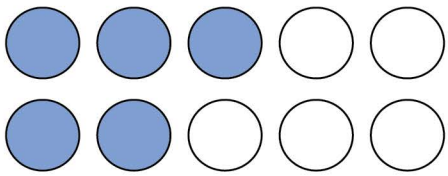
$\frac{3}{8}$

(C) The numerator is 3 and the denominator is 4.

(D) The numerator is 3 and the denominator is 8.



$\frac{1}{4}$

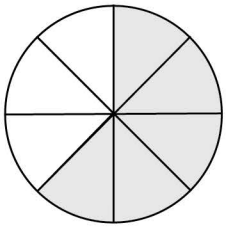


$\frac{5}{10}$

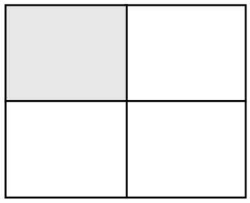
(E) The numerator is 1 and the denominator is 4.

(F) The numerator is 5 and the denominator is 10.

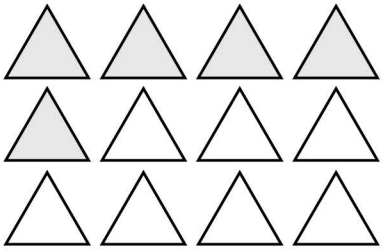
3. Shade the shapes to represent each given fraction.



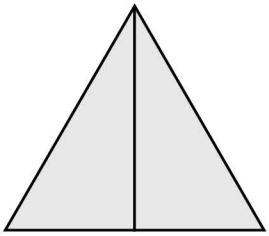
$\frac{5}{8}$



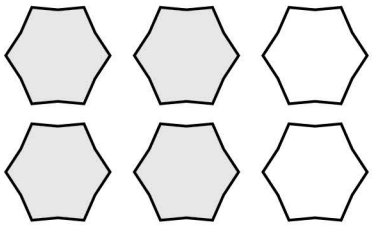
$\frac{1}{4}$



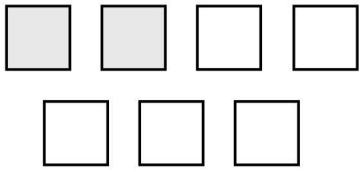
$\frac{5}{12}$



$\frac{2}{2}$

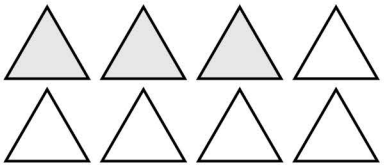


$\frac{4}{6}$



$\frac{2}{7}$

4. Draw a fraction where the numerator is 3 and the denominator represents a part of a set totaling 8, then fill in the blanks.



(A) The fraction is $\frac{3}{8}$.

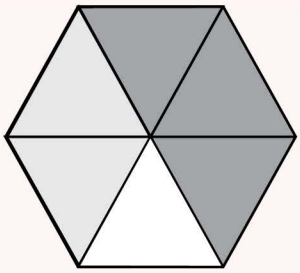
(B) The numerator is 3 and the denominator is 8.

(3-2) Adding Fractions with Like Denominators

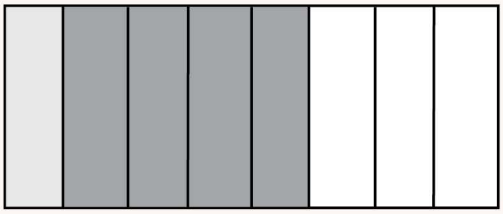
When we add fractions with the same denominators, we simply add the numerators together while keeping the denominators unchanged.

$\frac{1}{5} + \frac{2}{5} = \frac{3}{5}$

1. Shade, and then find the sum.



$\frac{2}{6} + \frac{3}{6} = \frac{5}{6}$



$\frac{1}{8} + \frac{4}{8} = \frac{5}{8}$

2. Fill the blanks.

$\frac{4}{9} + \frac{3}{9} = \frac{7}{9}$

$\frac{2}{11} + \frac{5}{11} = \frac{7}{11}$

$\frac{1}{14} + \frac{7}{14} = \frac{8}{14}$

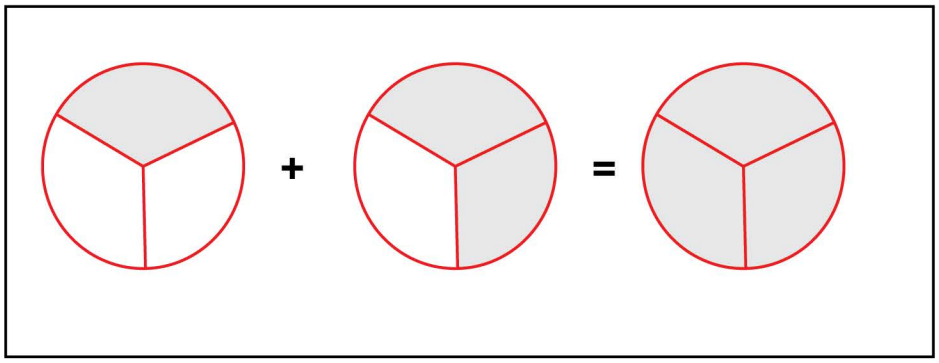
$\frac{11}{15} + \frac{2}{15} = \frac{13}{15}$

$\frac{5}{8} + \frac{1}{8} = \frac{6}{8}$

$\frac{10}{17} + \frac{5}{17} = \frac{15}{17}$

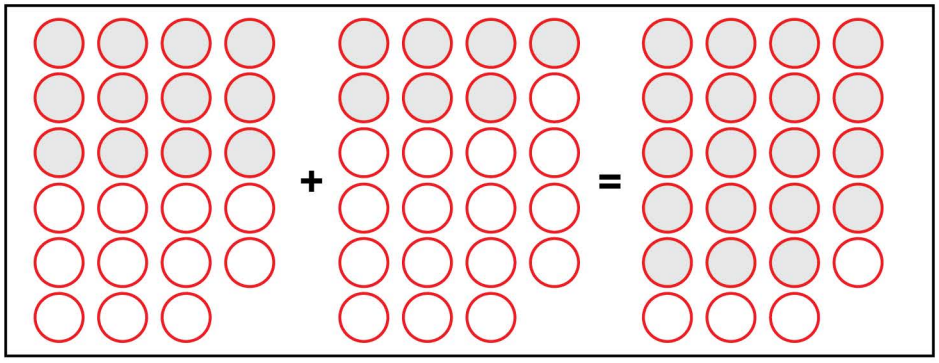
Your Work

1. Draw a shape to find the sum of $\frac{1}{3}$ and $\frac{2}{3}$.



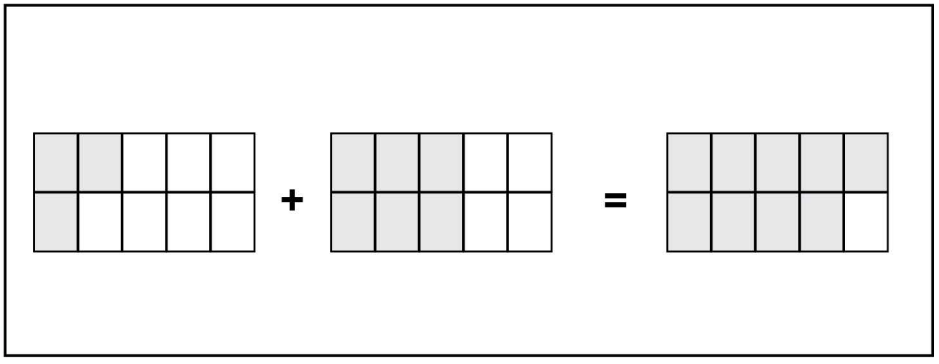
$\frac{1}{3} + \frac{2}{3} = \frac{3}{3}$

2. Draw a shape that represents the sum of $\frac{12}{23}$ and $\frac{7}{23}$.



$\frac{12}{23} + \frac{7}{23} = \frac{19}{23}$

3. Draw a shape that represents the sum of $\frac{3}{10}$ and $\frac{6}{10}$.

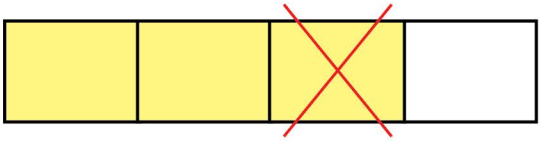


$\frac{3}{10} + \frac{6}{10} = \frac{9}{10}$

(3-3) Subtracting Fractions with Like Denominators

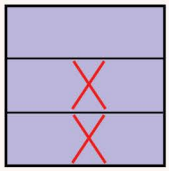
When we subtract fractions with the same denominators, we subtract the numerators while keeping the denominators unchanged.

$\frac{3}{4} - \frac{1}{4} = ?$

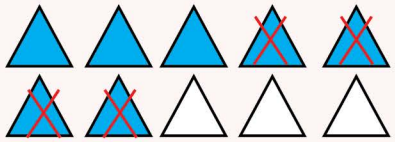


$\frac{3}{4} - \frac{1}{4} = \frac{2}{4}$

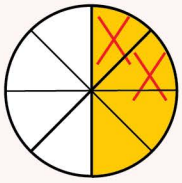
1. Shade and subtract.



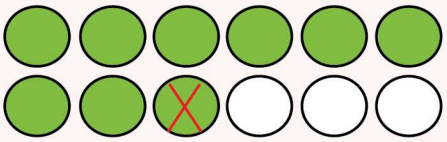
$\frac{3}{3} - \frac{1}{3} = \frac{2}{3}$



$\frac{7}{10} - \frac{4}{10} = \frac{3}{10}$



$\frac{4}{8} - \frac{2}{8} = \frac{6}{8}$



$\frac{9}{12} - \frac{1}{12} = \frac{8}{12}$

2. Fill the blanks.

$\frac{7}{16} - \frac{2}{16} = \frac{5}{16}$

$\frac{9}{9} - \frac{3}{9} = \frac{6}{9}$

$\frac{27}{42} - \frac{9}{42} = \frac{18}{42}$

$\frac{11}{25} - \frac{2}{25} = \frac{9}{25}$

$\frac{11}{14} - \frac{7}{14} = \frac{4}{14}$

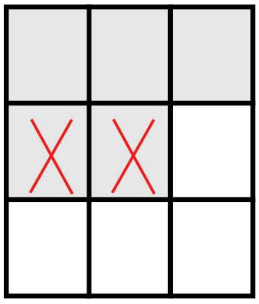
$\frac{6}{8} - \frac{2}{8} = \frac{4}{8}$

Your Work

1. Draw a shape to find the difference between $\frac{4}{6}$ and $\frac{2}{6}$.

$\frac{4}{6} - \frac{2}{6} = \frac{2}{6}$

2. Draw a shape that represents the difference between $\frac{5}{9}$ and $\frac{2}{9}$.



$\frac{5}{9} - \frac{2}{9} = \frac{3}{9}$

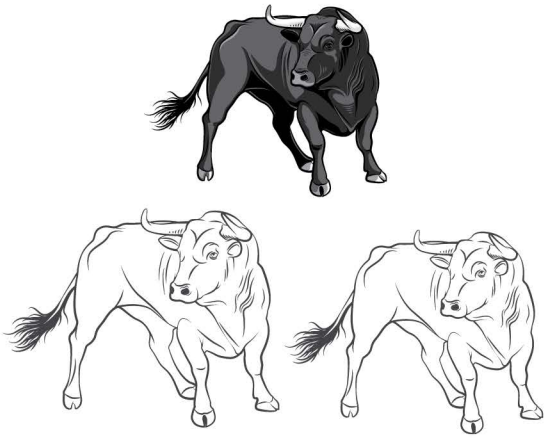
3. Subtract.

(A) $\frac{5}{5} - \frac{3}{5} = \frac{2}{5}$

(B) $\frac{7}{10} - \frac{3}{10} = \frac{4}{10}$

(3-4) Problem Solving

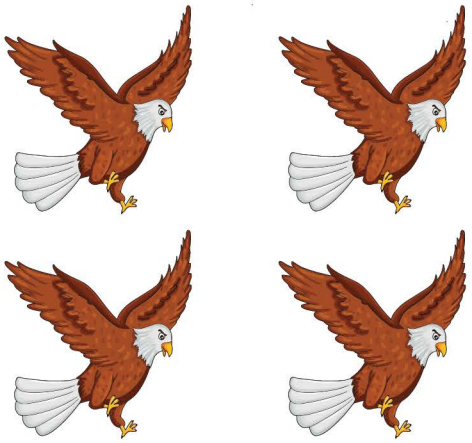
A



Write down the fraction that represents the black buffalo.

$\frac{1}{3}$

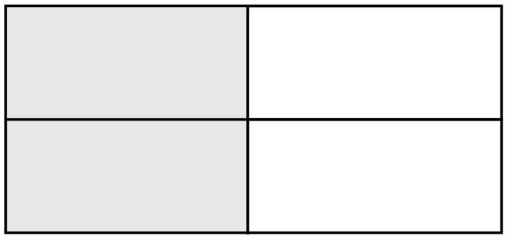
B



Write down the fraction that represents the brown eagles.

$\frac{4}{4}$

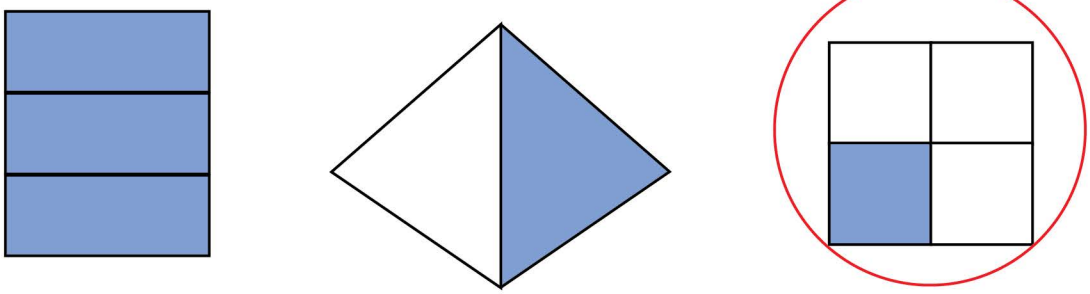
C



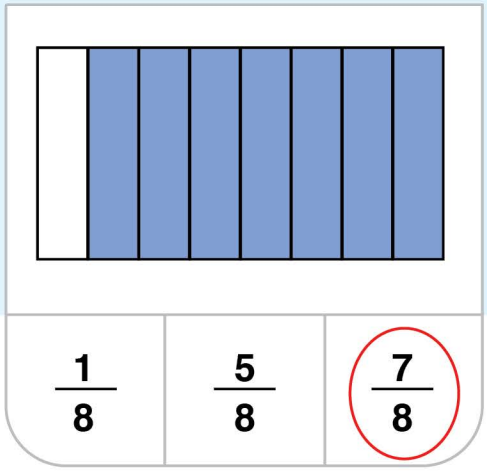
Shade the shape to represent $\frac{2}{4}$.

Show Your Turn

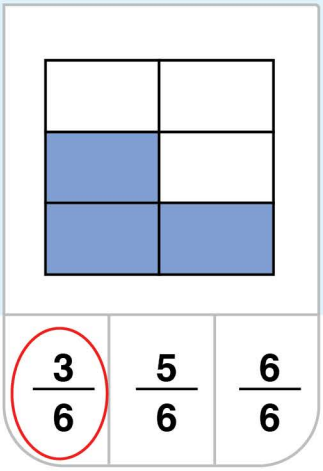
1. Circle the shape that represents $\frac{1}{4}$.



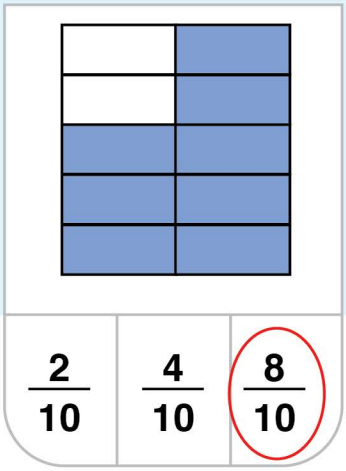
2. Circle the fraction that represents the shaded parts of each shape.



$\frac{1}{8}$ $\frac{5}{8}$ $\frac{7}{8}$

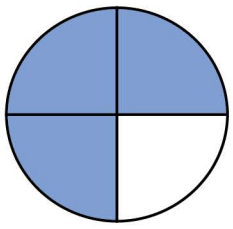


$\frac{3}{6}$ $\frac{5}{6}$ $\frac{6}{6}$

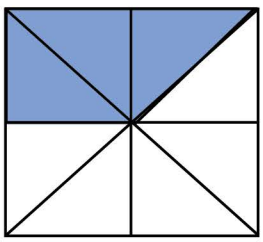


$\frac{2}{10}$ $\frac{4}{10}$ $\frac{8}{10}$

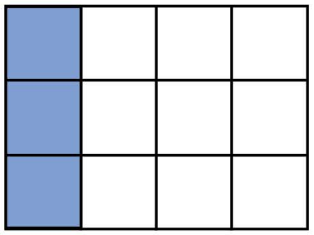
3. Color three parts of each shape, then write down the fraction.



$\frac{3}{4}$



$\frac{3}{8}$



$\frac{3}{12}$

4. Add or subtract.

$\frac{3}{5} + \frac{1}{5} = \frac{4}{5}$

$\frac{7}{9} - \frac{5}{9} = \frac{2}{9}$

$\frac{5}{8} + \frac{12}{8} = \frac{17}{8}$

$\frac{10}{17} - \frac{9}{17} = \frac{1}{17}$

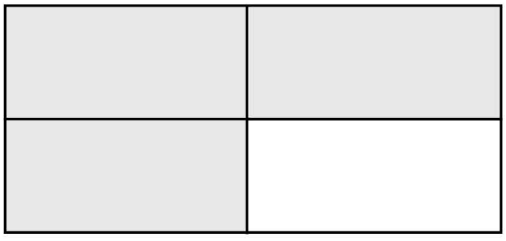
$\frac{4}{12} + \frac{3}{12} = \frac{7}{12}$

$\frac{5}{7} - \frac{1}{7} = \frac{4}{7}$

$\frac{7}{30} + \frac{3}{30} = \frac{10}{30}$

$\frac{19}{19} - \frac{7}{19} = \frac{12}{19}$

5. Draw a shape that represents $\frac{3}{4}$.



Unit 4

Measurement

Vocabulary

- mass
- kilogram (kg)
- gram (g)
- volume
- cubic unit
- analog clock
- half past
- past
- Islamic calendar
- Muharram
- Safar
- Rabi Al-Awwal
- Rabi Al-Akhir
- Jumada Al-Awwal
- Jumada Al-Akhir
- Rajab
- Sha'ban
- Ramadan
- Shawwal
- Dhu Al-Qi'dah
- Dhu Al-Hijah
- money
- Jordanian dinnar (JD)

Objectives

Upon completion of this unit, you will be able to:

- Determine the mass of an object.
- Find the volume of an object.
- Read analog clocks to tell the time.
- Identify the Islamic calendar.
- Solve problems involving Jordanian dinar (JD) currency.

(4-1) Mass

Mass is a measure of the amount of matter in an object. We measure the mass of objects in grams (g) and kilograms (kg).
(1000 g = 1 kg.)

1. Circle the heavier object.

2. Circle the lighter object.

3. Circle the heavier object.

4. Circle the appropriate mass for each picture.

10 kg	10 g

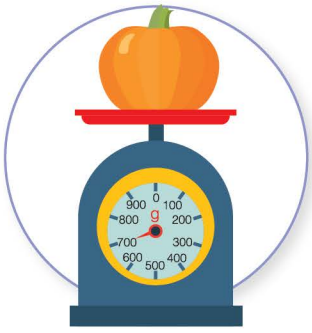
5 kg	5 g

4 kg	**4 g**

47 kg	47 g

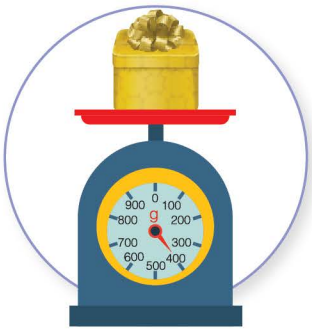
5. Measure the mass of each object.

8 kg



700 g

7 Kg

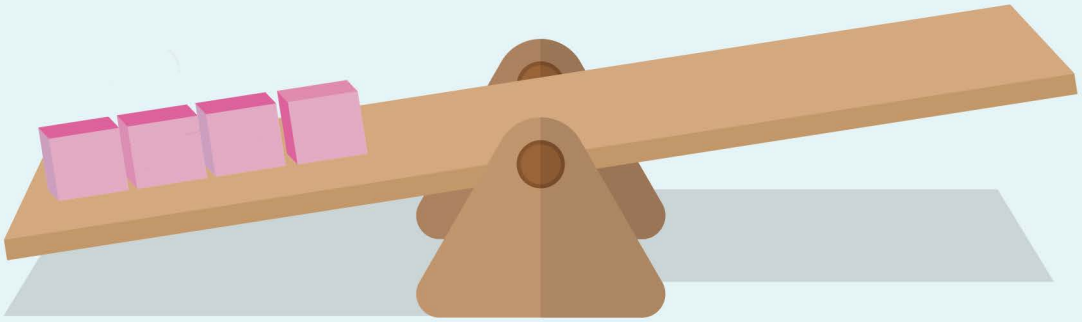


400 g

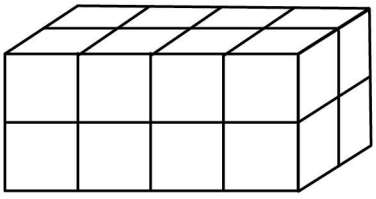
(4-2) Volume

Volume is the measurement of an amount of space occupied by on object.

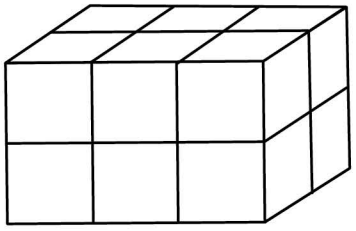
Volume is measured in cubic units (), such as cm^3.



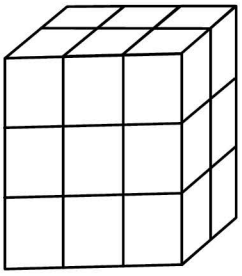
1. Find the volume.



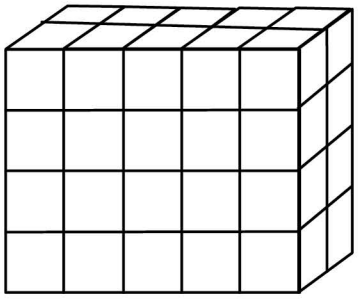
Volume = 16 cubic units



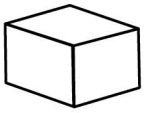
Volume = 12 cubic units

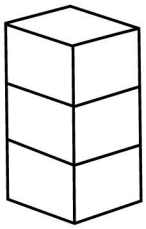


Volume = 18 cubic units

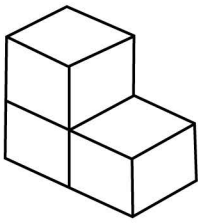


Volume = 40 cubic units

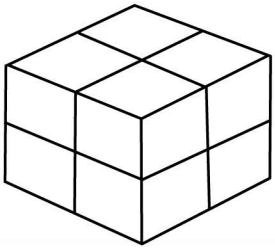
2. Count the cubes and write down the volume of each object. (Note: Each  = 1 cm^3.)



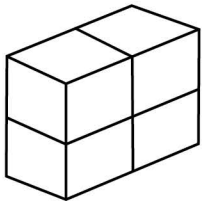
3 cm^3



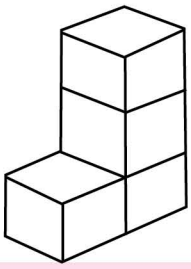
3 cm^3



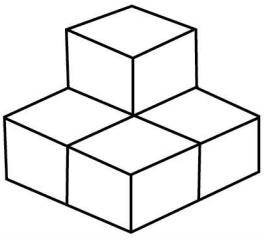
8 cm^3



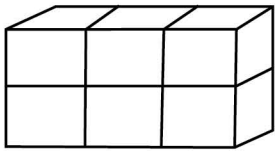
4 cm^3



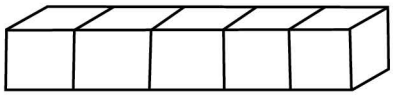
4 cm^3



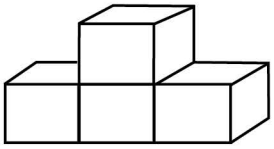
5 cm^3



6 cm^3



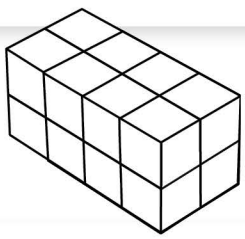
5 cm^3



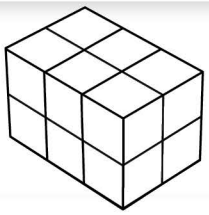
4 cm^3

3. Arrange the volumes of objects in ascending order.

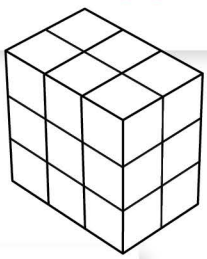
A 16 cm^3



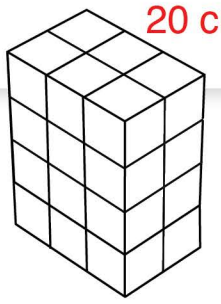
B 12 cm^3



C 18 cm^3



D 20 cm^3



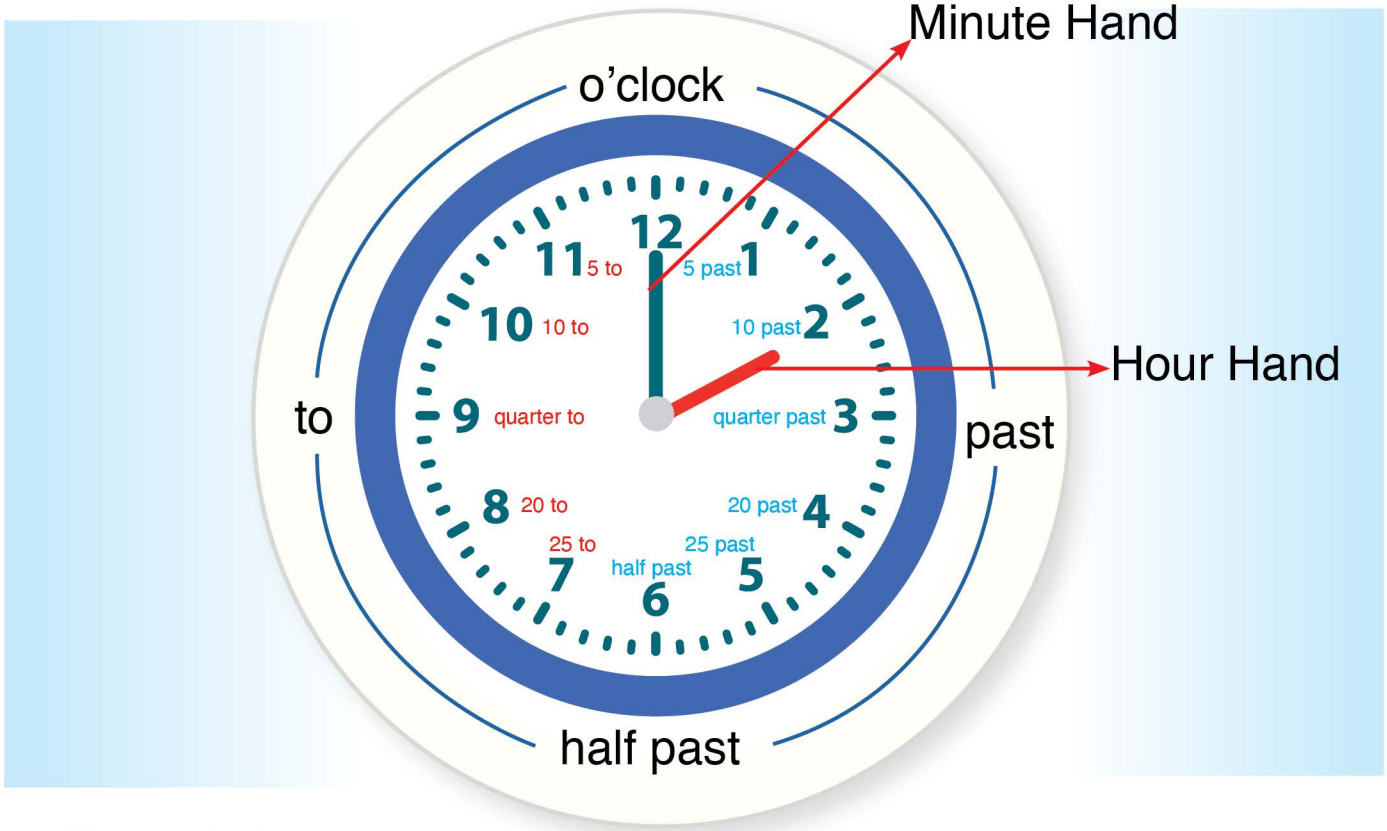
The order is B , A , C , then D .

(4-3) Time

The Analog Clock

On an analog clock:

- The short hand represents the hours.
- The long hand represents the minutes.
- There are 12 hours on an analog clock.
- Every hour has 60 minutes. (1 hour = 60 minutes.)
- Each 15 minutes equals a quarter of an hour.
- Each 30 minutes equals half an hour.



- Four o'clock means 4:00.
- Quarter past 4 means 4:15.
- Quarter to 4 means 3:45.
- Half past 4 means 4:30.

1. Match.

10:15

4:05

6:35

9:20

2. Write down the correct time.

A

3:10

B

7:45

C

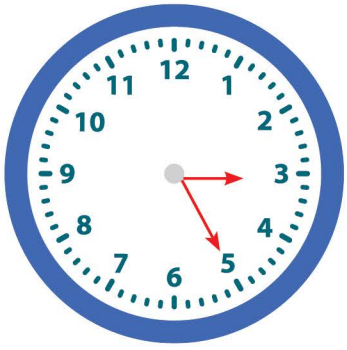
9:20

D

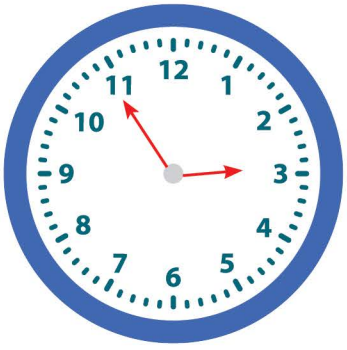
12:05

3. Draw the hands on each clock to indicate the time.

7:45



3:25



2:55

(4-4) The Islamic Calendar

Muslims use the Islamic calendar, also known as the Hijri calendar, to determine the dates of significant holidays and events.

Regular Calendar	Islamic Calendar
January	Muharram
February	Safar
March	Rabi Al-Awwal
April	Rabi Al-Akhir
May	Jumada Al-Awwal
June	Jumada Al-Akhir
July	Rajab
August	Sha'ban
September	Ramadan
October	Shawwal
November	Dhu Al-Qi'dah
December	Dhu Al-Hijjah

1. Answer the questions.

- **What is the first month of the regular calendar?** January.
- **What is the last month of the Islamic calendar?** Dhu al-Hijjah.
- **The month that comes after July is** August.
- **What is the first month of the Islamic calendar?** Muharram.
- **The 8th month of the Islamic calendar is** Sha'ban.
- **Arrange the months below:**

  Sha'ban-Ramdan-Rajab Rajab-Sha'ban-Ramdan
- **Shawwal is the** tenth **month of the Islamic calendar.**

(4-5) Money

1 JD

5 JD

10 JD

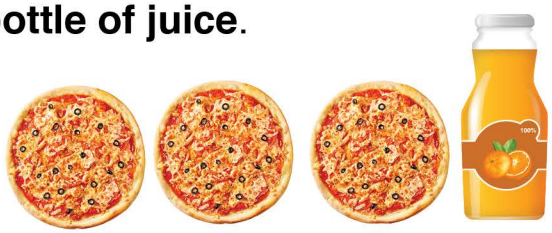
20 JD

1. Hassan wants to buy 3 pizzas and 1 bottle of juice.

The total cost is 20 JD.

The juice costs 2 JD.

How much does one pizza cost?



20 - 2 = 18 JD / 18 ÷ 3 = 6 JD

2. Lana has 50 JD to spend on presents.

She wants to buy 4 mugs, 3 teddy bears,

and 5 rings. What is the total cost of presents?

Can she buy all the things that she wants? Yes

4 x 2 + 3 x 6 + 5 x 3 = 8 +18 + 15 = 41 JD

3. Zaid wants to buy a computer and a printer for his office.

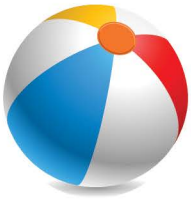
The computer costs 500 JD and the printer costs 220 JD.

How much money does he need?

500 + 220 = 720 JD

(4-6) Problem Solving

1. Look at the pictures and answer the following questions:

2 JD	8 JD	4 JD	12 JD	25 JD
				

A How much money would you need to buy:

- A robot and a yoyo. 25 + 2 = 27 JD
- A windmill and a beach ball. 4 + 8 = 12 JD
- A bicycle and a robot. 12 + 25 = 37 JD

B How much change would you get from 100 JD if you bought a robot and a bicycle?

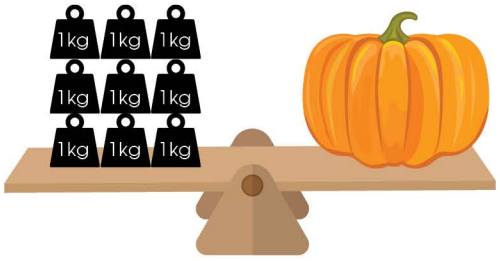
25 + 12 = 37 JD

100 - 37 = 63 JD

Show Your Turn

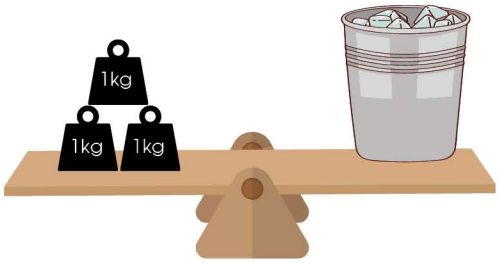
1. Write down the mass.

A



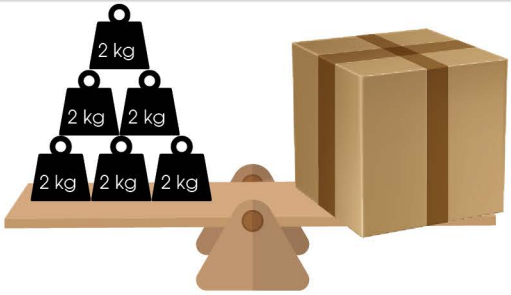
9 kg

B



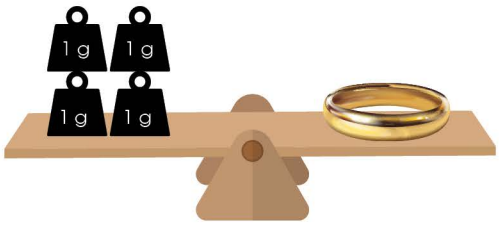
3 kg

C



12 kg

D



4 g

- Which object is the heaviest? C
- Which object is the lightest? D

2. Write down the correct time.

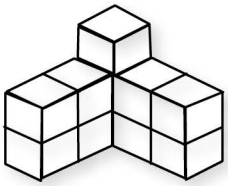
12:30

2:30

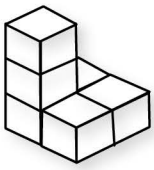
7:00

4:45

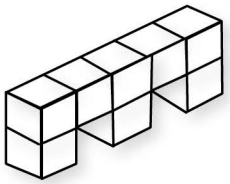
3. Find the volumes, then answer the questions.

A 

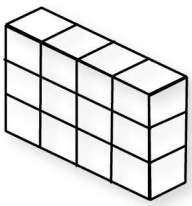
Volume = 11 cm^3

B 

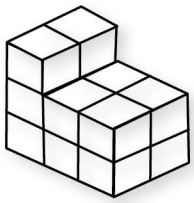
Volume = 6 cm^3

C 

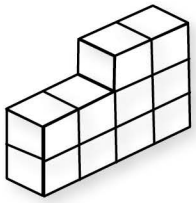
Volume = 8 cm^3

D 

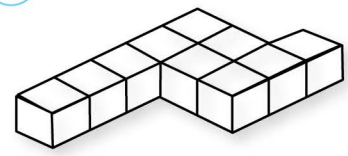
Volume = 12 cm^3

E 

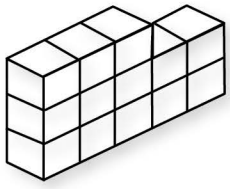
Volume = 14 cm^3

F 

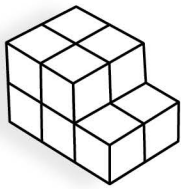
Volume = 10 cm^3

G 

Volume = 10 cm^3

H 

Volume = 13 cm^3

I 

Volume = 10 cm^3

- **Which model has the greatest volume?** E
- **Which model has a volume of 11 cm^3?** A
- **Which models have volumes of 10 cubic centimeters?** F, G, I
- **Which model has the least volume?** B

Unit 5

Geometry and Patterns

Vocabulary

- 2D shapes
- circle
- oval
- square
- triangle
- star
- hexagon
- diamond
- rectangle
- side
- vertex
- 3D shapes
- cone
- sphere
- pyramid
- cylinder
- cube
- cuboid
- face
- edge
- geometric patterns
- number patterns

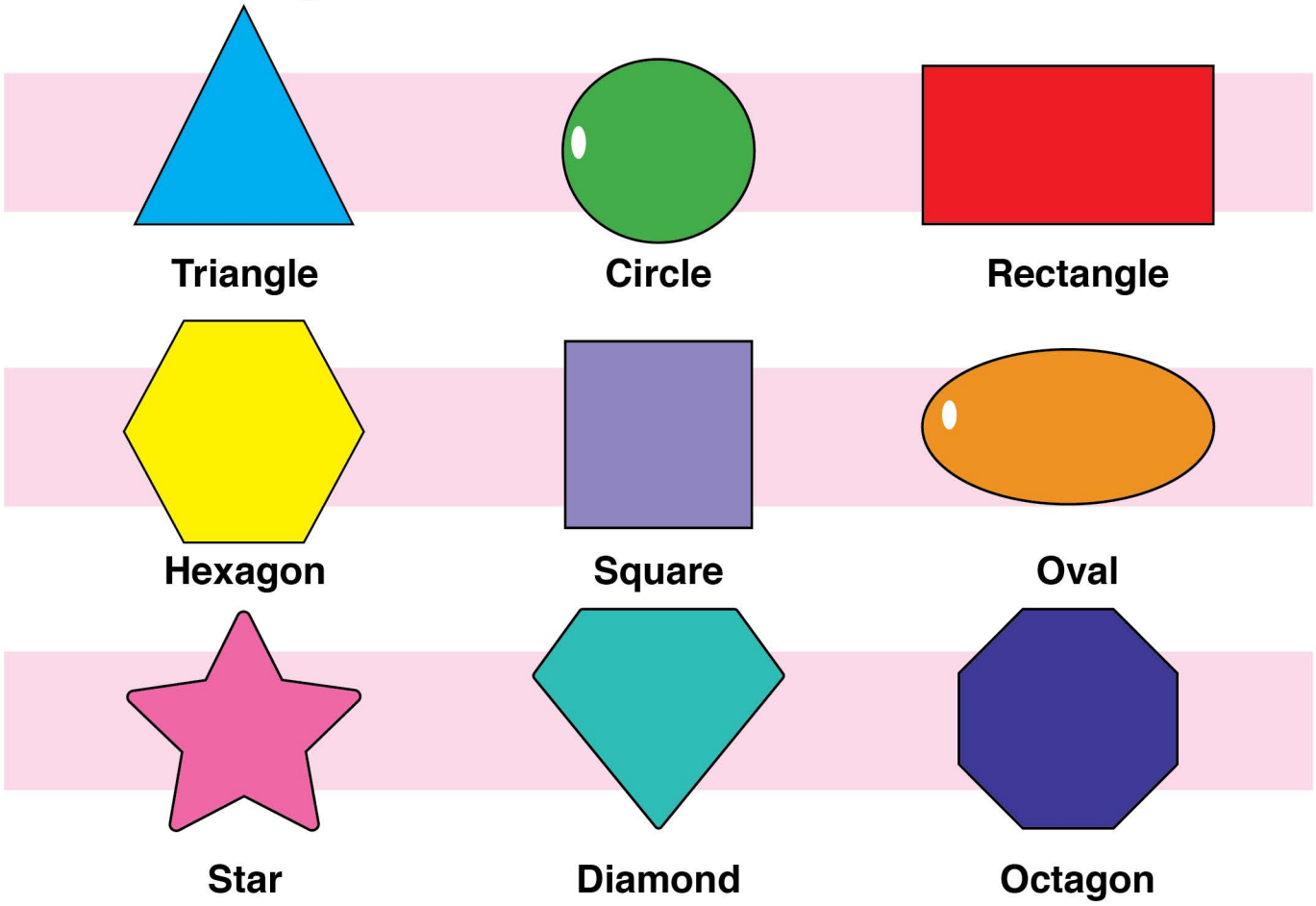
Objectives

Upon completion of this unit, you will be able to:

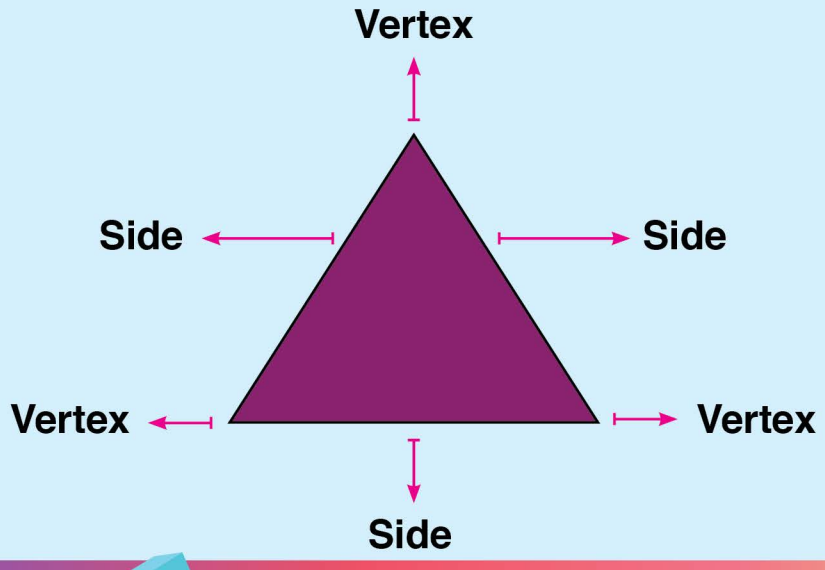
- Recognize the names of 2D shapes.
- Identify the 3D shapes.
- Recognize patterns of shapes and numbers.
- Complete the missing patterns.

(5-1) Shapes

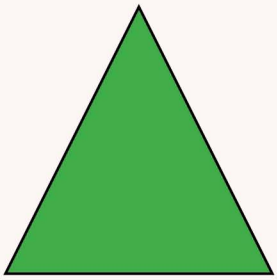
A shape is the form or outline of an object. Shapes can be flat or solid. Flat shapes, also known as 2D shapes, are figures that have only two dimensions: length and width.

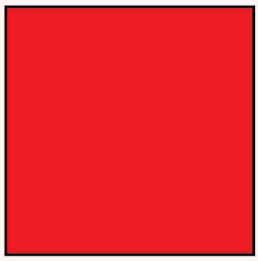


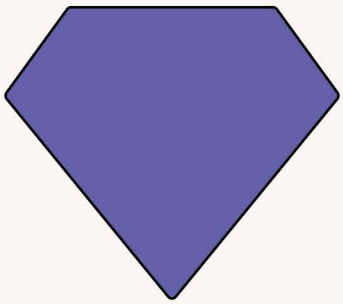
2D shapes have two main parts: sides and vertices.

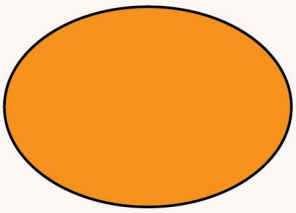


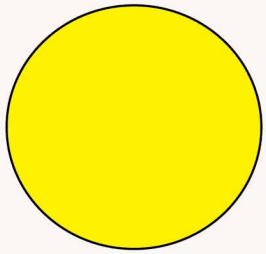
1. Color the shapes.

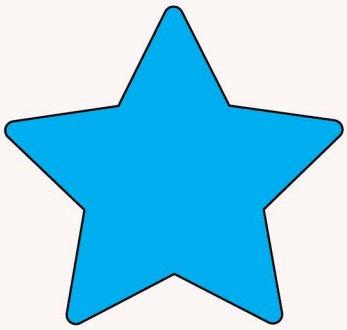












circle = yellow

oval = orange

square = red

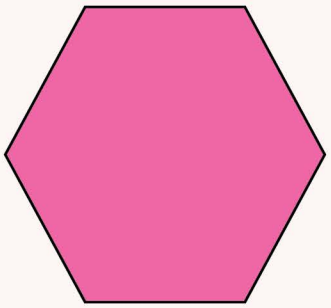
triangle = green

star = blue

hexagon = pink

diamond = purple

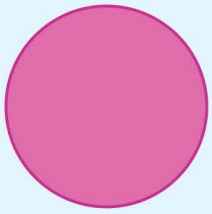
rectangle = black



2. Write down how many sides and vertices are in each shape.

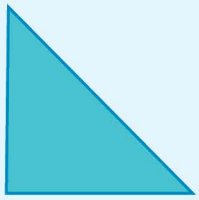
Sides 4

Vertices 4



Sides 0

Vertices 0

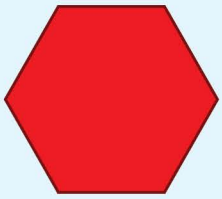


Sides 3

Vertices 3

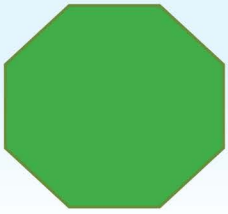
Sides 4

Vertices 4



Sides 6

Vertices 6



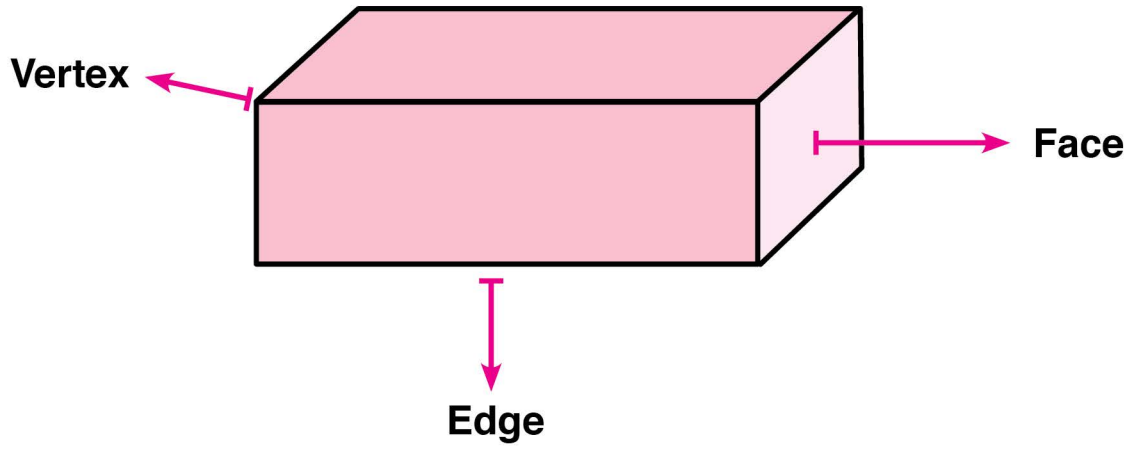
Sides 8

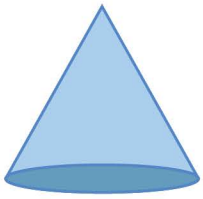
Vertices 8

(5-2) Solid Shapes

Solid shapes, also known as 3D shapes, are figures that have three dimensions: length, width, and height.

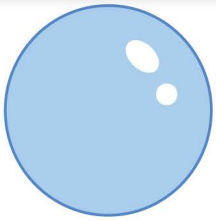
3D shapes have three main parts: faces, edges, and vertices.





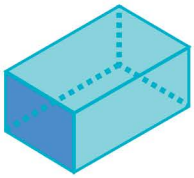
Cone

2 faces
1 edge
1 vertex



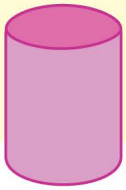
Sphere

1 face
1 edge
0 vertices



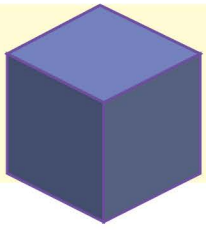
Cuboid

6 faces
12 edges
8 vertices



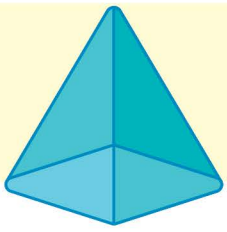
Cylinder

3 faces
2 edges
0 vertices



Cube

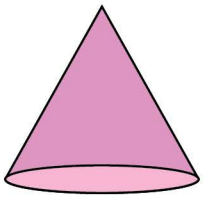
6 faces
12 edges
8 vertices



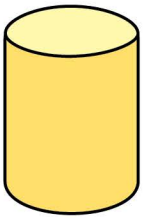
Pyramid

5 faces
8 edges
5 vertices

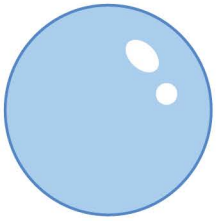
1. Name each of these 3D shapes below.



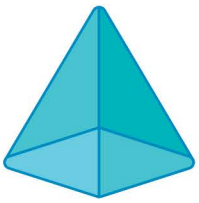
cone



cylinder

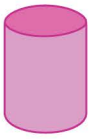
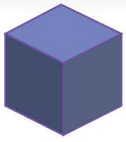
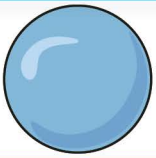


sphere

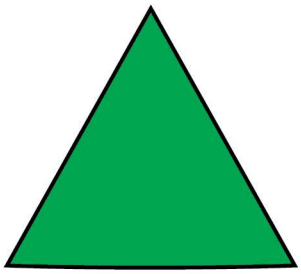


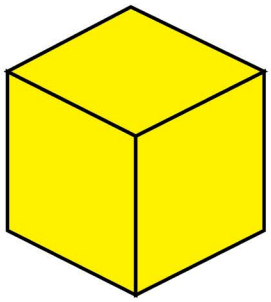
pyramid

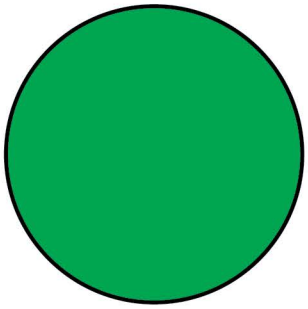
2. Fill in the table.

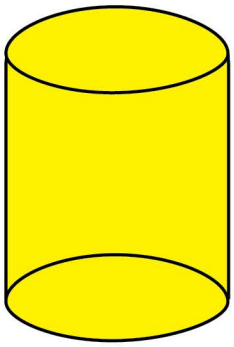
	Shape Name	Number of Faces	Number of Edges	Number of Vertices
	cylinder	3	2	0
	cube	6	12	8
	pyramid	5	8	5
	sphere	1	1	0
	cone	2	1	1
	cuboid	6	12	8

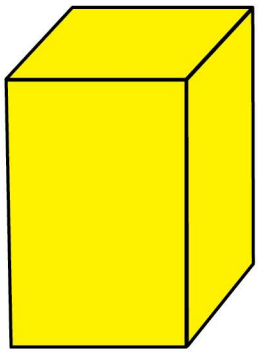
3. Color the 2D shapes green and the 3D shapes yellow.

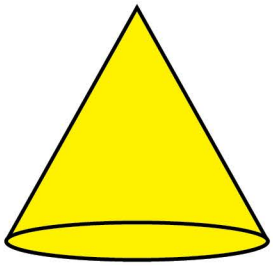








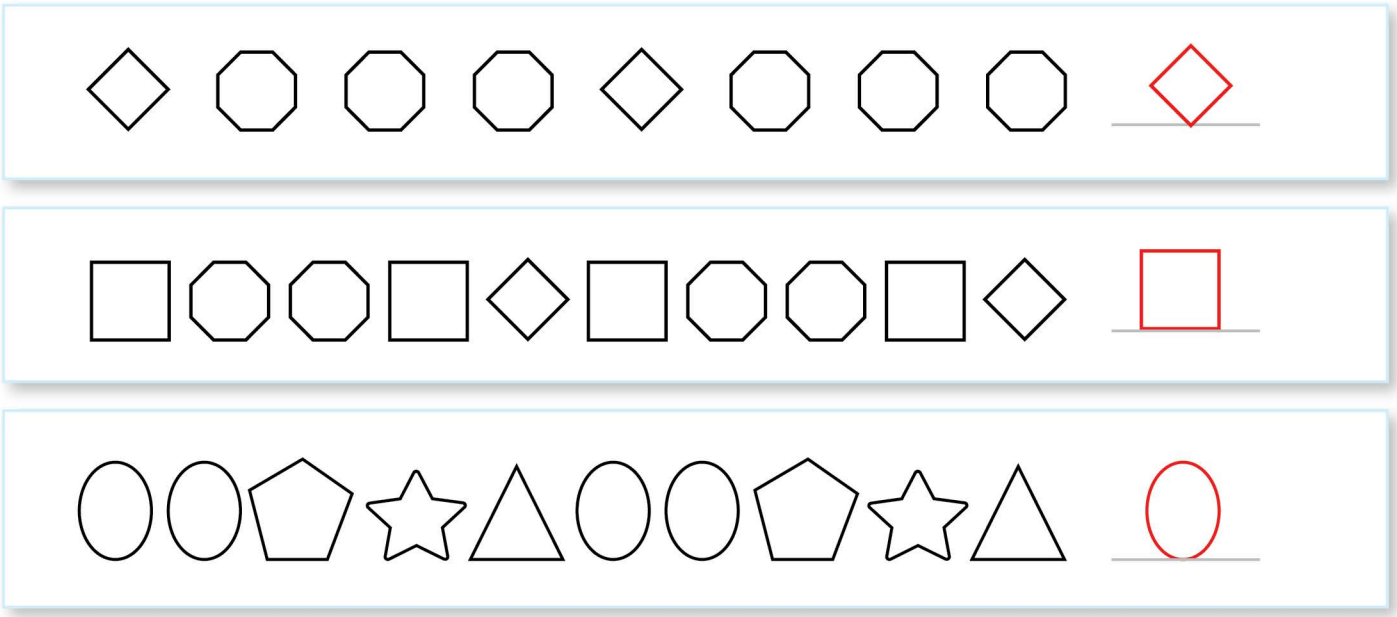




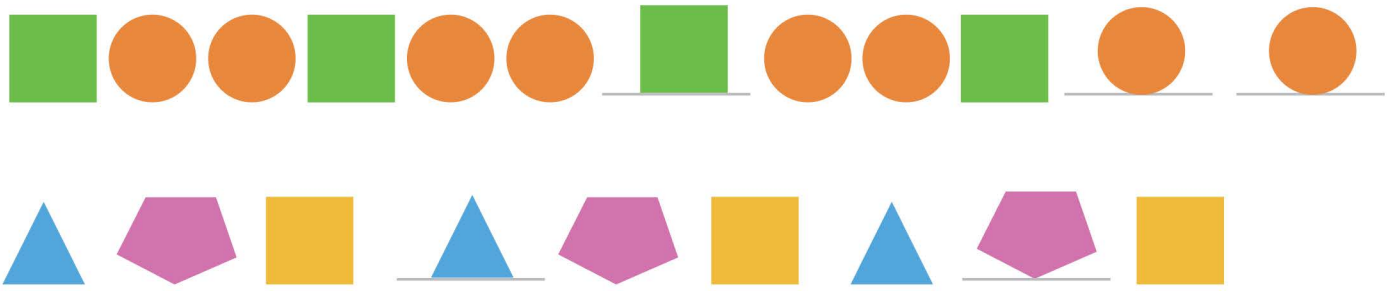
(5-3) Geometric Patterns

A geometric pattern is a sequence of geometric shapes.

1. Draw to complete each pattern with the next figure.



2. Draw the missing shapes to complete each pattern.



Your Work

Students' own answers

1. Draw a geometric pattern of your own.

e.g,

(5-4) Number Patterns

A number pattern is a sequence of numbers.

1. Write down the missing numbers to continue each pattern.

(A) 1, 3, 5, 1, 3, 5, 1, 3 , 5 , 1 , 3 , 5

(B) 3, 2, 6, 3, 2, 6, 3, 2, 6 , 3 , 2 , 6

(C) 4, 5, 7, 4, 5, 7, 4 , 5, 7 , 4 , 5 , 7

(D) 1, 1, 2, 1, 1, 2, 1 , 1 , 2, 1 , 1 , 2

2. Complete the patterns.

(A) 2, 4, 6, 8, 10, 12 , 14 , 16

(B) 1, 4 , 7, 10, 13, 16, 19 , 22, 25, 28 , 31 ,

(C) 65, 60, 55, 50, 45 , 40 , 35 , 30 , 25

(D) $\frac{1}{10}$, $\frac{2}{10}$, $\frac{3}{10}$, $\frac{4}{10}$, $\frac{5}{10}$, $\frac{6}{10}$, $\frac{7}{10}$, $\frac{8}{10}$, $\frac{9}{10}$, $\frac{10}{10}$

3. Write down the missing numbers.

5 →	10 →	15 →	20 →	25 →
4	8	12	16	20
3	6	9	12	15
2	4	6	8	10
7	14	21	28	35
8	16	24	32	40
10	20	30	40	50

(5-5) Problem Solving

1. Complete each pattern, and then Write down its rule.

12 16 20 24 28

Rule: + 4

17 19 21 23 25

Rule: + 2

30 40 50 60 70

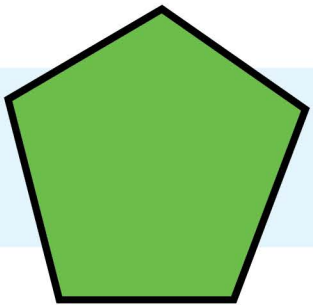
Rule: + 10

84 74 64 54 44

Rule: - 10

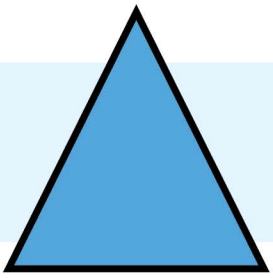
Show Your Turn

1. How many sides and vertices are in each shape.



Sides 5

Vertices 5

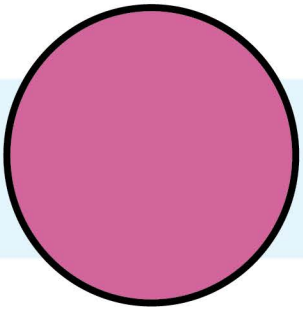


Sides 3

Vertices 3

Sides 4

Vertices 4



Sides 0

Vertices 0

2. Color the correct shapes.

(A) **Circle:**

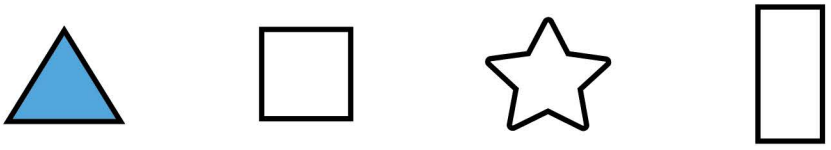
(B) **Rectangle:**

(C) **Square:**

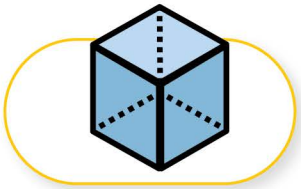
(D) **Star:**

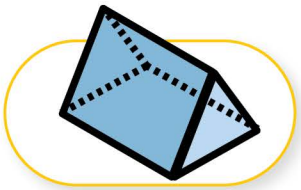
(E) **Hexagon:**

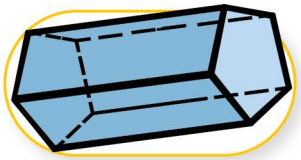
(F) **Triangle:**

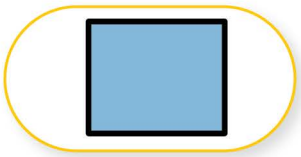


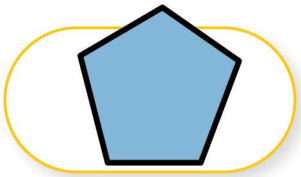
3. Match each figure with the correct sentence.

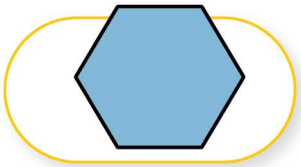












It has 4 vertices.

It has 7 faces.

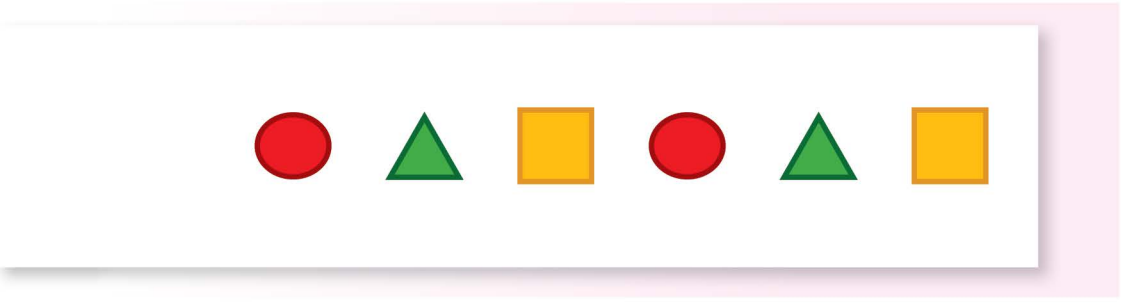
It has 5 sides.

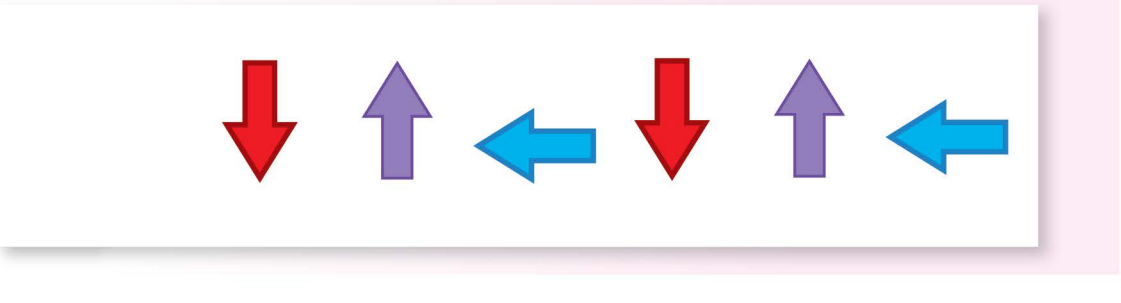
It has 6 sides.

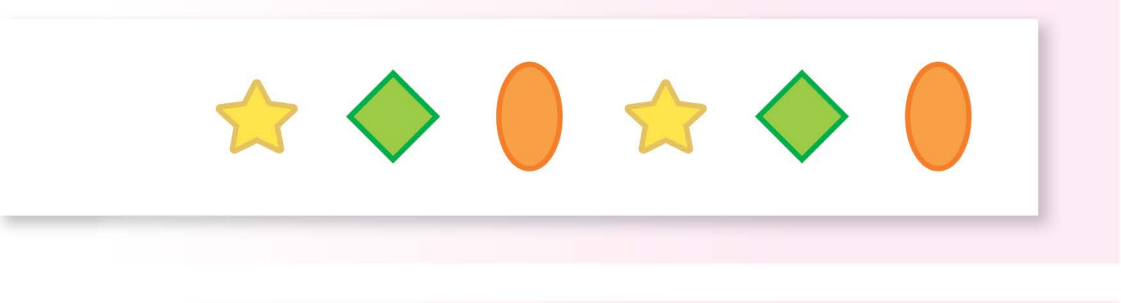
It has 6 faces and 8 vertices.

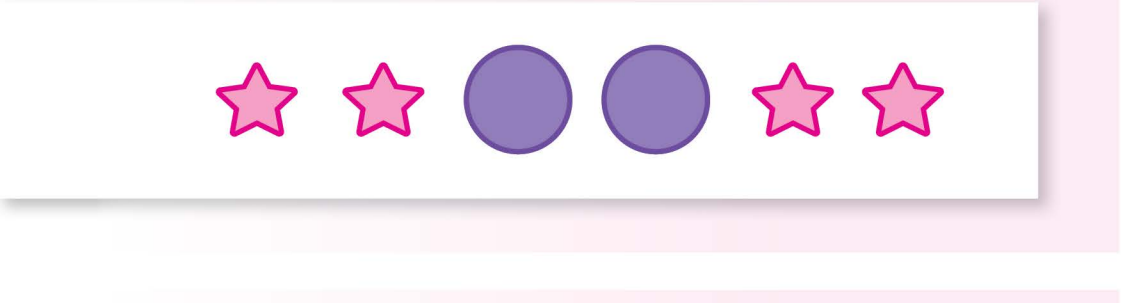
It has two triangle faces.

4. Circle the next figure for each pattern.









Spark of Math