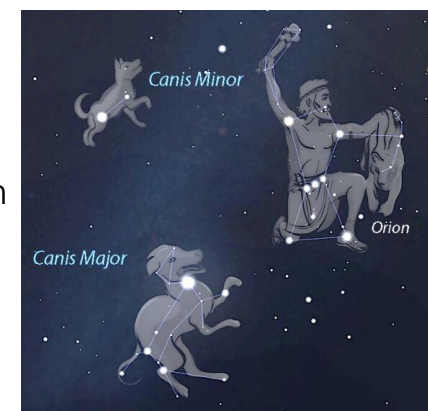


Name \_\_\_\_\_

# STARS IN THE SKY



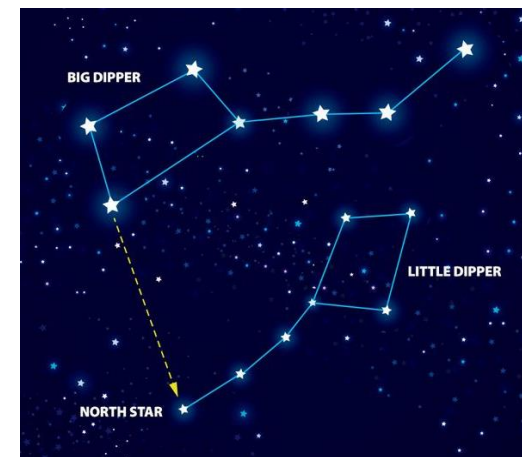
## WHAT ARE CONSTELLATIONS?

On a really dark night, you can see about 1000 to 1500 stars. These stars are VERY far away from Earth. They are not connected to each other at all. Throughout history, poets, farmers and astronomers have looked into the sky and found patterns in the stars that look like familiar shapes. We call these imaginary shapes constellations. Some stars in a constellation might be close while others are very far away. If you were to draw lines in the sky between the stars in a constellation like a dot-to-dot puzzle – and use lots of imagination – the picture would look like an object, an animal, or person. Being able to find these shapes in the sky allowed early people to use the night sky to predict the seasons for farming, measure time and for navigation. Over time people have named the constellations after what they look like or after mythological figures. Today, there are 88 officially recognized constellations.

**ANSWER:** What was the purpose of constellations in human history?

## FINDING PICTURES IN THE SKY

Because as the Earth revolves around the Sun, we see different constellations at different times of the year and at different locations on Earth. There are some stars that you can always see; called circumpolar constellations. The Big Dipper is part of a circumpolar constellation and is one of the easiest star patterns to locate in Earth's sky. It's visible just about every clear night in the Northern Hemisphere, looking like a big dot-to-dot of a kitchen spoon. As Earth spins, the Big Dipper and its sky neighbor, the Little Dipper, rotate around the North Star, Polaris. From the northern part of the Northern Hemisphere, the Big and Little Dippers are in the sky continuously, circling endlessly around Polaris. If you can spot the Big Dipper, then you can find the Little Dipper and the North Star, Polaris! On spring and summer evenings in the Northern Hemisphere, the Big Dipper shines at its highest in the evening sky. On autumn and winter evenings, the Big Dipper sits closer to the horizon. The Big Dipper belongs to the constellation Ursa Major, the Great Bear. The Little Dipper belongs to the constellation Ursa Minor, the Smaller Bear. You can see in the pictures to the right that some constellations take a lot of imagination to see!



**ANSWER:** What are constellations called that can be seen all year long?

# WHAT CONSTELLATIONS CAN YOU SEE IN THE NIGHT SKY?

It can be fun on a dark night to try to find the patterns in the stars. On a winter night, you can look for 3 stars in a row, close together. That's part of the constellation Orion-the Hunter. Once you find the 3 stars that make up Orion's Belt, you can find 2 very bright stars; Betelgeuse and Rigel. Then, Look for the rest of the constellation: arms, legs and his bow. Once you recognize Orion, you can find Orion's Hunting Dogs and other nearby constellations.



The constellations you can see at night depend on the time of year. Earth orbits around the Sun once each year. Our view into space through the night sky changes as we orbit. In the Northern Hemisphere, the constellation Orion is a winter constellation, while Leo is seen in spring, Scorpius in summer, and Pegasus in autumn. So, the night sky looks slightly different each night because Earth is in a different spot in its orbit each night. The stars appear each night to move slightly west of where they were the night before.

When we look at the night sky, we are looking in the opposite direction of the Sun. For example, in the Northern Hemisphere when you look into the night sky on September 21, you'll be able to see the constellation Pisces. You won't see Virgo, since that constellation is on the other side of the Sun. In September, Virgo's stars would only be visible during the daytime – but you'd never see them because of the brightness of our Sun.

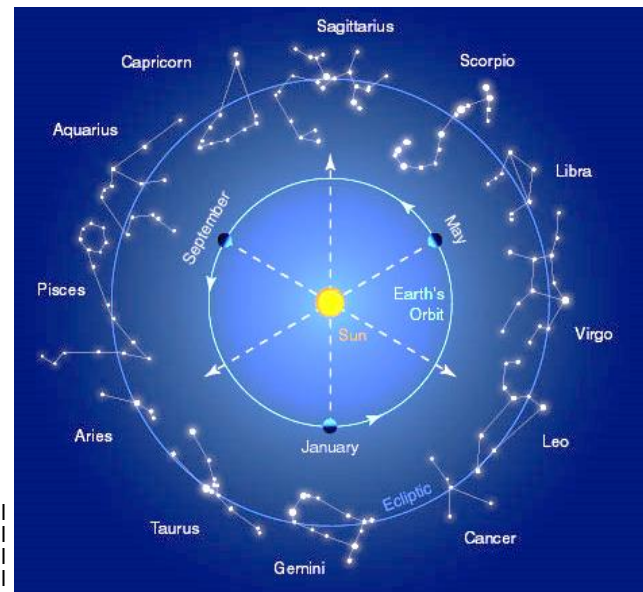


To help understand this, imagine sitting on a merry-go-round (Earth) with a very bright light (the Sun) placed at its center. If you look towards the center, you will not be able to see past the light because of its brightness. You can only see things by looking out from the merry-go-round.

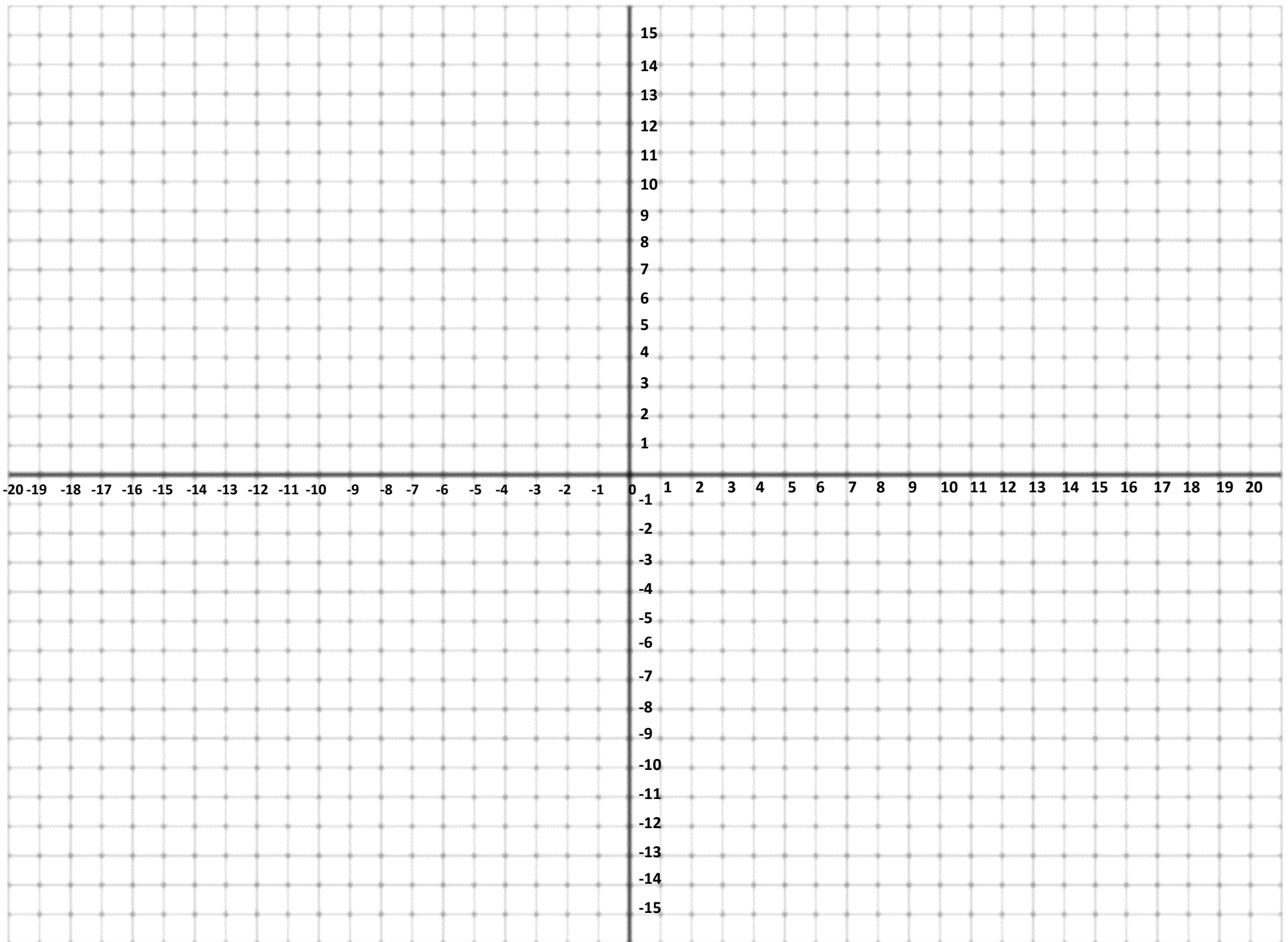
**ANSWER: Explain in your own words why the same constellations are not visible in the night sky every night all year long.**

Your location on Earth also determines what stars and constellations you see, and how high they appear to rise in the sky. Stargazers in Australia get a slightly different view of the sky and can see a few different constellations than those in the United States because of earth's tilt.

**ANSWER: Why do we not see constellations on the other side of the Sun (why do we not see the constellation Leo in September)?**



This diagram shows what constellations are visible during different months of the year.



Name: \_\_\_\_\_



# ASTRONOMY VS. ASTROLOGY

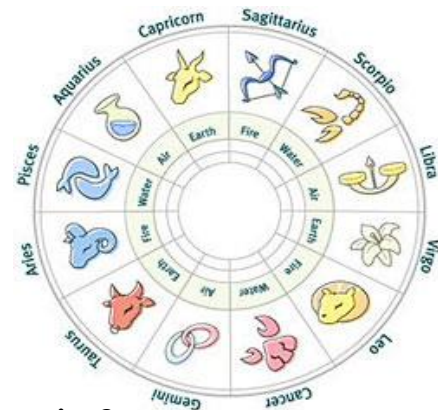
Even though astrology and astronomy have common roots and look at objects in the night sky, there is an important difference between astrology and astronomy today.

- Astronomy is the study of the universe and its contents outside of Earth's atmosphere. Astronomers examine the positions, motions, and properties of celestial objects.
- Astrology attempts to study how those positions, motions, and properties affect people and events on Earth. In history, the desire to improve astrological predictions was one of the main motivations for astronomical observations and theories.



Astrology was considered part of mainstream science until the late 1600s, when Isaac Newton changed how we understand the Universe by discovering the laws of gravity and motion. Newton showed that the same laws that make an apple fall from a tree, also apply to the motions of the objects in the Solar System. Since then, astronomy has evolved into a separate field, where predictions about celestial phenomena are made and tested using the scientific method.

In astrology, a sign of the zodiac refers to one of 12 specific constellations of the zodiac that the Sun passes through. Over the course of a year, the Sun appears to be in front of, or "in", different constellations. One month, the Sun appears in Gemini; the next month, in Cancer. The dates listed in the newspaper's horoscope tell when the Sun appears in a particular astrological sign. For example, the time between March 21 and April 19, is for the sign Aries. A person's sign of the zodiac is the one that the Sun was in when they were born. It is a belief in astrology (not astronomy) that a person's personality can be predicted using their sign of the zodiac.

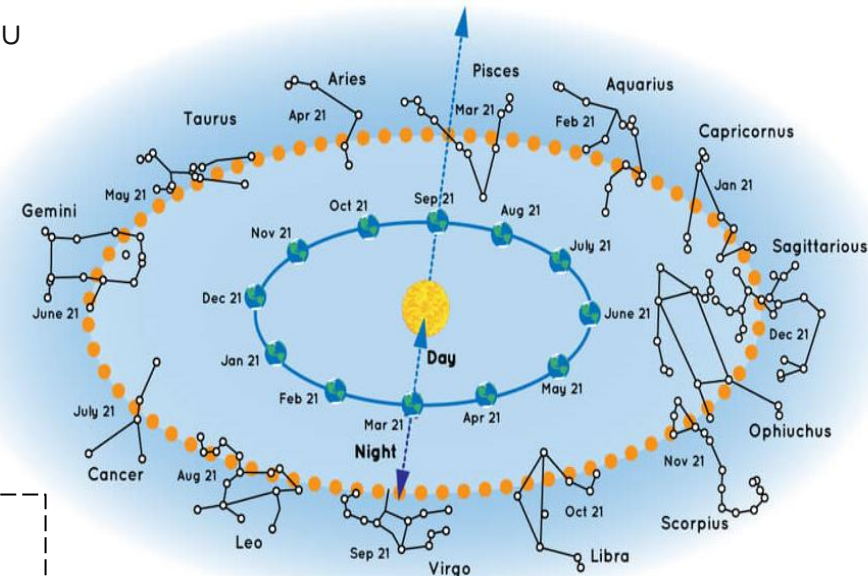


## WHY YOUR ZODIAC SIGN IS PROBABLY WRONG

***I was born a Leo, but the Sun was in the middle of Aquarius when I was born – so, shouldn't I be an Aquarius?***

The zodiac is closely tied to how the Earth moves through the sky. You might think that dates in a horoscope correspond to when the Sun passes through each constellation, but they don't always because astrology and astronomy are different.

When the ancient Babylonians originally drew the constellations, about 3,000 years ago, they didn't realize that the Earth's rotation was a bit wobbly, which would throw their drawing off after a few thousand years of the Earth spinning through space. As a result, the position of these stars in relation to our planet has shifted somewhat over time, meaning the constellations charted by these ancient people don't quite appear at the same times anymore.



**ANSWER: What is your zodiac sign?**  
**What is the constellation in the sky on your birthday?**

# CONSTELLATIONS COORDINATE GRAPHING

**DIRECTIONS:** Plot the points below on the graph given. Each coordinate is written as x, y. Find the first number on the x axis and the second number on the y axis and draw a dot! Connect the dots with lines to create the diagram. *Pick up your pencil when you get to the STOP line and start a new line at the START line.* PAY ATTENTION to positive and negative numbers!

A. Title this **SUMMER SKY** in the top right corner of the page.

B. Label these points  
 1, 15 NORTH  
 20, 1 WEST  
 -1, -15 SOUTH  
 -20, 1 EAST

C. Connect these points with a line to create the constellation **Scorpius** (*the Scorpion*).

START  
 5,-10  
 6,-9  
 6, -11  
 5,-10  
 4, -10  
 3, -12  
 3,-13  
 2, -14  
 1, -15  
 -1, -14  
 -1, -13  
 0, -12  
 STOP

Label it.

D. Connect these points with a VERY BOLD line to create the constellation **The Big Dipper**.

START  
 6, -1  
 4,1  
 4, 2  
 5,4  
 6,6  
 5,8  
 3,8  
 5,4  
 STOP

Label it.

E Connect these points with 3 more lines to add the stars to the Big Dipper needed to see the constellation **Ursa Major** (*the Big Bear*- which is the constellation the Big Dipper is part of).

START	START	START
3,8	4, 10	6, 6
2,9	5, 11	8, 7
2,11	5, 13	9, 9
4,10	5, 11	8, 7
5,8	6, 13	10, 7
STOP	STOP	STOP

Label it.

F. Connect these points with a line to create the constellation **Cassiopeia** (*the Seated Queen*).

START  
 -3, 1  
 -5, 2  
 -3, 3  
 -5, 5  
 -3, 6  
 STOP

Label it.

G Connect these points with a line to create the constellation **Libra**.

START  
 6, -6  
 7, -7  
 9, -6  
 10, -7  
 9, -9  
 9, -6  
 9, -9  
 7, -8  
 STOP

Label it.

H. Connect these points with 3 separate lines to create the constellation **Hercules** (*the Hero*).

START	START	START
3, -1	2, -5	1, -1
2, -3	1, -5	2, -3
2, -5	-1, -3	0, -3
3, -7	2, -3	1, -5
4, -8	STOP	-1, -7
STOP	STOP	-3, -6
Label it.		STOP

Label it.

I. Connect these points with a line to create the constellation **The Little Dipper**.

START  
 -1, 6  
 -1, 5  
 0, 4  
 1, 4  
 2, 3  
 2, 2  
 0, 3  
 1, 4  
 STOP

Label it.

J. Connect these points with a line to create the constellation **Aquarius** (*the Man Holding Water*).

START  
 -17, -11  
 -16, -9  
 -15, -8  
 -14, -8  
 -14, -10  
 -14, -8  
 -12, -6  
 -12, -5  
 -12, -6  
 -11, -6  
 -10, -5  
 -9, -6  
 -7, -6  
 STOP

Label it.

K. Connect these points with 3 separate lines to create the constellation **Pegasus** (*the Winged Horse*).

START	START	START
-8, 7	-9, -2	-4, -2
-10, 4	-7, -1	-6, -1
-9, 1	-9, -1	-7, -1
-8, 5	-11, 0	-7, -2
-6, 6	-9, -2	-5, -3
STOP	-9, -3	STOP
	-8, -4	
	-6, -4	
	STOP	

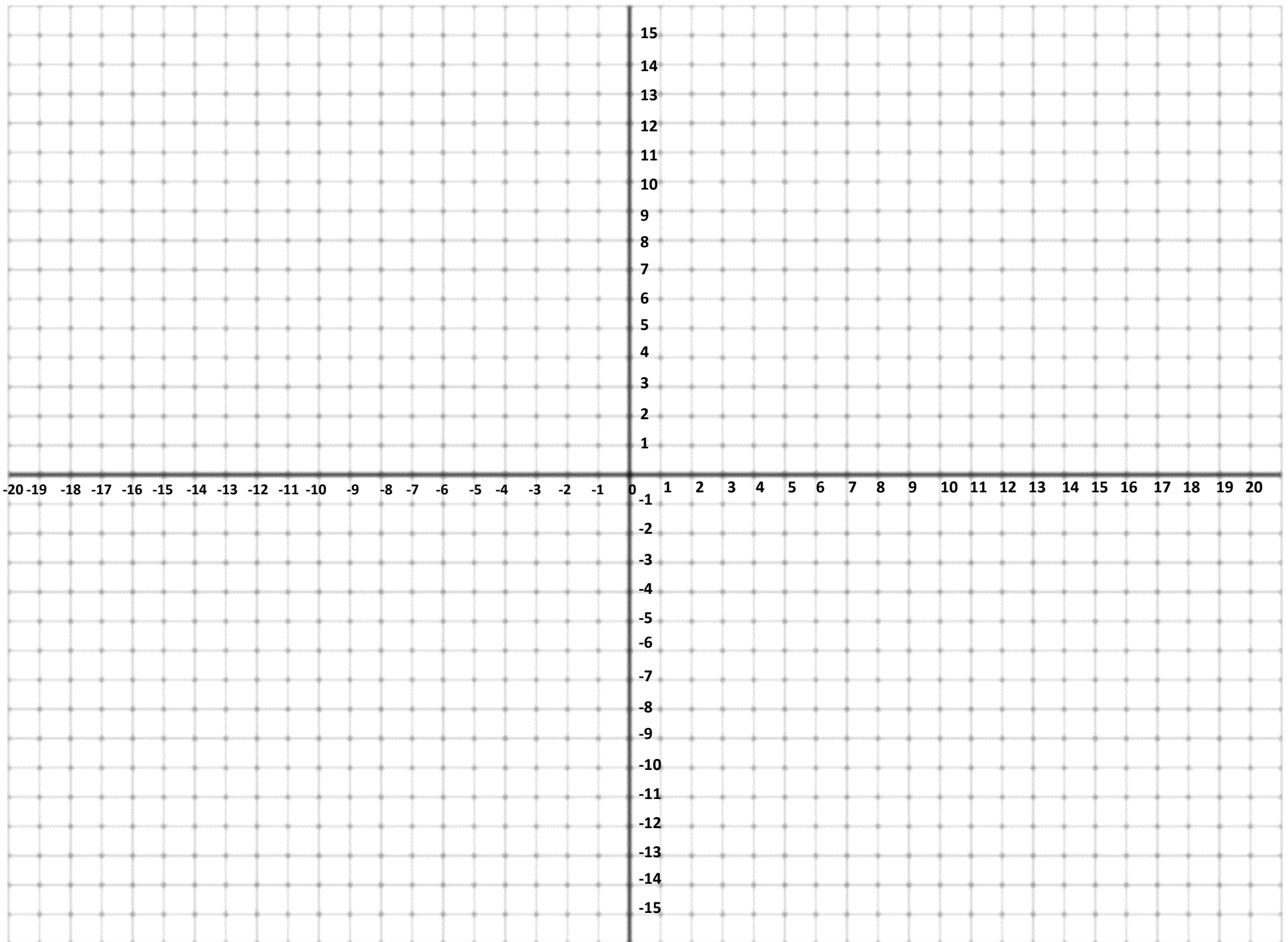
Label it.

L. Connect these points with a line to create the constellation **Capricornus** (*the Sea Goat*).

START  
 -4, -7  
 -6, -8  
 -8, -8  
 -7, -10  
 -6, -11  
 -5, -9  
 -4, -7  
 STOP

Label it.

M. Use the pictures of the constellations to draw in the imaginary shapes that these stars represent. Be creative!



Name: \_\_\_\_\_

# CONSTELLATIONS COORDINATE GRAPHING

**DIRECTIONS:** Plot the points below on the graph given. Each coordinate is written as x, y. Find the first number on the x axis and the second number on the y axis and draw a dot! Connect the dots with lines to create the diagram. *Pick up your pencil when you get to the STOP line and start a new line at the START line.* PAY ATTENTION to positive and negative numbers!

A. Title this **WINTER SKY** in the top right corner of the page.

- B. Label these points  
 1, 15 NORTH  
 20, 1 WEST  
 -1, -15 SOUTH  
 -20, 1 EAST

C. Connect these points to create the constellation **Leo** (*the Lion*).

- START  
 -10, 2  
 -9, 3  
 -9, 4  
 -10, 4  
 -11, 3  
 -12, 6  
 -12, 8  
 -11, 6  
 -12, 6  
 -11, 6  
 -10, 4  
 STOP

Label it.

D. Connect these points with a VERY BOLD line to create the constellation **The Big Dipper**.

- START  
 -5,13  
 -3,11  
 -2,8  
 0,5  
 -2,5  
 -3,7  
 -2,8  
 STOP

Label it.  
 E Connect these points with 3 more lines to add the stars to the Big Dipper needed to see **Ursa Major** (*the Big Bear*- which is the constellation the Big Dipper is part of).

- |       |       |       |
|-------|-------|-------|
| START | START | START |
| -3,7  | -2,5  | -1,3  |
| -5,7  | -1,3  | -2, 2 |
| -6,6  | 1,2   | -3, 1 |
| -5,7  | 1,3   | -2,2, |
| -6,8  | 0,5   | -2,1  |
| STOP  | STOP  | STOP  |

Label it.

F. Connect these points with a line to create the constellation **Cassiopeia** (*the Seated Queen*).

- START  
 4,1  
 5,-1  
 7,1  
 8,-1  
 9,1  
 STOP

Label it.

G Connect these points with a line to create the constellation **Cancer** (*The Crab*).

- START  
 -10, 1  
 -7, 1  
 -5, 3  
 -7, 1  
 -8, -2  
 STOP

Label it.

H. Connect these points with a line to create the constellation **The Little Dipper**.

- START  
 3,3  
 4,4  
 4,5  
 3,6  
 2,7  
 2,8  
 4,6  
 3,6  
 STOP

Label it.

I. Connect these points with a line to create the constellation **Orion** (*the Hunter*).

- START  
 2, -5  
 -1, -5  
 -2, -2  
 -5, -3  
 -4, -7  
 -5, -11  
 -1, -11  
 -2, -7  
 -1, -5  
 STOP  
 START  
 -4, -7  
 -3, -7  
 -2, -7  
 STOP

- START  
 2, -3  
 3, -4  
 3, -6  
 2, -7  
 STOP  
 START  
 -5, -3  
 -6, -2  
 -6, -1  
 -5, 0  
 STOP

Label it.

J. Connect these points with 3 separate lines to create the constellation **Pegasus** (*the Winged Horse*).

- START  
 16, -4  
 15, -5  
 14, -6  
 13, -6  
 10, -8  
 9, -5  
 12, -4  
 13, -6  
 STOP  
 START  
 13, -1  
 12, -3  
 12, -4  
 13, -4  
 14, -3  
 STOP

- START  
 5, -3  
 7, -4  
 9, -5  
 8, -5  
 7, -5  
 5, -4  
 STOP

Label it.

K. Use the pictures of the constellations to draw in the imaginary shapes that these stars represent. Be creative!

# CONSTELLATION COORDINATE GRAPHING

Draw in the pictures for the constellations!

Students can use these picture to draw in the imaginary pictures for the constellations.

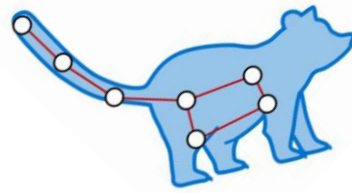
## Ursa Major

*(The Big Bear)*



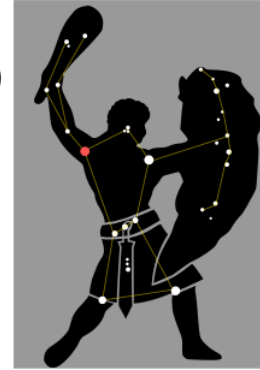
## The Little Dipper

*(also called The Little Bear)*



## Orion

*(The Hunter)*



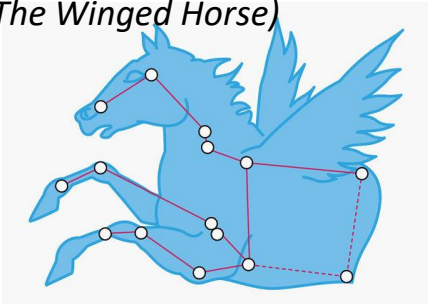
## Cassiopeia

*(The Seated Queen)*



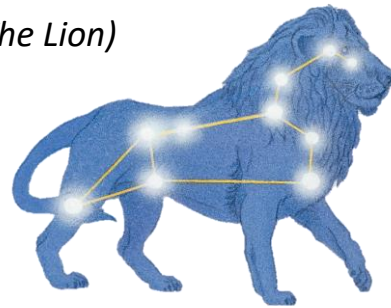
## Pegasus

*(The Winged Horse)*



## Leo

*(The Lion)*



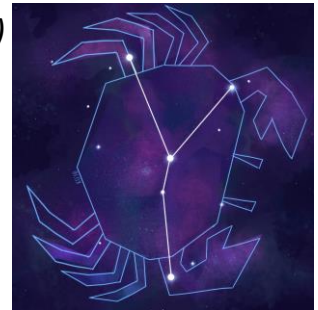
## Libra

*(The Scales of Justice)*



## Cancer

*(The Crab)*



## Aquarius

*(The Man Pouring Water)*



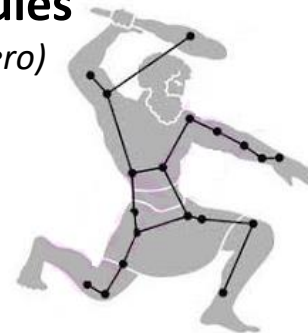
## Capricornus

*(The Sea Goat)*



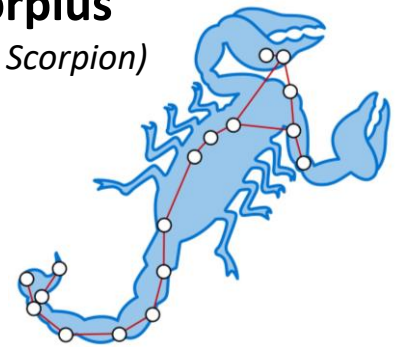
## Hercules

*(The Hero)*



## Scorpius

*(The Scorpion)*



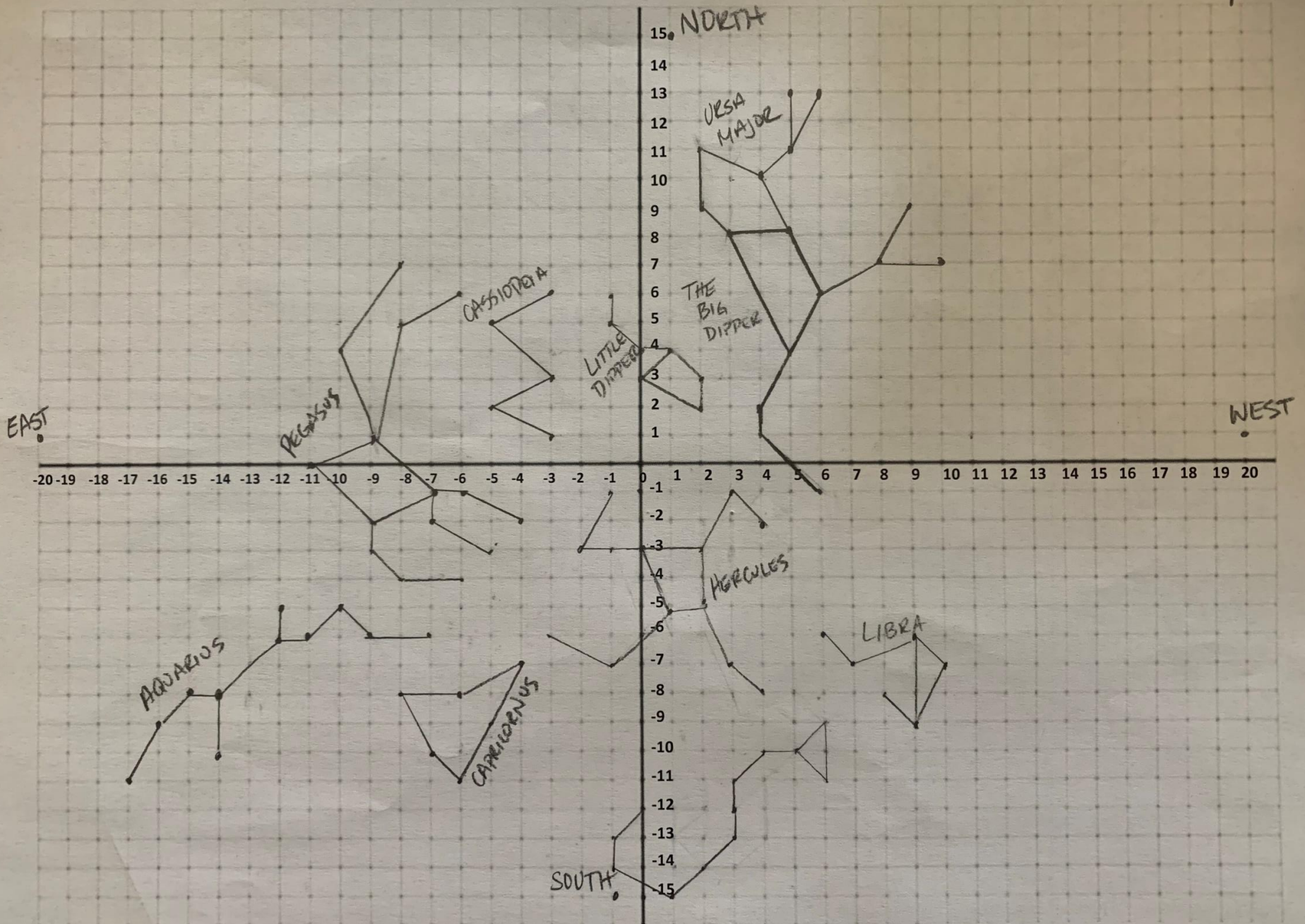


# CONSTELLATION COORDINATE GRAPHING

## Teacher Directions:

1. Students should read the information pages and answer the questions on it.
  1. Review as a class,
2. Explain they will now be making a picture of the night sky using a coordinate grid. This can also be used at night! There are 2 options the summer sky and the winter sky. The directions on the coordinate grid are designed to have students plot points to create constellations visible in the summer and winter months. You could have students make both or split the class in half and assign half winter and half summer.
3. Explain how to plot points on the Constellation Coordinate Grid. (X,Y) The first number is plotted on the X-axis and the second number is plotted on the Y-axis. Be sure to stress positive and negative numbers.
4. Students should check with you for the correct answers.
5. Once done they can draw in pictures on the constellations using the resource sheet.

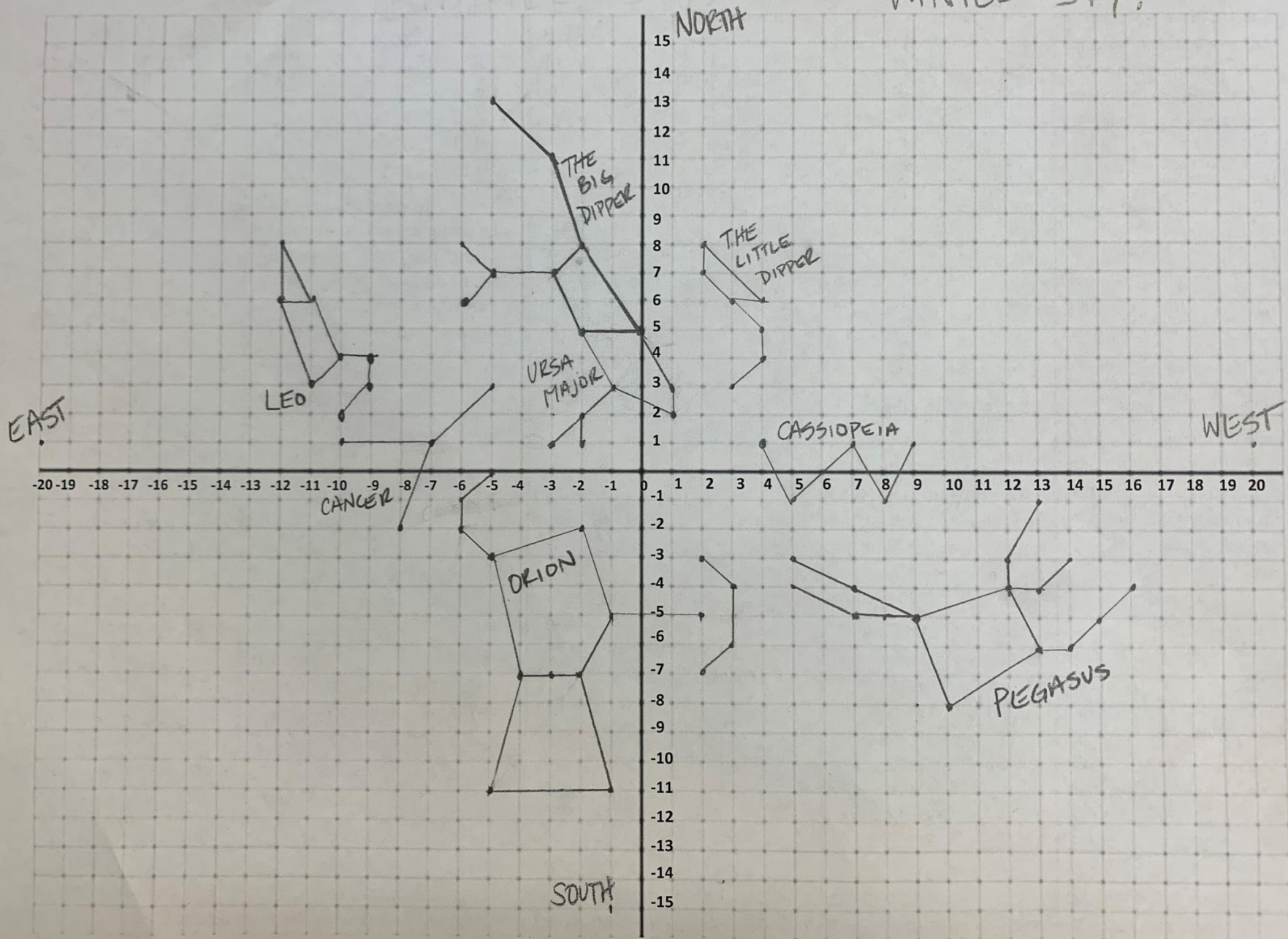
# SUMMER SKY



Name: \_\_\_\_\_



# WINTER SKY!



Name: \_\_\_\_\_