ANGLES

Mata Kuliah Bahasa Inggris untuk Matematika

By:
Chusnul Khotimah Galatea, M.Pd.

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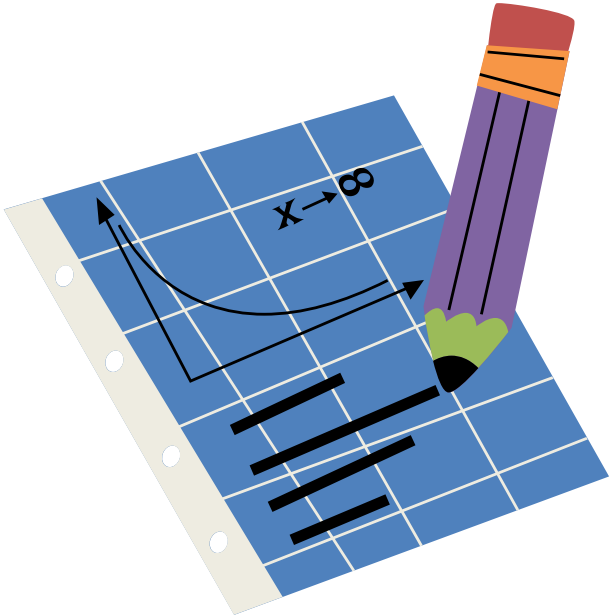
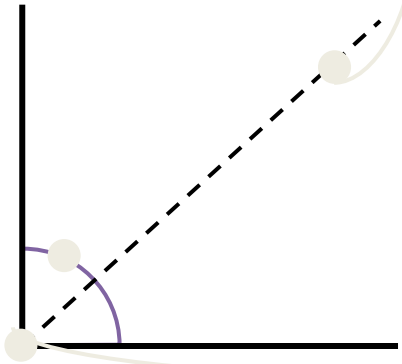
What is an angle?



What is an angle?

The angle is the portion of the plane between two ray lines with a common origin called vertex. Angles start from a point and have two lines that start from that point and generate an opening represented by an arc. The degree of opening of these arcs (and not their extension) is represented by the angle. The line that divides an angle into two equal parts is called a bisector and any point on it is equidistant from both sides of the angle



History of Angles in Math

Ancient Egypt: The mathematical measurement of angles possibly dates back to 1500 BC in Egypt, where measurements were taken of the Sun's shadow against graduations marked on stone tables.

Clay Tablet from Shush, depicting mathematical symbols

Babylonians: In 1936, a clay tablet was excavated at Shush (Khuzistan region of Iran) some 350km from the ancient city of Babylon. The inscription on the tablet shows the ratio of a perimeter of a regular hexagon to the circumscribed circle, i.e., Six sides of a hexagon times their base of 60 = 360. This proved that the Babylonians used the sexagesimal system based on 60 rather than the centesimal system based on units of 100.

History of Angles in Math

Etymology: The word “angle” is derived from the Latin word “angulus,” meaning “corner” and is related to the Greek word “ankylos,” meaning “crooked, curved,” and the English word “ankle.” Both Greek and English words come from the Proto-Indo-European root word "ank-" meaning “to bend” or "bow."

Model of Egyptian Groma

Groma: The first known instrument for measuring angles was possibly the Egyptian Groma, an instrument used in the construction of massive works such as the pyramids.

Protractor: The simple protractor is an ancient device. As an instrument used to construct and measure plane angles, the simple protractor looks like a semicircular disk marked with degrees, beginning with 0° to 180°.

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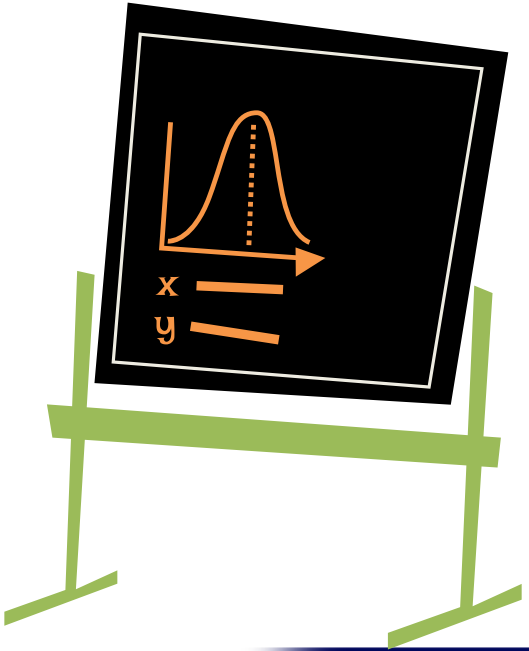
Types of angles



Types of angles based on measurement

Null

It's the angle that is 0°

Acute

It's smaller than 90°

Right

It's the angle that is 90°

Obtuse

Between 90° and 180°

Straight

It's the angle that is 180°

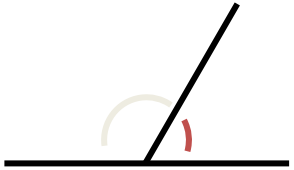
Reflex

It's more than 180°

Full rotation

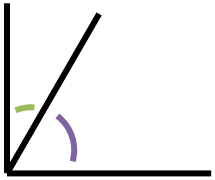
It's the angle that is 360°

Types of angle pairs



Supplementary angles

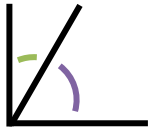
They both add up to 180°



Complementary angles

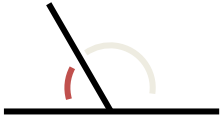
They both add up to 90°

Angles according to their position



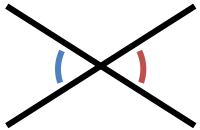
Consecutive angles

Angles that share a side and vertex



Adjacent angles

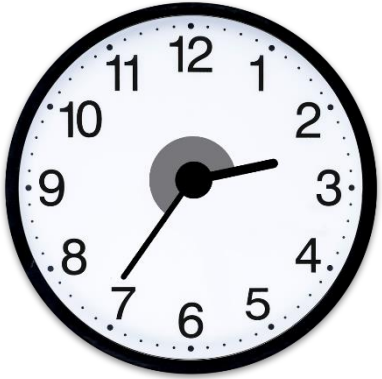
They are consecutive angles and the side they do not share is part of the same straight line



Opposite angles

They are angles that share the vertex but none of the sides

Real-life Examples of Reflex Angles



Hands of a Clock

The hands of a clock form a reflex angle at certain times. For instance, at 9 o'clock, the clock's hands make an angle of 270 degrees in a clockwise orientation, which is greater than 180 degrees and less than 360 degrees.

Pizza Slice

When you remove one slice of pizza, all the other pieces come together to form a reflex angle.

Real-life Examples of Reflex Angles

Chinese Fan

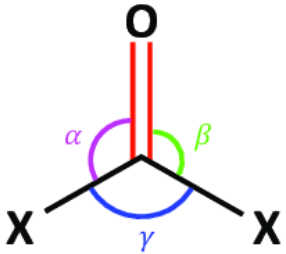
When a Chinese fan is opened, it forms a reflex angle that is greater than 180 degrees.

Pac-Man Game

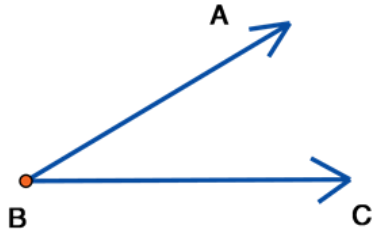
In the popular game Pac-Man, the character's mouth forms a reflex angle when it's open.

Labeling Angles

There are two main ways to label angles:



Give the angle a name, usually a lower-case letter like a or b, or sometimes a Greek letter like α (alpha) or θ (theta).



By the three letters on the shape that define the angle, with the middle letter being where the angle actually is (its vertex). For example, angle “a” is “BAC”, and angle “θ” is “BCD”.

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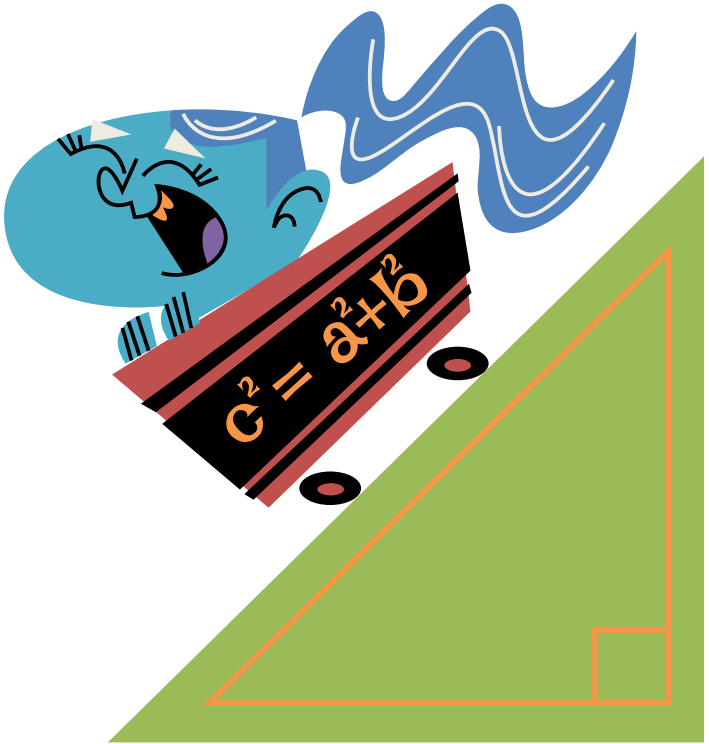
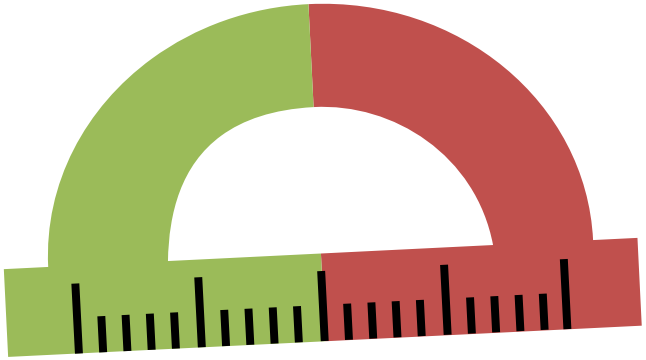
How do I measure an angle?

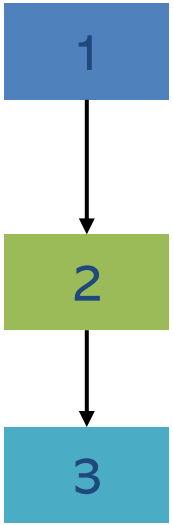




The protractor

To measure the amplitude of an angle, a measuring instrument called a protractor is needed. The protractor has degrees, can be circular or semicircular and is usually made of plastic

Steps to measure an angle



The center of the protractor, which is usually indicated by a line, should be placed at the vertex of the angle (the origin of the angle)

Then check that one of the sides of the angle coincides with the base of the protractor

The graduation of the remaining side is marked on the protractor and this is the amplitude

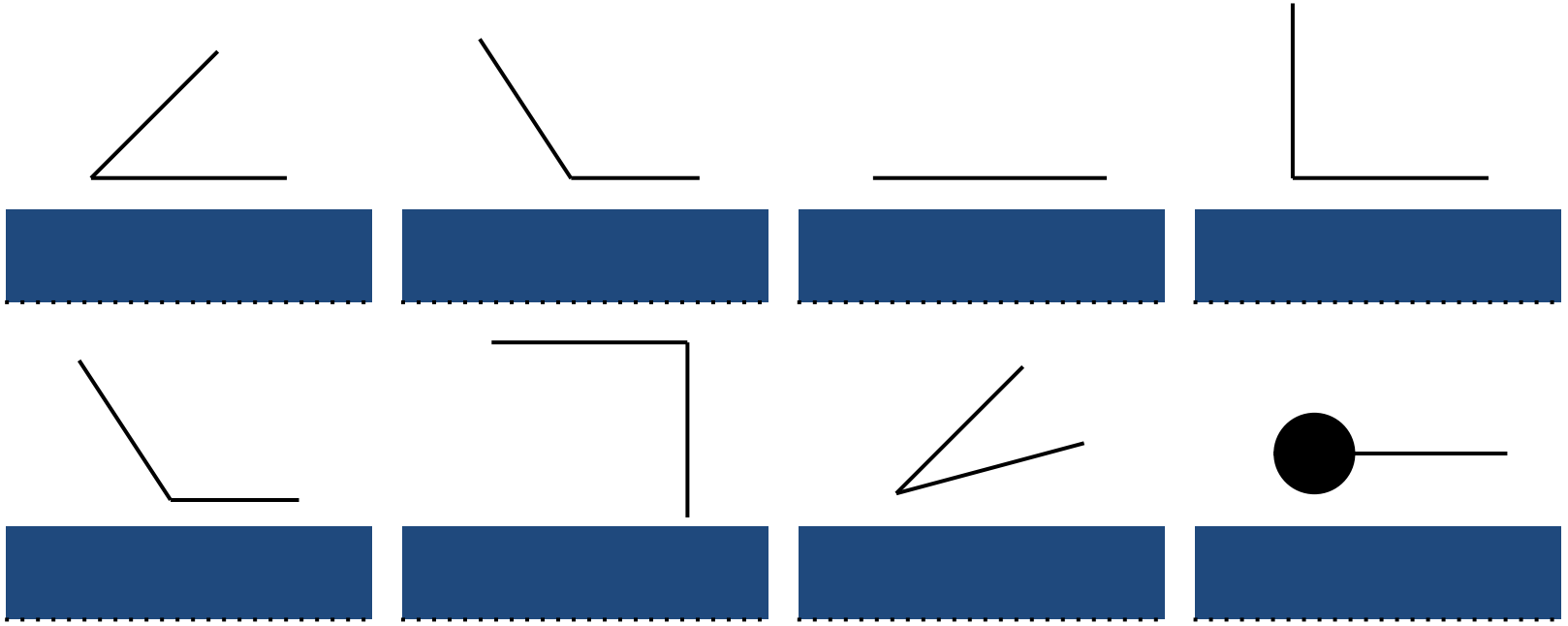
04

Activities

Task 1

Circle the right angles with these circles

Write the name of the angle according to the classification according to its measurement

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