

6. Health Option

6.1 Measurement; Health Applications

6.1 Exercise Set, page 663 (645): 1, 3, 5, 8, 14, 17, 19,

6.2 Ratio, rate, and percent; Health Applications

6.2 Exercise Set, page 680 (662): 1, 6, 10, 11, 18, 20, 21

I will provide supplementary material about computing values in direct, indirect, and inverse variation.

CK-12 Interactive Geometry

[CK-12 Interactive Geometry](#) | [CK-12 Foundation \(ck12.org\)](#)

1. Basics of Geometry

[1.1 The Three Dimensions](#)

[1.2 Angles - Definition, Types, Interactives and Examples](#)

[1.3 Polygons - Definition, Types, Properties, Interactives and Examples](#)

Memorize

Definition 4.5. Suppose x , y and z are variable quantities. We say

- y **varies directly with** (or is **directly proportional to**) x if there is a constant k such that $y = kx$.
- y **varies inversely with** (or is **inversely proportional to**) x if there is a constant k such that $y = \frac{k}{x}$.
- z **varies jointly with** (or is **jointly proportional to**) x and y if there is a constant k such that $z = kxy$.

The constant k in the above definitions is called the **constant of proportionality**.

science formulas supplied

Example 4.3.6. Translate the following into mathematical equations using Definition 4.5.

1. [Hooke's Law](#): The force F exerted on a spring is directly proportional the extension x of the spring.
$$F = kx$$
2. [Boyle's Law](#): At a constant temperature, the pressure P of an ideal gas is inversely proportional to its volume V .
$$P = \frac{k}{V} \Leftrightarrow PV = k$$
3. The volume V of a right circular cone varies jointly with the height h of the cone and the square of the radius r of the base.
$$V = kh r^2$$
4. [Ohm's Law](#): The current I through a conductor between two points is directly proportional to the voltage V between the two points and inversely proportional to the resistance R between

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Geometry 1.1

Remember this!

- A **point** is a zero dimensional object, having no length or width.
- A **line segment** has one dimension: length.
- A **Plane** **shape** has two dimensions: length and width.
- A **solid** has three dimensions: length, width and **height**.

Copilot

And is there a general word?

for two-dimensional objects.

Yes, two-dimensional objects are generally referred to as "plane figures" or "plane shapes" in geometry. These include circles, triangles, squares, and other polygons, all of which have only length and width. Want to dive deeper into a specific plane figure?

Geometry 1.2

memorize

Summary

- ✓ • A **line segment** is a portion of a line with two endpoints.
- ✓ • A **ray** is a portion of a line with one endpoint.
- ✓ • An **angle** is formed when two rays meet.
- ✓ • A **zero** angle has 0° .
- ✓ • An **acute** angle has less than 90° .
- ✓ • A **right** angle has exactly 90° .
- ✓ • An **obtuse** angle is between 90° and 180° .
- ✓ • A **straight** angle has exactly 180° .
- ✓ • **Complementary** angles add up to 90° .

- ✓ • An **obtuse** angle is between 90° and 180° .
- ✓ • A **straight** angle has exactly 180° .
- ✓ • **Complementary** angles add up to 90° .
- ✓ • **Supplementary** angles add up to 180° .

1.3

memorize ✓

Summary

- ✓ • A polygon is **convex** if all diagonals remain inside the polygon.
- A polygon is **concave** if some or all of its diagonals lie partly or wholly outside the polygon.
- ✓ • A polygon is **regular** if it is both equilateral and equiangular.
- The sum of all interior angles of an n -sided polygon $= (n - 2) \cdot 180^\circ$.
- The measure of each interior angle of an equiangular n -gon is: $\frac{(n - 2) \cdot 180^\circ}{n}$.
- The exterior angle and interior angle at the same vertex will always be supplementary.
- The sum of all the exterior angles of any polygon is 360° .

Memorize

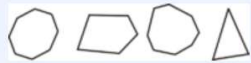
What is a Polygon?

A **polygon** is a shape bounded by a number of straight lines. A polygon is usually classified by its number of sides and its properties.

polygon

shape bounded by a number of straight lines

A polygon is a simple closed figure with at least three straight sides.



Could a college campus have a quad?

Absolutely — many college campuses have a "quad," short for **quadrangle**. It's typically:

- 🏡 **An open rectangular or square space** surrounded by campus buildings
- 🌳 Used for student gatherings, outdoor classes, events, or just relaxing
- 🏢 Often bordered by dorms, libraries, lecture halls, or administrative buildings

Some famous examples include Harvard Yard at Harvard University and the Main Quad at Stanford. If you're thinking about NOVA's Annandale campus, it may not have a traditional enclosed quad, but it does have open green spaces and central walkways that serve a similar purpose. Want to explore how to use such spaces for student engagement or outdoor learning?

memorize ✓

What is a quad?

In geometry, a "quad" is short for **quadrilateral** — a two-dimensional shape with **four sides** and **four angles**. Here are some common types of quads:

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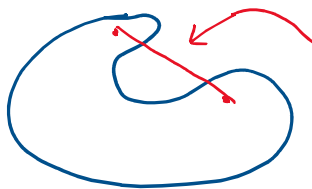
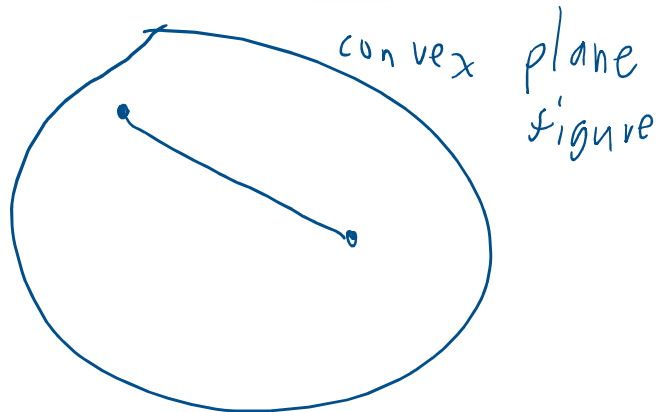
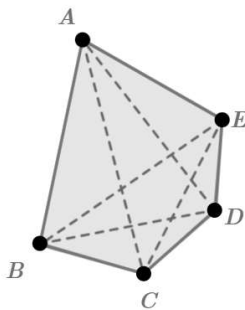
- ✓ **Square**: All sides equal, all angles 90° .
- ✓ **Rectangle**: Opposite sides equal, all angles 90° .
- Rhombus**: All sides equal, opposite angles equal, but angles aren't necessarily 90° .
- Parallelogram**: Opposite sides and angles equal, sides not necessarily equal.
- Trapezoid (US) / Trapezium (UK)**: Only one pair of opposite sides is parallel.
- Kite**: Two pairs of adjacent sides are equal.

Let me know if you want to explore properties, formulas, or visual examples of any of these!

supplied

Convex Polygon

A **diagonal** is a **line segment** that connects any two non-adjacent **vertices** of a polygon. A polygon is **convex** if all diagonals remain inside the polygon. Most polygons that you study in high school geometry will be **convex**.



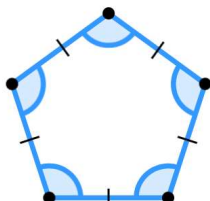
The line segment joining any two points in the figure lies entirely inside the figure

line not all inside the figure
figure is not convex

Memorize

Regular Polygon

A polygon is **equilateral** if all of its sides are the same length. A polygon is **equiangular** if all of its **angles** are the same **measure**. A polygon is **regular** if it is both equilateral and equiangular.



Your Name MTH 111 quiz 5 write each problem. Box around each answer.

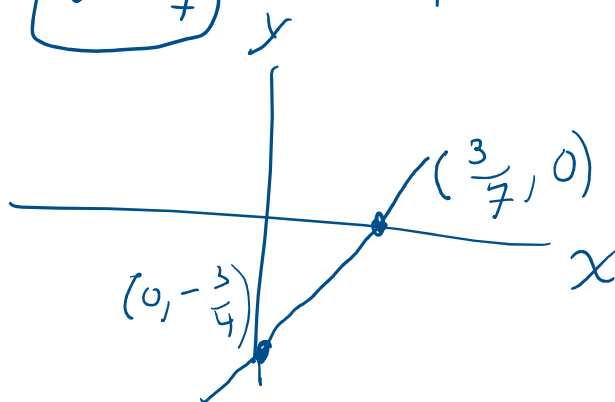
1. Find the slope of the line passing through the points $(-8,6)$ and $(18,6)$.

$$\text{slope} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{6 - 6}{18 - (-8)} = \frac{0}{18 + 8} = \boxed{0}$$

2. Find the x-intercept and y-intercept of the line with the equation $7x - 4y = 3$. Graph the line.

x-intercept
set $y = 0$, solve for x
 $7x - 4(0) = 3$
 $7x = 3$
 $x = \frac{3}{7}$

y-intercept
set $x = 0$, solve for y
 $(7)(0) - 4y = 3$
 $-4y = 3$
 $y = -\frac{3}{4}$



- 3.



Find $\sin(\theta)$.

$$\sin \theta = \frac{\text{opp}}{\text{hyp}} = \frac{6}{h}$$

$$= \sqrt{r_1} = h$$

$$h = \sqrt{5^2 + 6^2} = \sqrt{25 + 36} = \sqrt{61} = h$$

$$\sin \theta = \frac{6}{\sqrt{61}} \approx 0.768$$

$$6/\sqrt{61} = 0.768221279597376$$

4. One number is nine times larger than a second number. The sum of the two numbers is 25.

What are the two numbers? Use algebra, not just guessing and checking. Give exact answers.

Write final answer as a complete sentence.

Let x and y be the two numbers

$$y = 9x$$

$$x + y = 25$$

$$x + 9x = 25$$

$$10x = 25$$

$$x = \frac{25}{10}$$

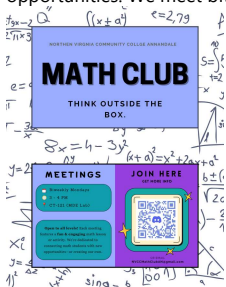
$$x = \frac{5}{2} = 2.5$$

$$y = 9 \left(\frac{5}{2} \right)$$

$$y = \frac{45}{2} = 22.5$$

The two numbers are $5/2$ and $45/2$.

a fun and engaging space to explore math topics, connect with peers, and learn about new opportunities. We meet biweekly on Mondays from 3:00 PM to 4:00 PM in CT-121 (MDE Lab).



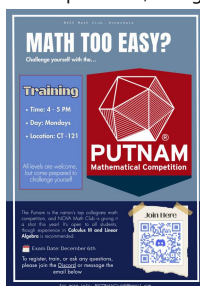
2nd Annual Integration Bee: This is a fun and challenging competition with over **\$300** in prizes. It's a great event for students to test their calculus skills and even challenge their professors! We'll have snacks, and all are welcome to attend, even just to watch.

- Date: Friday, November 21st
- Time: 3:00 PM
- Location: CA - 302 (Annandale Campus)
- Calculus II experience is recommended for competitors.



Putnam Mathematical Competition: We are actively recruiting and training students for the Putnam, the nation's top collegiate math competition. This is a fantastic opportunity for students seeking a serious challenge.

- Exam Date: Saturday, December 6th
- Training Sessions: Mondays from 4:00 PM to 5:00 PM in CT-121
- Open to all, though experience in Calculus III and Linear Algebra is recommended.



We would be very grateful if you could forward this email, along with the attached flyers, to the Annandale math faculty. Their support is invaluable for getting students involved.

Thank you for your time and for supporting student engagement in mathematics.

Best regards,

Emiliano Mercado
NVCCMathClubAN@gmail.com

The difference between two numbers is 3.

The quotient of the smaller number to the larger number is $\frac{1}{5}$.

Find the numbers.

Let x, y be the numbers

$$x - y = 3$$

$$x = y + 3$$

$$\Rightarrow \begin{array}{l} x = \text{larger number} \\ y = \text{smaller number} \end{array}$$

$$\frac{y}{x} = \frac{1}{5}$$

$$\frac{y}{y+3} = \frac{1}{5} \quad \text{solve for } y$$

$$5y = y + 3$$

$$4y = 3$$

$$\boxed{y = \frac{3}{4}}$$

$$x = 3 + \frac{3}{4}$$

$$= \frac{3(4)}{4} + \frac{3}{4} = \frac{12}{4} + \frac{3}{4} = \boxed{\frac{15}{4}}$$

The two numbers are $\frac{3}{4}$ and $\frac{15}{4}$.