VOCABULARY

Bases of a parallelogram Either pair of parallel sides of a parallelogram are bases.

Height of a parallelogram The shortest distance between bases of a parallelogram is the height.

POSTULATE 24: AREA OF A SQUARE POSTULATE

The area of a square is the square of the length of its side.

POSTULATE 25: AREA CONGRUENCE POSTULATE

If two polygons are congruent, then they have the same area.

POSTULATE 26: AREA ADDITION POSTULATE

The area of a region is the sum of the areas of its nonoverlapping parts.

THEOREM 11.1: AREA OF A RECTANGLE

The area of a rectangle is the product of its base and height.

THEOREM 11.2: AREA OF A PARALLELOGRAM

The area of a parallelogram is the product of a base and its corresponding height.

THEOREM 11.3: AREA OF A TRIANGLE

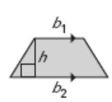
The area of a triangle is one half the product of a base and its corresponding height.

VOCABULARY

Height of a trapezoid The height of a trapezoid is the perpendicular distance between its bases.

THEOREM 11.4: AREA OF A TRAPEZOID

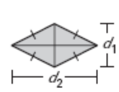
The area of a trapezoid is one half the product of the height and the sum of the lengths of the bases.



$A = \frac{1}{2}h(b_1 + b_2)$

THEOREM 11.5: AREA OF A RHOMBUS

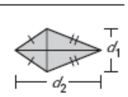
The area of a rhombus is one half the product of the lengths of its diagonals.



$A = \frac{1}{2}d_1d_2$

THEOREM 11.6: AREA OF A KITE

The area of a kite is one half the product of the lengths of its diagonals.



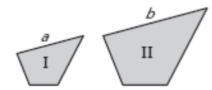
$A = \frac{1}{2}d_1d_2$

THEOREM 11.7: AREAS OF SIMILAR POLYGONS

If two polygons are similar with the lengths of corresponding sides in the ratio of $a:b$, then the ratio of their areas is $a^2 : b^2$.

$\frac{\text{Side length of Polygon I}}{\text{Side length of Polygon II}} = \frac{a}{b}$

$\frac{\text{Area of Polygon I}}{\text{Area of Polygon II}} = \frac{a^2}{b^2}$



Polygon I ~ Polygon II

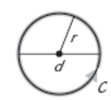
VOCABULARY

Circumference The circumference of a circle is the distance around the circle.

Arc length An arc length is a portion of the circumference of a circle.

THEOREM 11.8: CIRCUMFERENCE OF A CIRCLE

The circumference C of a circle is $C = \pi d$ or $C = 2\pi r$, where d is the diameter of the circle and r is the radius of the circle.



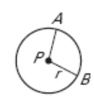
$C = \pi d = 2\pi r$

ARC LENGTH COROLLARY

In a circle, the ratio of the length of a given arc to the circumference is equal to the ratio of the measure of the arc to 360°.

$\frac{\text{Arc length of } \overset{\frown}{AB}}{2\pi r} = \frac{m\overset{\frown}{AB}}{360°}$, or

$\text{Arc length of } \overset{\frown}{AB} = \frac{m\overset{\frown}{AB}}{360°} \cdot 2\pi r$



VOCABULARY

Sector of a circle A sector of a circle is the region bounded by two radii of the circle and their intercepted arc.

THEOREM 11.9: AREA OF A CIRCLE

The area of a circle is π times the square of the radius.

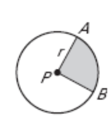
$A = \pi r^2$

THEOREM 11.10: AREA OF A SECTOR

The ratio of the area of a sector of a circle to the area of the whole circle (πr^2) is equal to the ratio of the measure of the intercepted arc to 360°.

$\frac{\text{Arc of sector } APB}{\pi r^2} = \frac{m\overset{\frown}{AB}}{360°}$, or

$\text{Area of sector } APB = \frac{m\overset{\frown}{AB}}{360°} \cdot \pi r^2$



VOCABULARY

Center of a polygon The center of a polygon is the center of its circumscribed circle.

Radius of a polygon The radius of a polygon is the radius of its circumscribed circle.

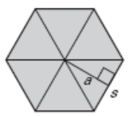
Apothem of a polygon The distance from the center to any side of the polygon is the apothem.

Central angle of a regular polygon A central angle of a regular polygon is an angle formed by two radii drawn to consecutive vertices of the polygon.

THEOREM 11.11: AREA OF A REGULAR POLYGON

The area of a regular n-gon with side length s is half the product of the apothem a and the perimeter P, so

$A = \frac{1}{2}\underline{aP}$, or $A = \frac{1}{2}\underline{a} \cdot \underline{ns}$.



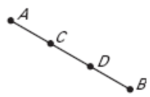
VOCABULARY

Probability The probability of an event is a measure of the likelihood that the event will occur.

Geometric probability A geometric probability is a ratio that involves a geometric measure such as length or area.

PROBABILITY AND LENGTH

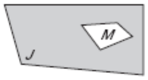
Let $\overline{AB}$ be a segment that contains the segment $\overline{CD}$. If a point K on $\overline{AB}$ is chosen at random, then the probability that it is on $\overline{CD}$ is the ratio of the length of $\overline{CD}$ to the length of $\overline{AB}$.



$P(K \text{ is on } \overline{CD}) = \dfrac{\text{Length of } \overline{CD}}{\text{Length of } \overline{AB}}$

PROBABILITY AND AREA

Let J be a region that contains region M. If a point K in J is chosen at random, then the probability that it is in region M is the ratio of the area of M to the area of J.



$P(K \text{ is in region } M) = \dfrac{\text{Area of } M}{\text{Area of } J}$