

Summative Assessment Review Day 4

☺ **Geometric Relationships (chapter 7 in text)**

- From grade 8 ... you must remember
 - ✓ How to classify triangles using side lengths
 - ✓ How to classify triangles using angle measures
 - ✓ When two lines intersect, the opposite angles are equal
 - ✓ The sum of the angles of a triangle is 180°
 - ✓ When a transversal crosses parallel lines,
 - Alternate angles are equal (Z pattern)
 - Corresponding angles are equal (F pattern)
 - Co-interior angles have a sum of 180° (C pattern)

- Grade 8 review is on pages 362-363 of textbook.
- **Terminology** (all definitions are in text chapter seven - look for green highlighted words):
Vertex, interior angle, exterior angle, ray, equiangular, adjacent, supplementary, complementary, transversal, congruent, convex polygon, concave polygon, pentagon, hexagon, heptagon, octagon, regular polygon, midpoint, median (the line segment joining a vertex of a triangle to the midpoint of the opposite side), bisect, right bisector, centroid (the point where the medians of a triangle intersect), similar

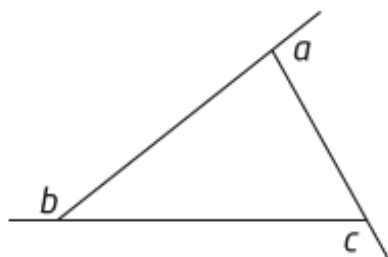
- The sum of the exterior angles of a convex polygon is 360° .
 - ✓ RECALL: Convex polygon - all interior angles measure less than 180°

See red box on page 370 for diagram of triangle, red box on page 380 for diagram of quadrilateral, 7.3 for convex polygons in general.

- The exterior angle at each vertex of a triangle is equal to the sum of the interior angles at the other two vertices. (E.A.T.) See red box on page 370 for diagram.
- The sum of the interior angles of a quadrilateral is 360°
- For a polygon with n sides, the sum of the interior angles, in degrees, is $180(n-2)$
- A line segment joining the midpoints of two sides of a triangle is parallel to the third side and half as long.
- The height of a triangle formed by joining the midpoints of two sides of a triangle is half the height of the original triangle.

- The medians of a triangle bisect its area.
- Joining the midpoints of the sides of any quadrilateral produces a parallelogram
- The diagonals of a parallelogram bisect each other.
- The diagonals of a square are equal and they bisect each other at right angles.
- The diagonals of a rectangle bisect each other.
- The diagonals of a kite meet at right angles.
- The diagonals of a rhombus bisect each other at right angles.

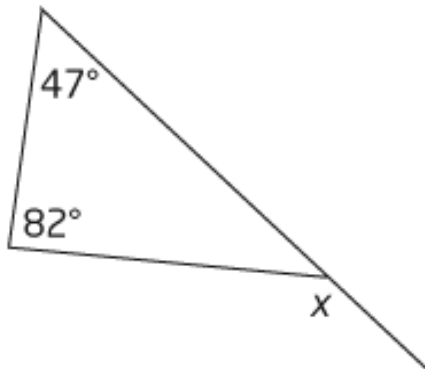
Example 1: In the diagram, $a + b + c =$



- | | | | |
|----|-------------|----|----------------|
| a. | 180° | c. | 540° |
| b. | 360° | d. | None of these. |

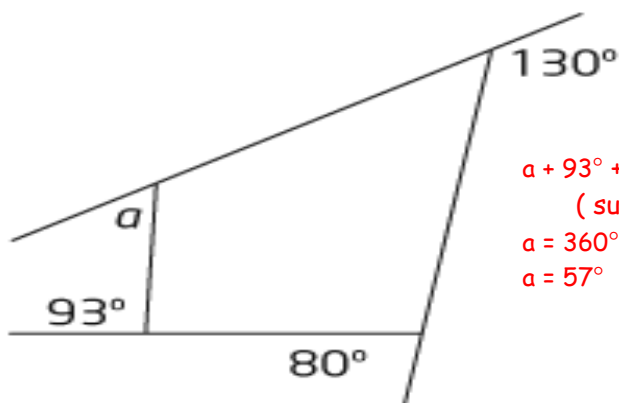
Answer: b, P.E.A.S.T

Example 2: Find the measure of the exterior angle, x .



$$\begin{aligned}x &= 47^\circ + 82^\circ \text{ (E.A.T.)} \\ &= 129^\circ\end{aligned}$$

Example 3: Find the measure of the exterior angle, a .



$$\begin{aligned}a + 93^\circ + 80^\circ + 130^\circ &= 360^\circ \\ &\text{(sum of the exterior angles of a polygon is } 360^\circ\text{)} \\ a &= 360^\circ - 93^\circ - 80^\circ - 130^\circ \\ a &= 57^\circ\end{aligned}$$

Example 4: A regular polygon has exterior angles equal to 30° .
How many sides does the polygon have?

$$360 / 30 = 12$$

the polygon has 12 sides.

Example 5: A regular polygon has interior angles equal to 140° .
How many sides does the polygon have?

$$180(n-2) = 140n$$

$$180n - 360 = 140n$$

$$180n - 140n = 360$$

$$40n = 360$$

$$n = 9$$

the polygon has 9 sides.

☺ Measurement Relationships (chapter 8 in text)

- Be able to use given formulas to find the area and perimeter of 2-D figures and the surface area, volume of 3-D figures.
- Be able to use the Pythagorean theorem as it relates to slant height, height, and radius in a cone and a pyramid. $s^2 = h^2 + r^2$
- The volume of a prism is 3 times the area of a pyramid with the same dimensions.
- The volume of a cylinder is 3 times the area of a cone with the same dimensions.

Example 6: The volume of a cylinder is 300 cm^3 . What is the volume of a cone with the same dimensions as the cylinder?

Volume of a cone = $\frac{1}{3}$ volume of a cylinder (with the same dimensions)

$$V = \frac{1}{3} (300)$$

$$= 100$$

the volume is 100 cm^3 .

Example 7: A cone has a radius 7cm and a height of 18 cm.

What is its slant height?

$$s^2 = h^2 + r^2$$

$$s^2 = 18^2 + 7^2$$

$$s^2 = 373$$

$$s = \sqrt{373}$$

$$s = 19.3$$

• The Slant height is
• 19.3cm

Example 8: A sphere has a diameter 12 cm. What is its volume, to the nearest cubic centimeter?

$$V = \frac{4}{3}\pi r^3 \quad \text{so, } V = \frac{4}{3}\pi(6)^3$$

$$V = \frac{4}{3}\pi(216)$$

$$V \approx 905 \quad \therefore \text{the volume of the sphere is } 905 \text{ cm}^3.$$

Optimizing Measurements (chapter 9 in text)

- Optimizing the area of a rectangle means finding the dimensions of the rectangle with maximum area for a given perimeter.
- The dimensions of a rectangle with optimal area depend on the number of sides to be fenced. If all four sides are to be fenced, the optimal area occurs with a square.
- The "optimal volume" (greatest possible volume for a given surface area) of a square-based prism occurs when the prism is a cube (or the closest to a cube possible)
- The "optimal surface area" of a square-based prism occurs when the prism is a cube (or the closest to a cube possible)
- The "optimal volume" (greatest possible volume for a given surface area) of a cylinder occurs when the height equals the diameter or $h = 2r$ (or the closest to $h = 2r$ as possible)
- The "optimal surface area" of a cylinder occurs when the height equals the diameter or $h = 2r$ (or the closest to $h = 2r$ as possible)

Home Work

Page 520 # 8-15, 16a (ch. 8, 9)

Pages 472-473 # 1 – 12 (ch. 8)

Pages 518 – 519 # 1 – 9 (ch. 9)