

Geometry Competency Exam

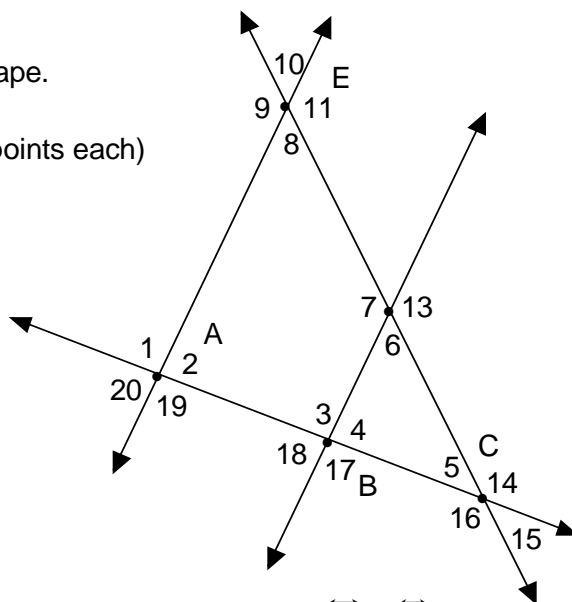
To receive the full benefit of this test, watch the student to ensure he has mastered the concepts presented in Geometry.
If he demonstrates proficiency, he is ready to move on to Algebra 2.
If he struggles with the material on this exam, he should begin in Geometry.

I. Fill in the blank with the best answer. (3 points each)

- 1) _____ The trigonometric function defined as the adjacent side over the hypotenuse.
- 2) _____ An angle with a measure greater than 90° but less than 180° .
- 3) _____ A piece of the circumference of a circle.
- 4) _____ Any two angles whose measure adds to 90° .
- 5) _____ An infinite number of connected lines lying in the same flat surface; it has length and width; two dimensional.
- 6) _____ A four-sided polygon with two parallel sides and two sides that are not parallel.
- 7) _____ A rectangular solid with all edges having the same length.
- 8) _____ Two or more points on the same line.
- 9) _____ Having the same size and shape.
- 10) _____ Distance around any geometric shape.

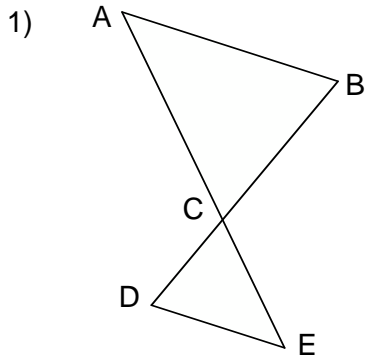
II. Given the drawing at right, answer the following questions. (3 points each)

- 1) What kind of quadrilateral is quadrilateral ABDE?
- 2) What angle(s) correspond(s) to $\angle 10$? (give all answers)
- 3) $m\angle 6 =$
- 4) $m\angle 5 =$
- 5) Given that segment DC is 8 inches, find the lengths of the other two sides of triangle BCD.
- 6) $m\angle 14 =$
- 7) Is the $m\angle 2 = m\angle 11$? Why or why not?
- 8) Name all the points given that are not collinear with point B as shown in this drawing.
- 9) $\triangle BCD \sim \triangle ACE$ Using your answers from #5 above, find the length of the segment AE if $CE = 20$.
- 10) Using your answers from #5 and #9, what would be the length of segment AB?



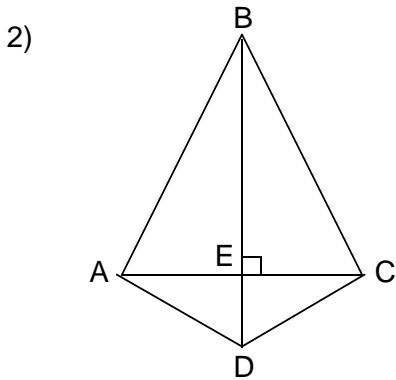
Given: $\vec{AE} \parallel \vec{BD}$
 $m\angle 8 = 60^\circ$
 $m\angle 4 = 90^\circ$

III. Write a proof for each of the following. (12 points each)



Given: $\overline{CE} \cong \overline{CA}$
 $\angle B \cong \angle D$
 Prove: $\triangle ABC \cong \triangle CDE$
 Drawing is not to scale!

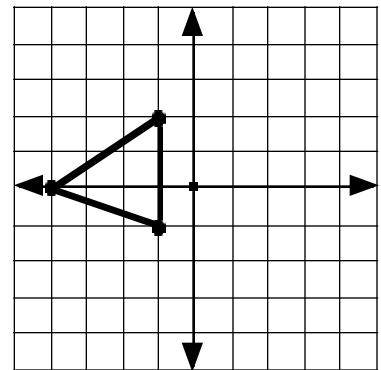
Statements	Reasons



Given: $\overline{AB} \cong \overline{BC}$
 Prove: $\overline{AE} \cong \overline{EC}$

Statements	Reasons

IV. Graph the reflection of the triangle about the Y axis. (5 points)



V. Find the volume of a sphere if the radius is given as 3 cm. (5 points)

VI. Find the surface area of a rectangular solid with edges of length 2 cm, 5 cm, and 7 cm. (5 points)

VII. The measure of an exterior angle of a regular polygon is 45° . Name its shape. (5 points)

VIII. Simplify the following radical expressions, if possible. Reduce to simplest terms. (4 points each)

1) $(3\sqrt{2})(4\sqrt{22})$

2) $\frac{4}{\sqrt{3}} - \frac{2\sqrt{6}}{\sqrt{2}}$

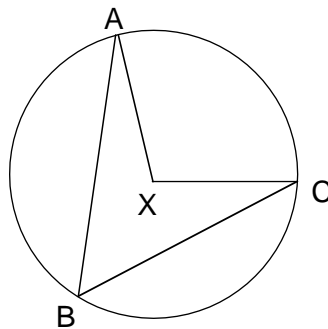
3) $-3\sqrt{5} + \sqrt{5}$

4) $\sqrt{2} + \sqrt{3} + \sqrt{4} + \sqrt{1}$

IX. Given that the circumference of a circle is 8π , find the radius. (5 points)

X. Draw a segment 4 centimetres long. Now construct the perpendicular bisector to that segment. Measure your results to check. (5 points)

XI. If the length of the minor arc AC in the diagram below is 98° , give the measures of the central angle and the inscribed angle shown. (5 points)



Given: X is the center of the circle

XII. If the hypotenuse of a right triangle is 5 cm and one leg is 2 cm, what is the measurement of the other leg? (5 points)

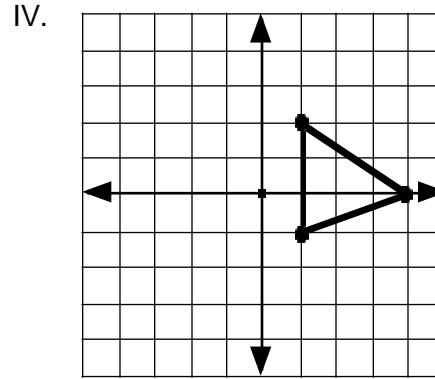
XIII. Given that $\sin q = 3/5$, find the values of the other 5 trig functions. (10 points)

Solutions

- I. 1) cosine
 2) obtuse
 3) arc
 4) complementary
 5) plane
 6) trapezoid
 7) cube
 8) collinear
 9) congruent
 10) perimeter

- II. 1) trapezoid
 2) $\angle 12$
 3) 60° (corresponding angles)
 4) 30° (180° in a triangle)
 5) use answers to #4 and 5 and rules for 30° - 60° - 90° triangle
 $BD = 4$ and $BC = 4\sqrt{3}$
 6) 150° (remote exterior angles)
 7) no, \vec{EC} is not parallel to \vec{AC}
 8) E
 9) $\frac{20}{8} = \frac{X}{4}$ $X = AE = 10$
 10) use rules for 30° - 60° - 90° triangle
 $AC = 10\sqrt{3}$; $AB = 10\sqrt{3} - 4\sqrt{3} = 6\sqrt{3}$

- III. 1) $\overline{CE} \cong \overline{CA}$ | given
 $\angle B \cong \angle D$ | given
 $\angle ACB \cong \angle DCE$ | vertical angles
 $\triangle ABC \cong \triangle CDE$ | AAS
- 2) $\overline{AB} \cong \overline{BC}$ | given
 $\angle BEC$ is a right \angle | given
 $\angle BEA$ is a right \angle | supplementary
 $\overline{BE} \cong \overline{BE}$ | reflexive
 $\triangle ABE \cong \triangle EBC$ | HL
 $\overline{AE} \cong \overline{EC}$ | CPCTRC



- V. $(\frac{4}{3})(\frac{22}{7})(3)^3 = 113.14$ cu. cm (rounded)
 using decimal value of π yields 113.04
- VI. first find the area of each face of the solid
 $2(10 \text{ cm}^2) + 2(35 \text{ cm}^2) + 2(14 \text{ cm}^2) = 118 \text{ cm}^2$
- VII. $360^\circ \div 45^\circ = 8$ sides, octagon
- VIII. 1) $(3\sqrt{2})(4\sqrt{22}) = 12\sqrt{44} = 24\sqrt{11}$
 2) $\frac{4}{\sqrt{3}} - \frac{2\sqrt{6}}{\sqrt{2}} = \frac{4\sqrt{3}}{3} - \frac{2\sqrt{3}}{1} =$
 $\frac{4\sqrt{3} - 6\sqrt{3}}{3} = \frac{-2\sqrt{3}}{3}$
 3) $-3\sqrt{5} + \sqrt{5} = -2\sqrt{5}$
 4) $\sqrt{2} + \sqrt{3} + \sqrt{4} + \sqrt{1} = \sqrt{2} + \sqrt{3} + 3$

IX. $C = pd$ so diameter is 8 and radius is 4

X. check by measuring - each side of the bisected segment should be 2 cms

XI. central angle = 98° ,
 inscribed angle = $(1/2)(98) = 49^\circ$

XII. $2^2 + L^2 = 5^2$
 $4 + L^2 = 25$, $L = 21^2$, $L = \sqrt{21}$

XIII.
 $\sin q = \frac{3}{5}$ $\csc q = \frac{5}{3}$
 $\cos q = \frac{4}{5}$ $\sec q = \frac{5}{4}$
 $\tan q = \frac{3}{4}$ $\cot q = \frac{4}{3}$