

Math 5 – Trigonometry – Fair Game Problems for Chapter 1 Test

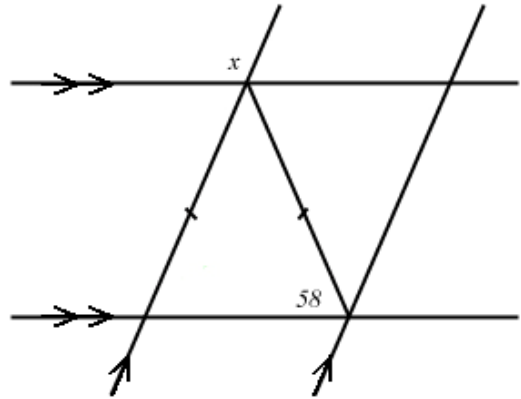
These problems are meant to convey the type of questions that may be posed, not the number of questions. The instructions for the test will be to

- (1) Show all work for credit.
- (2) Write all responses on separate paper.
- (3) Do not use a calculator.

1. What angle has the same measure as its complement? How do you know?
2. What is the complement of the supplement of  $100^\circ$  angle?

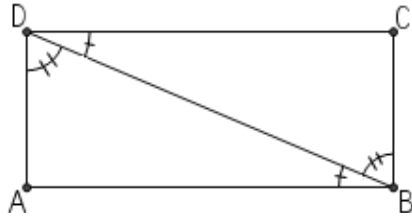
3. Explain why the two acute angles of a right triangle are complementary.

4. What is the degree measure of angle  $x$  in the figure at right? Explain how you know.



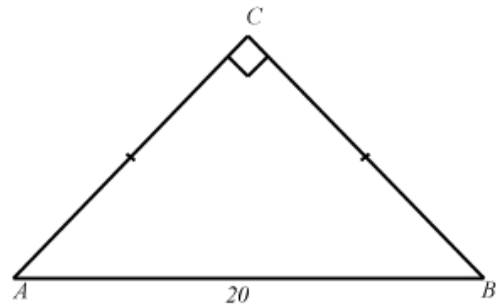
5. True or false: if one side of a quadrilateral is congruent to the opposite side, then the quadrilateral is either a parallelogram or an isosceles trapezoid. Justify your answer.

6. Given Quadrilateral  $ABCD$  with diagonal  $BD$  forming congruent angles  $\angle CDB \cong \angle ABD$  and  $\angle CBD \cong \angle ADB$ , what kind of quadrilateral do you think this is? Why? Give as persuasive a justification as you can.



7. In the isosceles right triangle shown at right,  $AB = 20$ .

- (a) What is the length of  $AC$ ?
- (b) Draw the altitude from  $C$  to  $AB$ . What is its length?



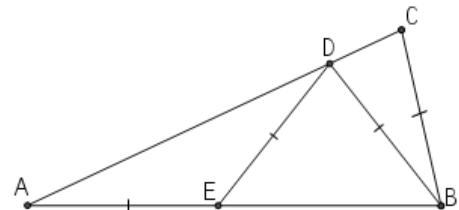
8. Two boats leave a dock at the same time and at a  $90^\circ$  angle from each other. After 3 hours one boat is 10 miles from the dock, while the other is 40 miles from the dock. How far are the boats from each other? Write your answer in simplest radical form.

9. Find the (a) perimeter and (b) area of a rectangle with one side 10 cm and diagonal 13 cm.

10. Find the perimeter of an isosceles triangle with base = 12cm and height = 4cm.

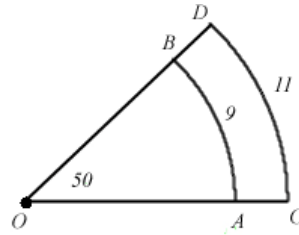
11. Find the area of an isosceles triangle with sides of length 2cm, 3cm and 3cm.

12. Given that  $AC = AB$  and  $AE = ED = DC = BC$  in  $\triangle ABC$  at right, find the degree measure of  $\angle BAC$

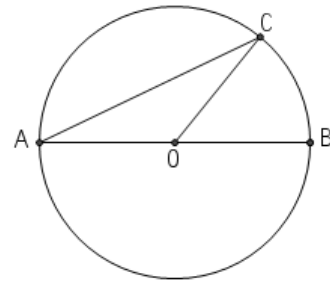


13. Explain why a diagonal of a parallelogram creates two congruent triangles.
14. Carlos and Karla start at the north west corner of a square block measuring 120 meters on a side and Carlos starts walking around the block by heading east at 0.5 meters per second at the same time that Karla starts walking around the block by heading south at 0.6 meters per second. What is the length of the line segment connecting Carlos and Karla after five minutes?
15. Consider a  $120^\circ$  sector of a circle with radius 10cm.
- Find the perimeter of the sector.
  - Find the area of the sector.

16. Find the area of region ACDB in the figure at right where  $AB = 9\text{cm}$  and  $CD = 11\text{cm}$  are concentric arcs with center  $O$ .

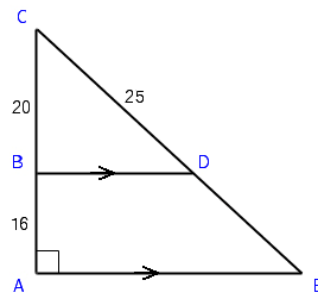


17. In the diagram at right,  $AB$  is a diameter of the circle centered at  $O$  and  $C$  is a point on the perimeter of the circle.
- Express  $\angle BOC$  in terms of  $\angle AOC$ .
  - Explain why  $\triangle AOC$  is isosceles.
  - Express  $\angle BAC$  in terms of  $\angle AOC$ .
  - Express  $\angle BAC$  in terms of  $\angle BOC$ .



18. A closed right circular cylinder has a radius of 3 meters. Find the volume of the cylinder if its lateral surface area is  $84\pi$  square meters. Leave your answer in terms of  $\pi$ .

19. In the figure to the right, explain how to prove triangles BCD and ACE are similar and use that similarity to find the length of DE in the diagram at right.



20. In the figure at right,
- Show that  $\triangle ABC \sim \triangle EDC$
  - Find the length of AE.
  - Draw  $BD$  and find its length. Is  $\triangle DCB \sim \triangle ABC$ ? Why or why not?

