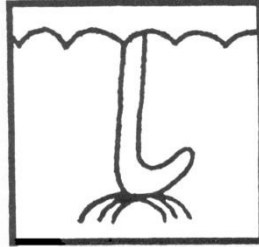


# A Turvy for Measuring Angles in Circles

by David Pleacher

Many thanks to Kara Luna for finding the errors in the original puzzle



A Turvy is a Drawing which has a caption right side up and has another caption if you turn it topsy-turvy.

Caption for the picture:

"  $\frac{8}{23}$   $\frac{12}{7}$   $\frac{10}{6}$   $\frac{21}{1}$   $\frac{24}{13}$   $\frac{10}{7}$   $\frac{22}{3}$   $\frac{8}{19}$   
 $\frac{11}{15}$   $\frac{4}{21}$   $\frac{6}{13}$   $\frac{13}{8}$ ."

Caption for the picture turned upside down:

"  $\frac{17}{13}$   $\frac{1}{24}$   $\frac{6}{2}$   $\frac{1}{20}$   $\frac{6}{23}$   $\frac{23}{18}$   $\frac{24}{19}$   $\frac{23}{17}$   $\frac{6}{6}$   $\frac{21}{23}$   
 $\frac{12}{24}$   $\frac{21}{17}$   $\frac{7}{20}$   $\frac{3}{8}$   $\frac{17}{24}$   $\frac{11}{12}$   $\frac{6}{6}$ ."

To determine the titles to this turvy, determine the measures of the ten angles using the first diagram and choose the answer from those listed from A to J. Then determine the answers to the fourteen angles in the second diagram and match them up with the answers from K to Z. Then replace each numbered blank in the puzzle with the letter corresponding to the answer for that problem.

In Diagram 1 at the right:

$\overline{AD}$  is a diameter.  $\overline{OF}$  is a radius

$\overline{AT}$  is a tangent.

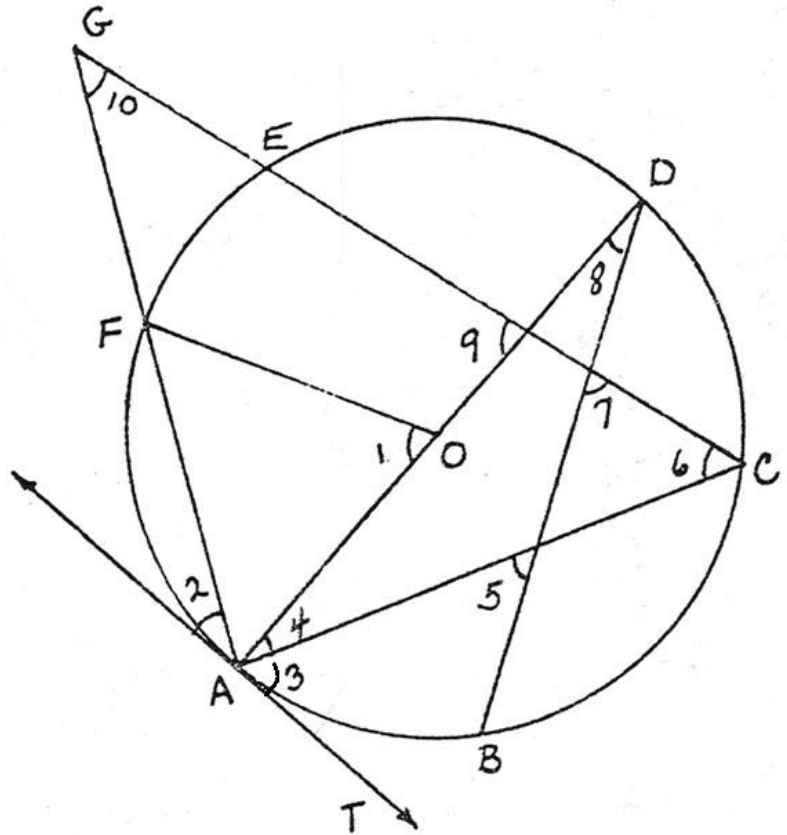
$m(\text{arc } FE) = 30^\circ$ ,

$m(\text{arc } AB) = 50^\circ$ ,

$m(\text{arc } BC) = m(\text{arc } FA) = 70^\circ$ ,

Find these angle measures:

- \_\_\_ 1. Determine  $m\angle 1$
- \_\_\_ 2. Determine  $m\angle 2$
- \_\_\_ 3. Determine  $m\angle 3$
- \_\_\_ 4. Determine  $m\angle 4$
- \_\_\_ 5. Determine  $m\angle 5$
- \_\_\_ 6. Determine  $m\angle 6$
- \_\_\_ 7. Determine  $m\angle 7$
- \_\_\_ 8. Determine  $m\angle 8$
- \_\_\_ 9. Determine  $m\angle 9$
- \_\_\_ 10. Determine  $m\angle 10$



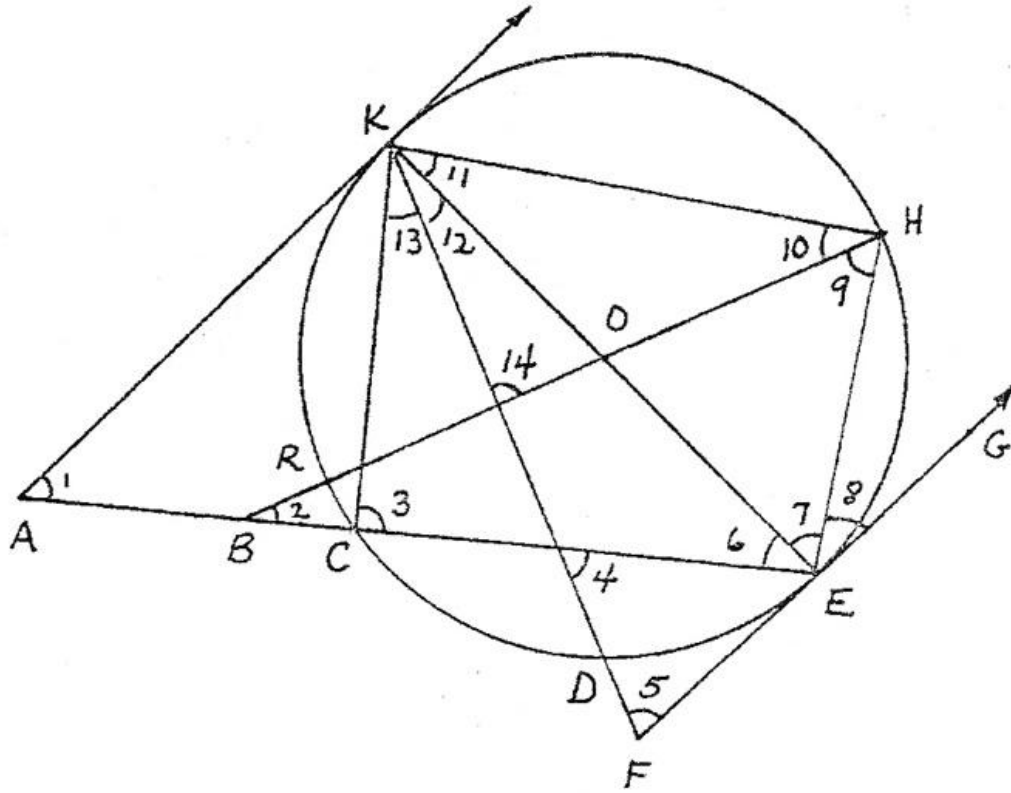
Choose your answers to the ten questions above from the following:

- A.  $25^\circ$
- B.  $30^\circ$
- C.  $35^\circ$
- D.  $45^\circ$
- E.  $50^\circ$
- F.  $55^\circ$
- G.  $60^\circ$
- H.  $70^\circ$
- I.  $75^\circ$
- J.  $80^\circ$

In Diagram 2 below:  $\overline{RH}$  and  $\overline{KE}$  are diameters.  $\overline{FE}$  is a tangent.

$m\angle HOE = 70^\circ$ ,  $m(\text{arc } CR) = 10^\circ$ ,  $m(\text{arc } DE) = 60^\circ$ .

Find the measures of each of the following angles:



- |   |                |
|---|----------------|
| <input type="checkbox"/> 11. Determine $m\angle 3$  | K. $15^\circ$  |
| <input type="checkbox"/> 12. Determine $m\angle 1$  | L. $20^\circ$  |
| <input type="checkbox"/> 13. Determine $m\angle 13$ | M. $30^\circ$  |
| <input type="checkbox"/> 14. Determine $m\angle 7$  | N. $35^\circ$  |
| <input type="checkbox"/> 15. Determine $m\angle 12$ | O. $40^\circ$  |
| <input type="checkbox"/> 16. Determine $m\angle 9$  | P. $50^\circ$  |
| <input type="checkbox"/> 17. Determine $m\angle 14$ | Q. $55^\circ$  |
| <input type="checkbox"/> 18. Determine $m\angle 2$  | R. $60^\circ$  |
| <input type="checkbox"/> 19. Determine $m\angle 11$ | S. $70^\circ$  |
| <input type="checkbox"/> 20. Determine $m\angle 10$ | T. $80^\circ$  |
| <input type="checkbox"/> 21. Determine $m\angle 5$  | U. $90^\circ$  |
| <input type="checkbox"/> 22. Determine $m\angle 8$  | W. $95^\circ$  |
| <input type="checkbox"/> 23. Determine $m\angle 4$  | Y. $105^\circ$ |
| <input type="checkbox"/> 24. Determine $m\angle 6$  | Z. $110^\circ$ |