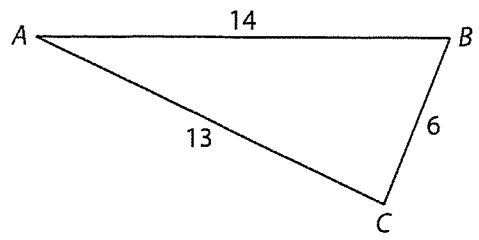
For each triangle, write the order of the angle measures from least to greatest.

13.



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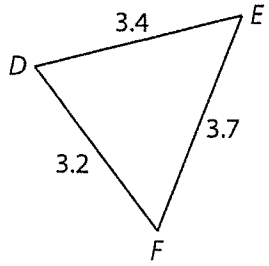
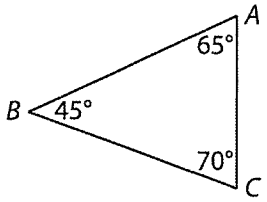


15. Analyze Relationships Suppose a triangle has side lengths PQ, QR, and PR, where $PR = 2PQ = 3QR$. Write the angle measures in order from least to greatest.

For each triangle, write the side lengths in order from least to greatest.

16.



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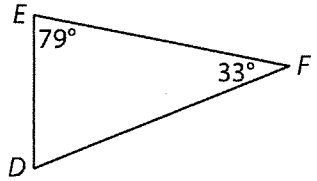
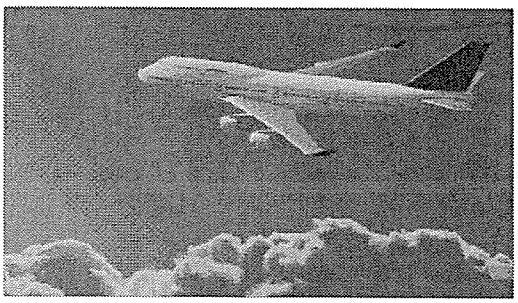
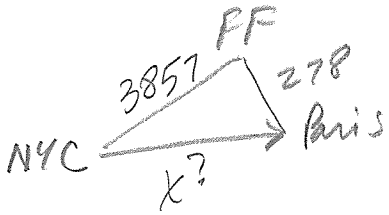


18. In $\triangle JKL$, $m\angle J = 53°$, $m\angle K = 68°$, and $m\angle L = 59°$.

19. In $\triangle PQR$, $m\angle P = 102°$ and $m\angle Q = 25°$.

20. Represent Real-World Problems Rhonda is traveling from New York City to Paris and is trying to decide whether to fly via Frankfurt or to get a more expensive direct flight. Given that it is 3,857 miles from New York City to Frankfurt and another 278 miles from Frankfurt to Paris, what is the range of possible values for the direct distance from New York City to Paris?





$3857 + 278 > x$

$4135 > x$

$278 + x > 3857$

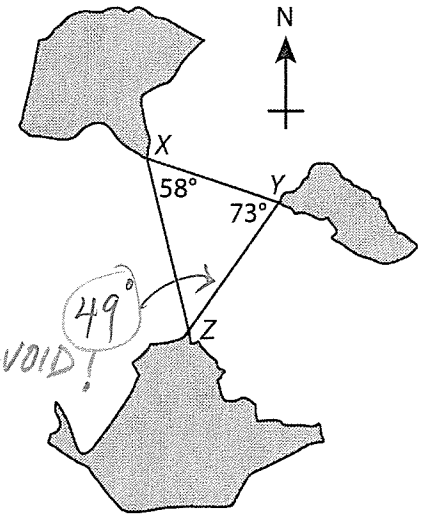
$x > 3579$

$3857 + x > 278$

$x > -3579$

$3579 < \text{distance} < 4135$

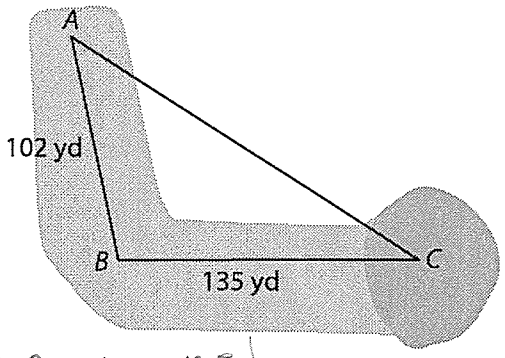
21. **Represent Real-World Problems** A large ship is sailing between three small islands. To do so, the ship must sail between two pairs of islands, avoiding sailing between a third pair. The safest route is to avoid the closest pair of islands. Which is the safest route for the ship?



$m\angle Z = 49° \rightarrow \overline{XY}$ is the shortest distance and therefore the closest pair of islands → AVOID!

Should said through $\overline{XZ}$.

22. **Represent Real-World Problems** A hole on a golf course is a dogleg, meaning that it bends in the middle. A golfer will usually start by driving for the bend in the dogleg (from *A* to *B*), and then using a second shot to get the ball to the green (from *B* to *C*). Sandy believes she may be able to drive the ball far enough to reach the green in one shot, avoiding the bend (from *A* direct to *C*). Sandy knows she can accurately drive a distance of 250 yd. Should she attempt to drive for the green on her first shot? Explain.



Find range of $\overline{AC}$.

$102 + 135 > AC$ → $237 > AC$

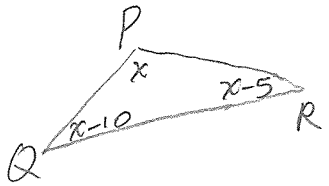
$102 + AC > 135$ → $AC > 33$

$135 + AC > 102$ → $AC > -33$

The distance of AC is $33 < AC < 237$.

Since she can accurately drive 250 yds, then yes, she should make the attempt.

23. **Represent Real-World Problems** Three cell phone towers form a triangle, $\triangle PQR$. The measure of $\angle Q$ is 10° less than the measure of $\angle P$. The measure of $\angle R$ is 5° greater than the measure of $\angle Q$. Which two towers are closest together?



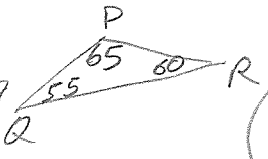
let $x = m\angle P$

$x - 10 = m\angle Q$

$x - 5 = m\angle R$

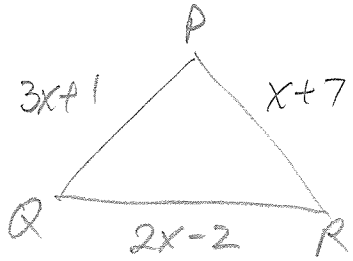
$x + x - 10 + x - 5 = 180$

$x = 65$



Tower Q and tower R are closest.

24. **Algebra** In $\triangle PQR$, $PQ = 3x + 1$, $QR = 2x - 2$, and $PR = x + 7$. Determine the range of possible values of *x*.



$(3x+1) + (x+7) > 2x - 2$

$x > -5$

$(2x-2) + (x+7) > 3x + 1$

$5 > 1$

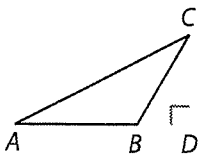
all Reals

$(3x+1) + (2x-2) > x + 7$

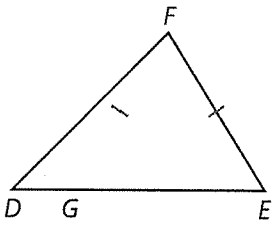
$x > 2$

$x > 2$

29. **Justify Reasoning** In obtuse $\triangle ABC$, $m\angle A < m\angle B$. The auxiliary line segment $\overline{CD}$ perpendicular to $\overleftrightarrow{AB}$ (extended beyond B) creates right triangles ADC and BDC. Describe how you could use the Pythagorean Theorem to prove that $BC < AC$.

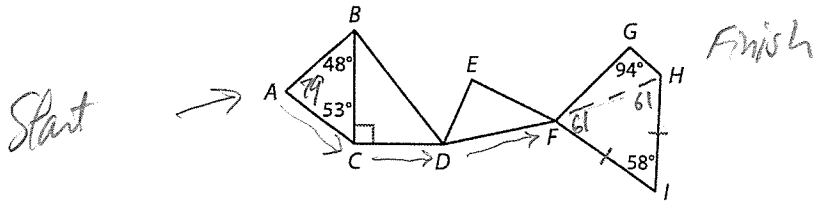


30. **Make a Conjecture** In acute $\triangle DEF$, $m\angle D < m\angle E$. The auxiliary line segment $\overline{FG}$ creates $\triangle EFG$, where $EF = FG$. What would you need to prove about the points D, G, and E to prove that $\angle DGF$ is obtuse, and therefore that $EF < DF$? Explain.



Lesson Performance Task

As captain of your orienteering team, it's your job to map out the shortest distance from point A to point H on the map. Justify each of your decisions.



Shortest route: A → C → D → F → G → H

A → C: $\triangle ABC$, $\overline{AC}$ is the shortest route since it is opp. smallest $\angle$.

C → D: $\triangle BCD$, $\overline{CD}$ is the shortest side. $\triangle BCD$ is a rt $\triangle$. Therefore $\overline{BD}$ is the longest side and the route C to B to D is longer.

D → F: $\triangle DEF$. Use the Triangle Inequality Theorem. $\overline{DF}$ is shorter than D → E → F.

F → G → H: Draw FH. $\triangle FIH$ is isosceles. $\overline{FH}$ is shortest route b/c it is opp. smallest $\angle$ (58°). But $\overline{FH}$ is longest route in $\triangle FGH$. So, the route F → G → H is shorter than F → I → H.