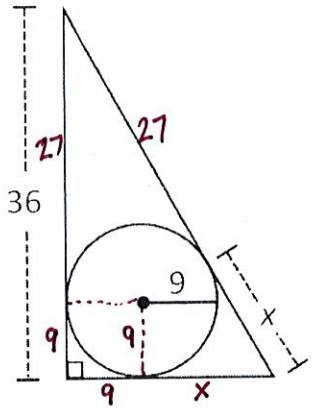
Honors Geometry
Unit 6 – Circles

Name Answer key
Circles Activity

1. Find $x$




$$36^2 + (x+9)^2 = (x+27)^2$$

$$1296 + x^2 + 18x + 81 = x^2 + 54x + 729$$

$$648 = 36x$$

$$x = 18$$

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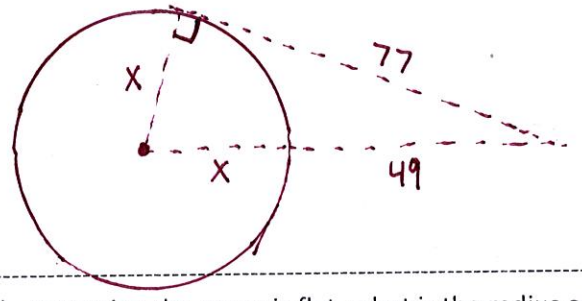
2. A green of a golf course is in the shape of a circle where the hole is also the center of the green. Will's golf ball is currently 49 ft from the edge of the green and 77 ft from the point of tangency on the green.

a) Draw the figure that diagrams this problem, and label it with the corresponding values.




b) Assuming the green is flat, what is the radius of the green?

$$x^2 + 77^2 = (x+49)^2$$

$$x^2 + 5929 = x^2 + 98x + 2401$$

$$3528 = 98x$$

$$x = 36$$

$\therefore$ radius is 36 ft

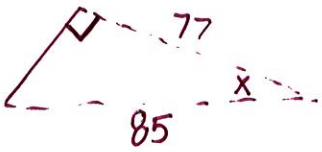
c) How far is your golf ball from the cup at the center of the green?

$$d = 49 + 36$$

$$= 85$$

$\therefore$ 85 ft away

d) If you were to putt directly at the hole to sink your shot, what angle should your putt make with the tangent line to the green?




$$\cos x = \frac{77}{85}$$

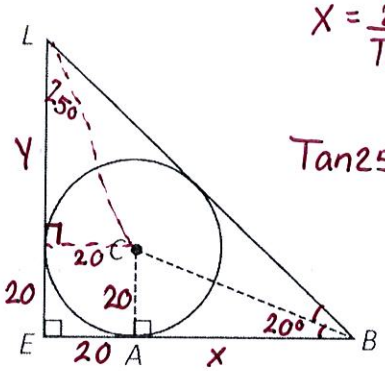
$$x = \cos^{-1}\left(\frac{77}{85}\right)$$

$$x \approx 25.058^\circ$$

$\tan 20° = \frac{20}{x}$

$x = \frac{20}{\tan 20°} \approx 54.950$

3. In the figure to the right, the radius of the circle is 20 cm. $\overline{BC}$ bisects $\angle ABL$, which measures 40°. Round all answers to the nearest thousandth.




$\tan 25° = \frac{20}{y}$

$y = \frac{20}{\tan 25°} \approx 42.890$

a) Find the measure of each side of $\Delta BEL$

$BE =$ 74.950 cm

$EL =$ 62.890 cm

$BL =$ 97.840 cm

b) Find the perimeter and area of $\Delta BEL$

Perimeter = 235.68 cm

Area = 2356.803 cm²

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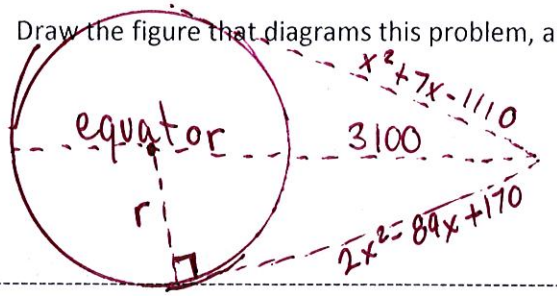
4. A surveillance satellite is hovering over the Earth 3100 miles directly from the equator. The distance from the satellite to the northern horizon is $x^2 + 7x - 1110$ miles, and the distance from the satellite to the southern horizon is $2x^2 - 89x + 170$ miles.

a) Draw the figure that diagrams this problem, and label it with the corresponding values.




b) Find the value(s) of $x$.

$x^2 + 7x - 1110 = 2x^2 - 89x + 170$

$0 = x^2 - 96x + 1280$

$0 = (x-16)(x-80)$

$\cancel{x = 16}$ Invalid

$\boxed{x = 80}$

c) How far is the satellite from each horizon?

$y = 80^2 + 7(80) - 1110$

$y = 5850$

$\boxed{5850 \text{ miles}}$

d) Use this data to find the estimated radius of the Earth.

$5850^2 + r^2 = (r + 3100)^2$

$34{,}222{,}500 + r^2 = r^2 + 6200r + 9{,}610{,}000$

$24{,}612{,}500 = 6200r$

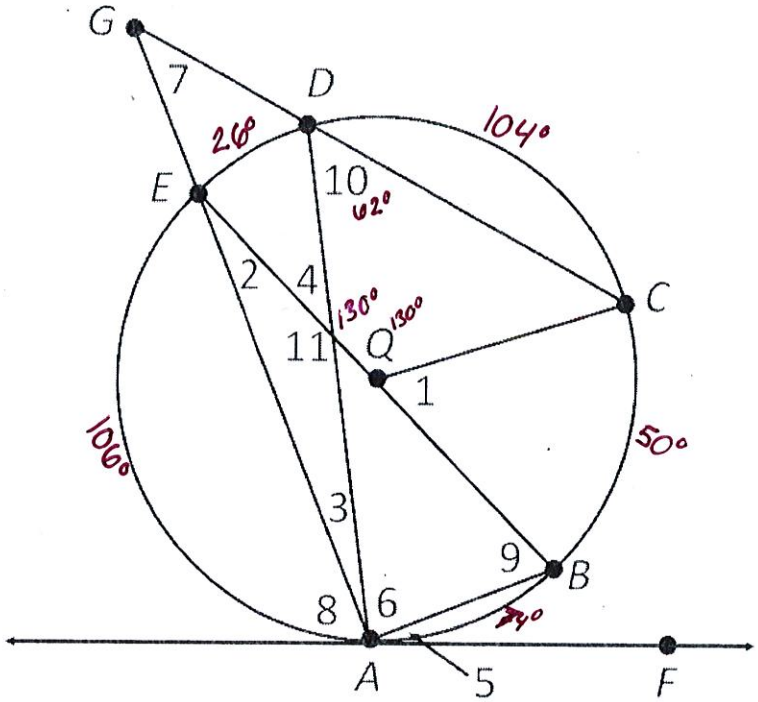
$r \approx 3969.758$ miles

5. Points $A, B, C, D, E$ lie on $\odot Q$

$\overline{BE}$ is a diameter

$\overleftrightarrow{AF}$ is a tangent

$m\widehat{AB} = 74°$, $m\widehat{BC} = 50°$, $m\widehat{DE} = 26°$




$m\angle 1 =$ 50°

$m\angle 2 =$ 37°

$m\angle 3 =$ 13°

$m\angle 4 =$ 50°

$m\angle 5 =$ 37°  $m\angle 6 =$ 77°  $m\angle 7 =$ 49°

$m\angle 8 =$ 53°  $m\angle 9 =$ 53°  $m\angle 10 =$ 62°

$m\angle 11 =$ 130°  $m\angle EQC =$ 130°  $m\angle C =$ 38°  360-130-130-62

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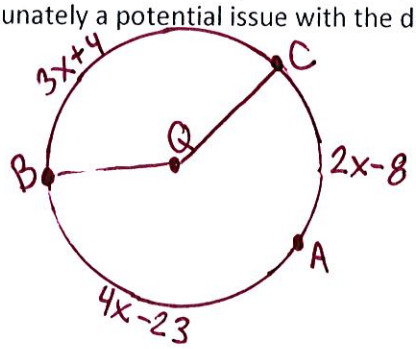
6. A gardener is designing a circular garden, and in doing so, she places flower pots around a large circular garden (represented by $\odot Q$). Once she places point $A$, she walks in a clockwise rotation to place point $B$, and then point $C$. Unfortunately a potential issue with the design arises, and in order to fix it she must solve the following:




$m\widehat{AB} = (4x - 23)°$

$m\widehat{AC} = (2x - 8)°$

$m\angle BQC = (3x + 4)°$

$x =$ 43°

$m\widehat{AB} =$ 149°

$m\widehat{AC} =$ 78°

$m\widehat{BCA} =$ 211°

$(2x-8) + (4x-23) + (3x+4) = 360°$

$9x - 27 = 360$

$9x = 387$

$x = 43$

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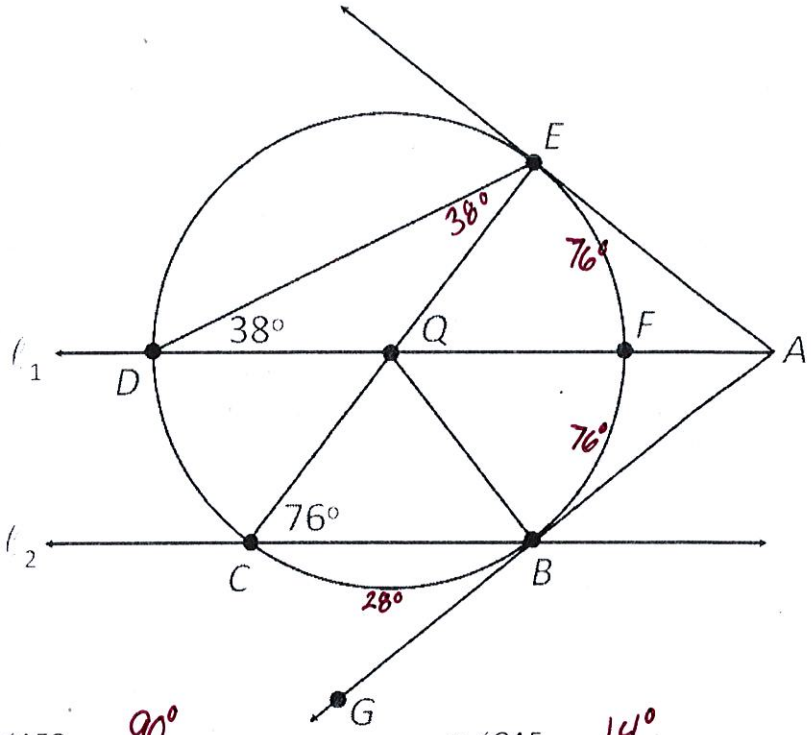
7. Given that $l_1 // l_2$, find the measure of each arc/angle




m∠AQE = 76°

m∠AQB = 76°

m∠BQC = 28°

m∠CQD = 76°

m∠DQE = 104°

m∠AEQ = 90°

m∠QAE = 14°

m$\widehat{FB}$ = 76°

m∠ABQ = 90°

m∠CBG = 14°

m$\widehat{BC}$ = 28°

m$\widehat{DC}$ = 76°

m$\widehat{ED}$ = 104°