Polygons & Quadrilaterals

Sum of Interior Angles: $(n-2)\cdot 180$

Each regular interior angle: $\frac{(n-2)\cdot 180}{n}$

Sum of exterior angles: $360°$

Each regular exterior angle: $\frac{360}{n}$

1. What is the measure of each interior angle of a regular 16 – gon?

$$\frac{(16-2)\cdot 180}{16}$$

157.5

2. What is the measure of the sum of the interior angles of a pentagon?

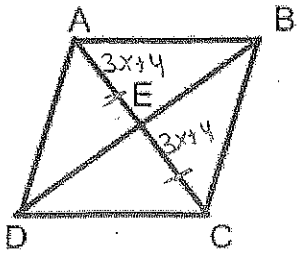
$(5-2)\cdot 180$

540°

3. A regular polygon has 20 sides. The measure of an exterior angle is 18°.

$\frac{360}{20}$

4. For parallelogram ABCD if AE = 3x + 4 and AC = 8x - 10. Find x.



$\overline{AE} + \overline{EC} = \overline{AC}$

$3x+4+3x+4 = 8x-10$

$6x+8 = 8x-10$

$-6x \quad -6x$

$8 = 2x-10$

$+10 \quad +10$

$\frac{18}{2} = \frac{2x}{2}$

$9 = x$

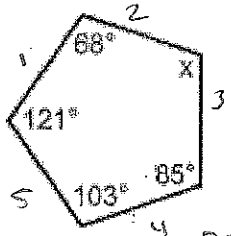
5. What properties of a polygon make it regular?

equiangular and equilateral

6. Find x.

Sum of pentagon
$(5-2)\times 180 = 540°$

(A)



$68 + 121 + 103 + 85 + X = 540$

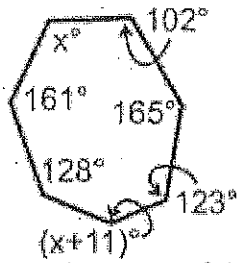
$377 + X = 540$

$-377 \quad -377$

$X = 163°$

Sum of septagon
$(7-2)\times 180 = 900°$

(B)



$X + 102 + 165 + 123 + X + 11 + 128 + 161 = 900$

$2X + 690 = 900$

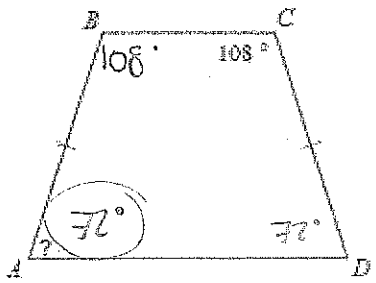
$-690 \quad -690$

$\frac{2X}{2} = \frac{210}{2}$

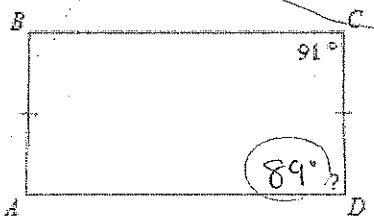
$X = 105$

7. The figures below are isosceles trapezoids. Find the missing angle measure.

(A)

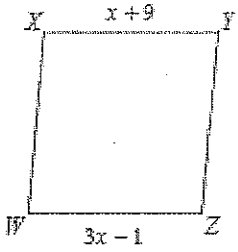


(B)



8. The figures below are parallelograms. Find x.

(A)



$X + 9 = 3X - 1$

$-X \quad -X$

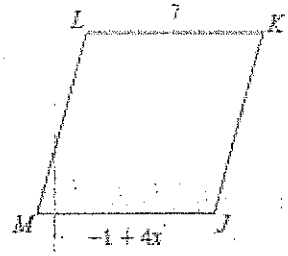
$9 = 2X - 1$

$+1 \quad +1$

$\frac{10}{2} = \frac{2X}{2}$

$5 = X$

(B)



$7 = -1 + 4X$

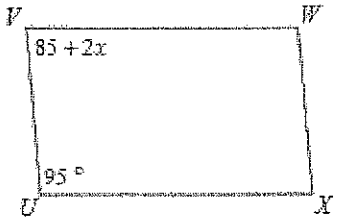
$+1 \quad +1$

$\frac{8}{4} = \frac{4X}{4}$

$2 = X$

9. The figures below are parallelograms. Find x.

(A)



$85 + 2X + 95 = 180°$

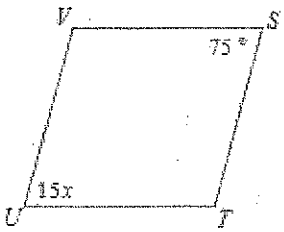
$180 + 2X = 180$

$-180 \quad -180$

$\frac{2X}{2} = \frac{0}{2}$

$X = 0$

(B)

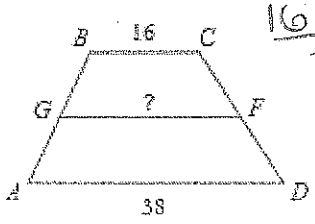


$\frac{15X}{15} = \frac{75}{15}$

$X = 5$

10. Find the midsegment of the trapezoid.

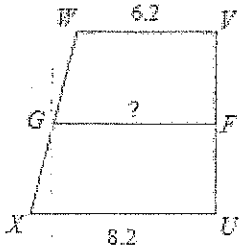
(A)



$\frac{16 + 38}{2}$

27

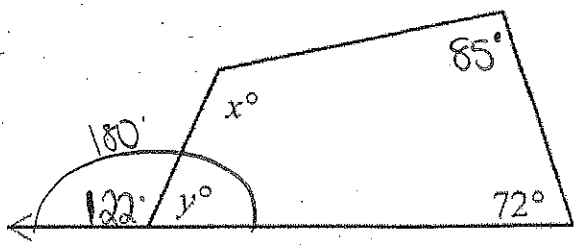
(B)



$\frac{6.2 + 8.2}{2}$

7.2

11. Find x and y.

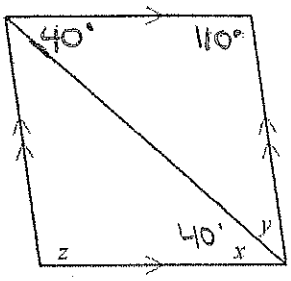


$x + 58 + 72 + 85 = 360$

$x = 145°$

$y = 58°$

12. Find the values of the variables in the parallelogram below.

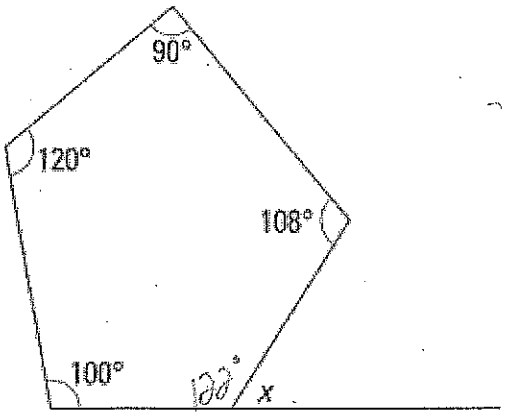


$x = 40°$

$y = 30°$

$z = 110°$

13. What is the value of x?



$100 + 120 + 90 + 108 + y = 540$

$418 + y = 540$

$-418 \quad -418$

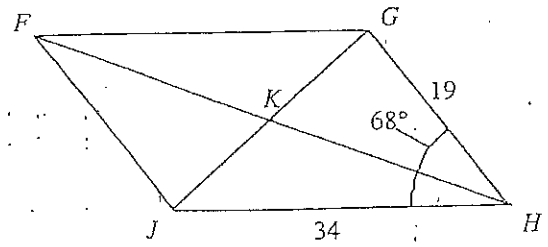
$y = 122°$

$180 - 122 = x$

$58° = x$

Use the figure below.

14.



Given: $FGHJ$ is a parallelogram, $m\angle JHG = 68°$, $JH = 34$, $GH = 19$

A. Find $m\angle FJH$. 112°

B. Find JF. 19

C. Find $m\angle GFJ$. 68°

D. Find FG. 34

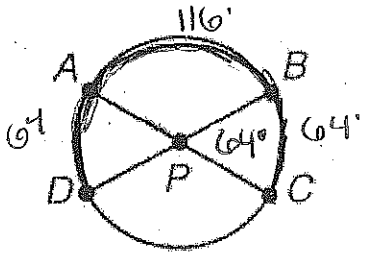
CIRCLES

1. The chord through the center of a circle measures 18 feet. What is the measure of the radius?

diameter

radius = 9 ft.

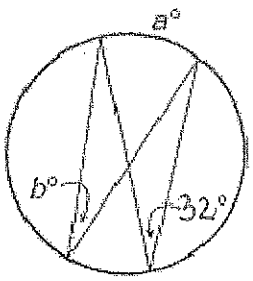
2. Find the measure of $\overset{\frown}{DBC}$ in $\odot P$.



$\overset{\frown}{DBC} = 64 + 116 + 64$

$= 244°$

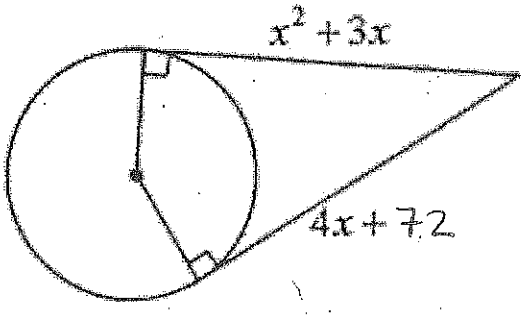
3. Find the values of a and b.



$a = 2(32°) = 64°$

$b = 32°$

4.



$x^2 + 3x = 4x + 72$

$-4x \quad -4x$

$x^2 - 1x = 72$

$-72 \quad -72$

$x^2 - 1x - 72 = 0$

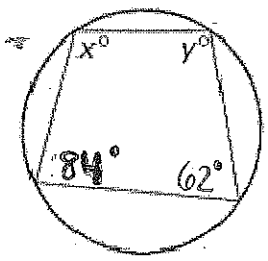
$(x - 9)(x + 8) = 0$

$x - 9 = 0$ $\qquad$ $x + 8 = 0$

$x = 9$ $\qquad$ $x = -8$

5. Find the values of x and y.

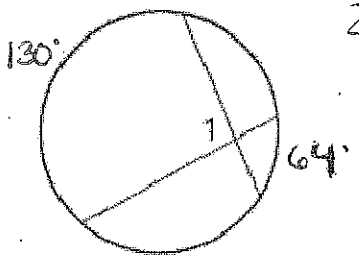
Opposite angles are supplementary



$x + 62 = 180$
$-62 \quad -62$
$x = 118°$

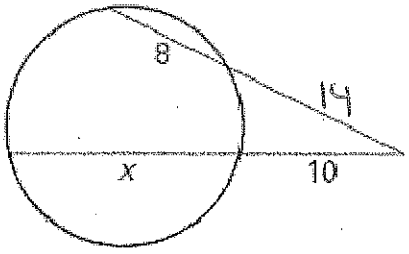
$y + 84 = 180$
$-84 \quad -84$
$y = 96°$

6. Find m∠1



$\angle 1 = \frac{1}{2}$(vertical Arcs)
$= \frac{1}{2}(130 + 64)$
$= \frac{1}{2}(194)$
$= 97°$

7. Find the value of x.

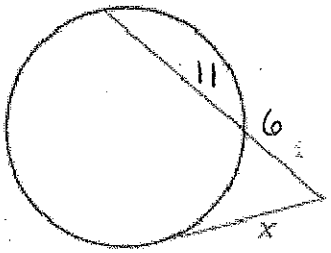


outside piece (whole) = outside piece (whole)

$14(14 + 8) = 10(x + 10)$
$14(22) = 10x + 100$
$308 = 10x + 100$
$-100 \quad -100$
$\frac{208}{10} = \frac{10x}{10}$

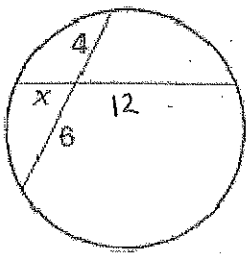
$x = 20.8$

8. Find the value of x.



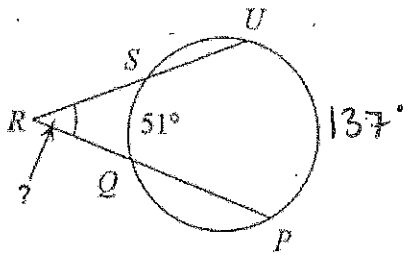
tangent^2 = outside piece (whole)
$x^2 = 6(6 + 11)$
$x^2 = 6(17)$
$x^2 = 102$
$\sqrt{x^2} = \sqrt{102}$
$x = 10.1$

9. Find the value of x.



piece · piece = piece · piece
$12x = 6(4)$
$\frac{12x}{12} = \frac{24}{12}$
$x = 2$

10. Find the measure of <R



$\angle = \frac{1}{2}(\text{Big Arc} - \text{Little Arc})$

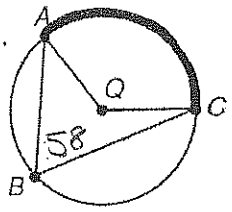
$= \frac{1}{2}(137 - 51)$

$\frac{1}{2}(86)$

$= 43°$

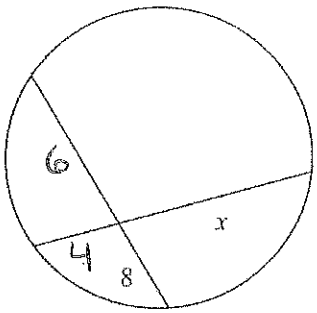
11. Given: $\odot Q$ and $m\angle B = 58°$

Find $m\widehat{AC}$.



$58(2) = 116°$

12. Find the value of x.



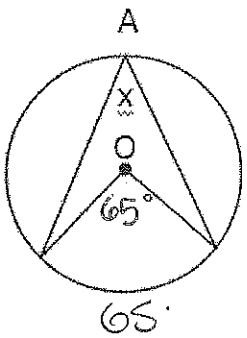
piece · piece = piece · piece

$6(8) = 4(x)$

$\frac{48}{4} = \frac{4x}{4}$

$12 = x$

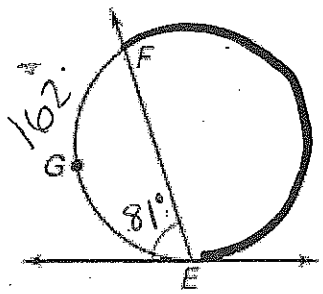
13. Find x.



$\frac{1}{2}(65) = x$

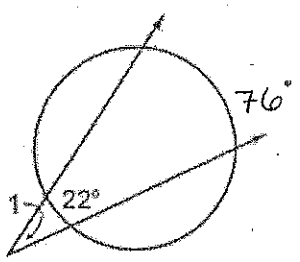
$32.5°$

14. Find $m\widehat{FE}$.



$360 - 162 = \boxed{198°}$

15. Find m∠1.



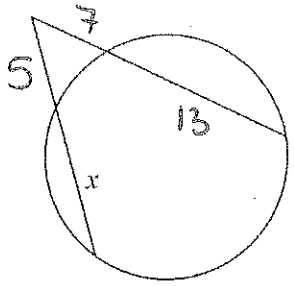
$\angle = \frac{1}{2}(\text{Big Arc} - \text{Little Arc})$

$= \frac{1}{2}(76 - 22)$

$= \frac{1}{2}(54)$

$\boxed{= 27°}$

16. Find the value of x.



outside piece (whole) = outside piece (whole)

$7(7+13) = 5(5+x)$

$7(20) = 25 + 5x$

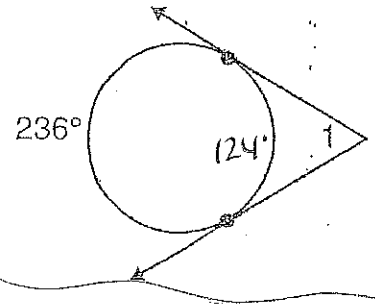
$140 = 25 + 5x$

$-25 \quad -25$

$\frac{115}{5} = \frac{5x}{5}$

$\boxed{x = 23}$

17. Find the measure of ∠1.



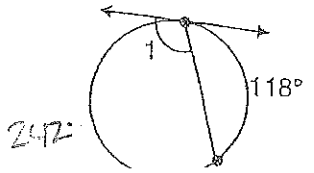
$\angle = \frac{1}{2}(\text{Big Arc} - \text{Little Arc})$

$= \frac{1}{2}(236 - 124)$

$= \frac{1}{2}(112)$

$= 56°$

18. Find the measure of ∠1.



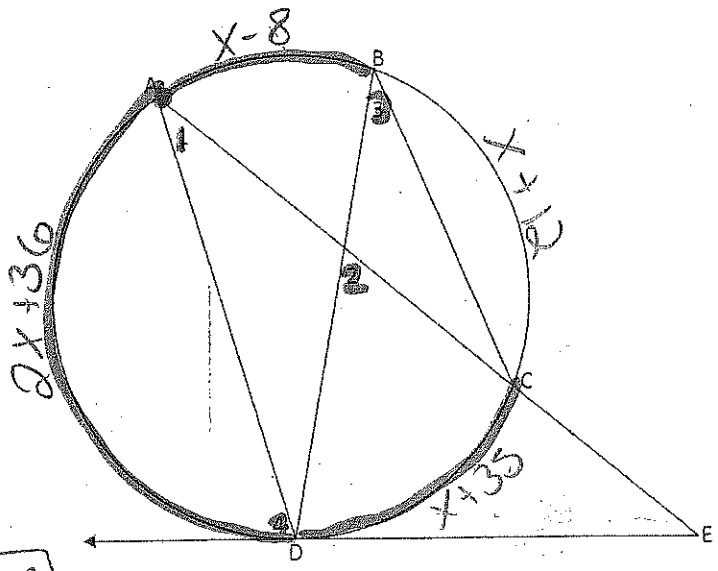
$\frac{1}{2}(242) = \boxed{121°}$

19. Given: $m\overset{\frown}{AD} = 2x + 36 = 150°$

$m\overset{\frown}{AB} = x - 8 \quad 49°$

$m\overset{\frown}{BC} = x + 12 \quad 69°$

$m\overset{\frown}{CD} = x + 35 \quad 92°$



Find: $x = \boxed{57}$

$m\angle 1 = \frac{1}{2}(92) = \boxed{46°}$

$m\angle 2 = \frac{1}{2}(\text{vertical arcs}) \quad \frac{1}{2}(92 + 49) = \boxed{70.5°}$

$m\angle 3 = \frac{1}{2}(92) = \boxed{46°}$

$m\angle 4 = \frac{1}{2}(150) = \boxed{75°}$

$$2x + 36 + x - 8 + x + 12 + x + 35 = 360$$

$$5x + 75 = 360$$

$$-75 \quad -75$$

$$\frac{5x}{5} = \frac{285}{5}$$

$$x = 57°$$