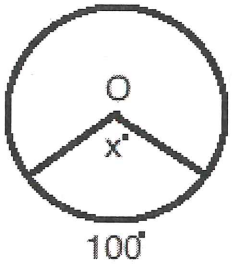
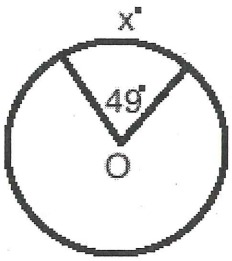
Name:_____ **Unit 6 Review**
Monica
Geometry Period:____
Date:_____

ANGLES INSIDE AND OUTSIDE OF CIRCLES

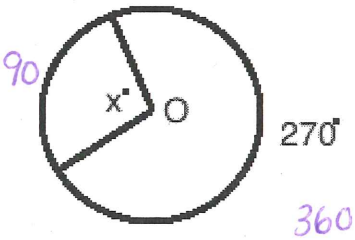
1) Determine the value of x in each of the circles below. These angles are called central ∠s.



$X = 100°$



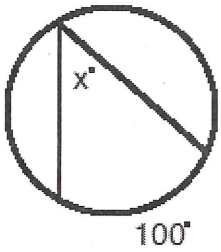
$X = 49°$



$360 - 270 = 90$

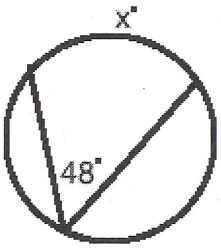
$X = 90°$

2) Determine the value of x in each of the circles below. These angles are called inscribed ∠s.



$X = \frac{1}{2}(100)$

$X = 50°$



$X = 2(48)$

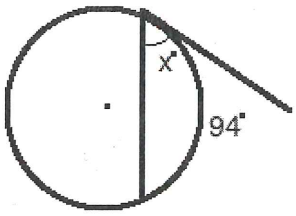
$X = 96°$

$360 - 250 = 110$

$x = \frac{1}{2}(110)$

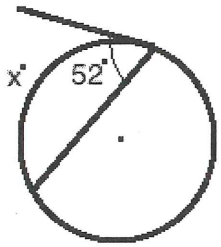
$x = 55°$

3) The diagrams below show a chord and a tangent. Determine the value of x.



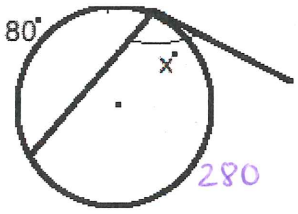
$X = \frac{1}{2}(94)$

$x = 47°$



$X = 2(52)$

$X = 104°$



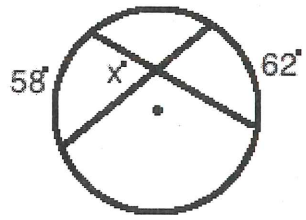
$360 - 80 = 280$

$X = \frac{1}{2}(280)$

$X = 140$

4) The diagrams below show two intersecting chords. Determine the value of x.

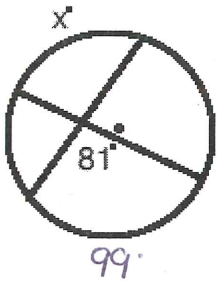
180 - 30 = 150



$\frac{58+62}{2} = x$

$\frac{120}{2} = x$

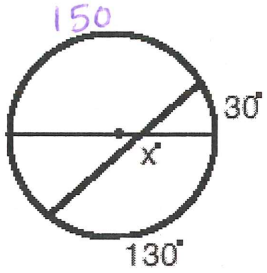
$60 = x$



$\frac{x+99}{2} = 81$

$x + 99 = 162$

$x = 63$



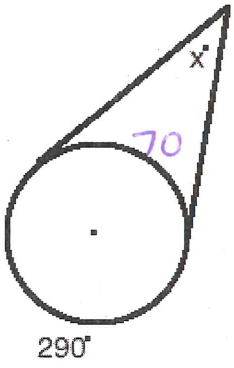
$\frac{150+130}{2} = x$

$\frac{280}{2} = x$

$140 = x$

5) The diagrams below shows two tangents to a circle. Determine the value of x.

180 - 80 = 100

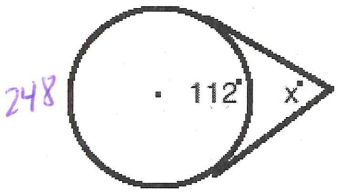


$360 - 290 = 70$

$\frac{290-70}{2} = x$

$\frac{220}{2} = x$

$110 = x$

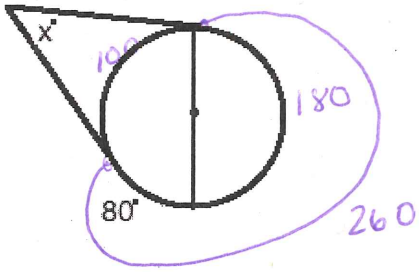


$360 - 112 = 248$

$\frac{248-112}{2} = x$

$\frac{136}{2} = x$

$68 = x$

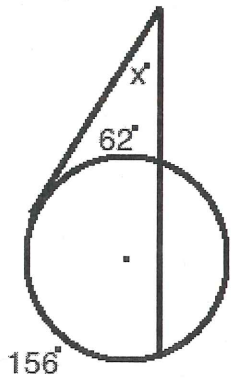


$\frac{260-100}{2} = x$

$\frac{160}{2} = x$

$80 = x$

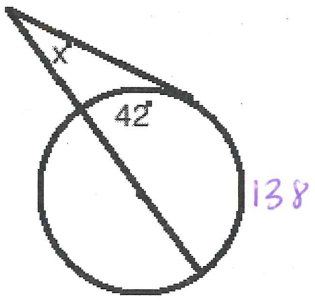
6) The diagram below shows a tangent and a secant to a circle. Determine the value of x.



$$\frac{156 - 62}{2} = x$$

$$\frac{94}{2} = x$$

$$47 = x$$

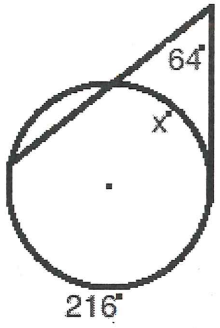


$180 - 42 = 138$

$$\frac{138 - 42}{2} = x$$

$$\frac{96}{2} = x$$

$$48 = x$$



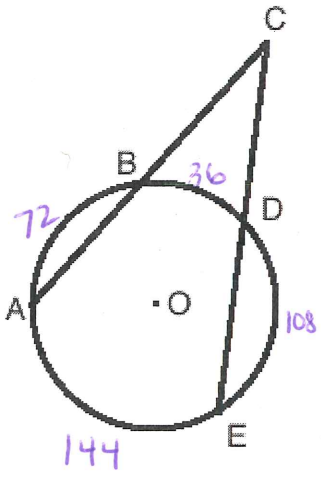
$$\frac{216 - x}{2} = 64$$

$$216 - x = 128$$

$$-x = -88$$

$$x = 88$$

7) In circle O below, secants AC and CE are drawn such that $m\overset{\frown}{AB}:m\overset{\frown}{AD}:m\overset{\frown}{DE}:m\overset{\frown}{EA} = 2:1:3:4$. Determine the measure of $\angle C$.



$\overset{\frown}{BD}$

$2x + 1x + 3x + 4x = 360$

$10x = 360$

$x = 36$

$\overset{\frown}{AB} = 2(36) = 72$

$\overset{\frown}{BD} = 36$

$\overset{\frown}{DE} = 3(36) = 108$

$\overset{\frown}{EA} = 4(36) = 144$

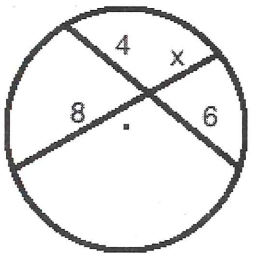
$$\angle C = \frac{144 - 36}{2}$$

$$\angle C = \frac{108}{2}$$

$$\angle C = 54$$

SEGMENT LENGTHS INSIDE AND OUTSIDE OF CIRCLES

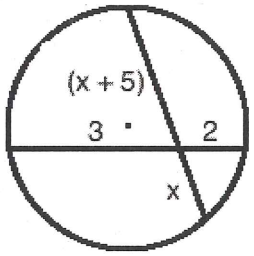
8) The diagrams below show two intersecting chords. Determine the value of x.



$8 \cdot x = 4 \cdot 6$

$8x = 24$

$\boxed{x = 3}$



$x(x+5) = 3 \cdot 2$

$x^2 + 5x = 6$

$x^2 + 5x - 6 = 0$

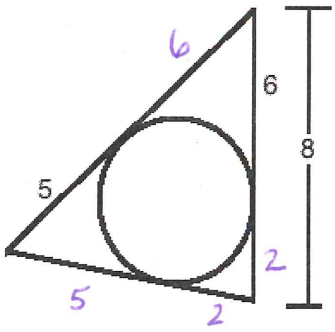
$(x+6)(x-1) = 0$

$x+6=0$ | $x-1=0$

~~$x=-6$~~ | $x=1$

$\boxed{x=1}$

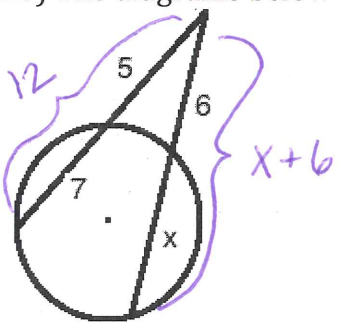
9) Three tangents were drawn to the circle below creating a triangle. Determine the perimeter of the triangle.



$P = 5 + 6 + 8 + 2 + 5$

$\boxed{P = 27}$

10) The diagrams below show two secants in a circle. Determine the value of x.

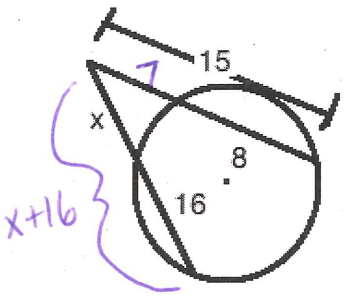


$12 \cdot 5 = 6(x+6)$

$60 = 6x + 36$

$24 = 6x$

$\boxed{4 = x}$



$x(x+16) = 7 \cdot 15$

$x^2 + 16x = 105$

$x^2 + 16x - 105 = 0$

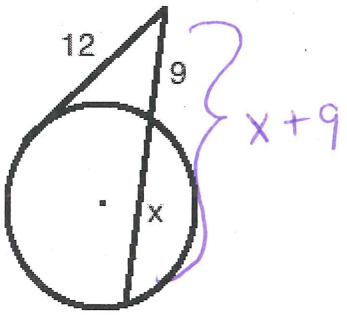
$(x+21)(x-5) = 0$

$x+21=0$ | $x-5=0$

~~$x=-21$~~ | $x=5$

$\boxed{x=5}$

11) The diagrams below show a tangent and a secant to a circle. Determine the value of x. If necessary, write your answer in simplest radical form.

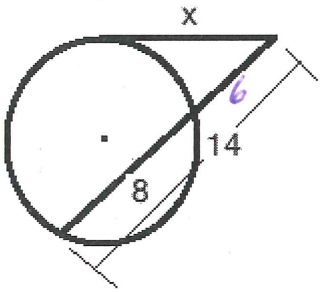


$12 \cdot 12 = 9(x+9)$

$144 = 9x + 81$

$63 = 9x$

$\boxed{7 = x}$



$x \cdot x = 6 \cdot 14$

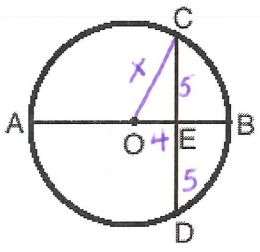
$x^2 = 84$

$x = \sqrt{84}$

$x = \sqrt{4}\sqrt{21}$

$\boxed{x = 2\sqrt{21}}$

12) In the diagrams below, the diameters are perpendicular to the chords. Determine the lengths as indicated.



CD = 10, OE = 4

Determine the length of OA.

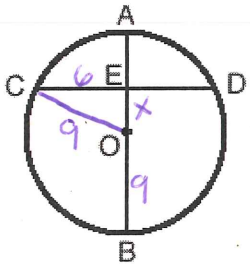
$4^2 + 5^2 = x^2$

$16 + 25 = x^2$

$41 = x^2$

$\sqrt{41} = x$

$\boxed{OA = \sqrt{41}}$



OB = 9, CE = 6

Determine the length of OE.

$9^2 = x^2 + 6^2$

$81 = x^2 + 36$

$45 = x^2$

$\sqrt{45} = x$

$\sqrt{9}\sqrt{5} = x$

$\boxed{3\sqrt{5} = x}$

EQUATIONS OF CIRCLES AND GRAPHING CIRCLES

13) What is the equation of a circle with a center of (-2, 5) and a radius of 5?

h k

$(x--2)^2+(y-5)^2=5^2$

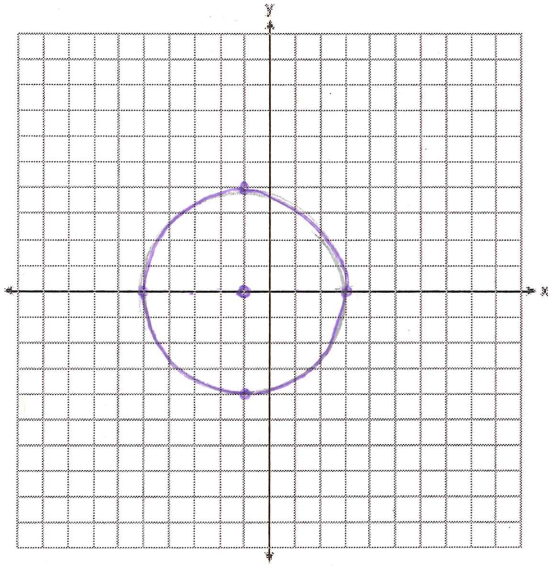
$(x+2)^2+(y-5)^2=25$

14) Determine the coordinates of the center and the length of the radius of a circle with an equation of $(x-2)^2+(y+5)^2=36$.

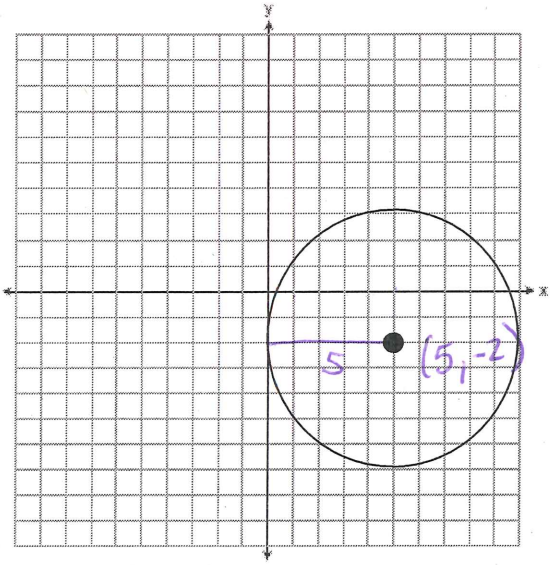
center = (2, -5)

radius = 6

15) Graph a circle on the coordinate plane below with an equation of $(x+1)^2+y^2=16$.



16) Determine the equation of the circle on the coordinate plane below.



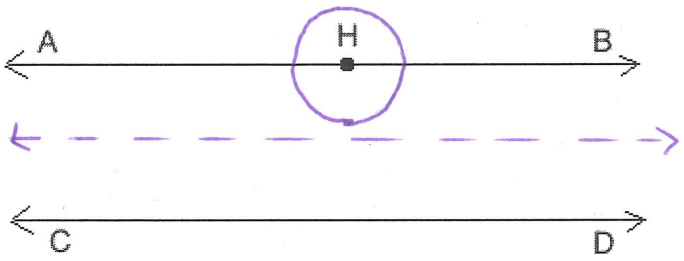
$(x-5)^2+(y--2)^2=5^2$

$(x-5)^2+(y+2)^2=25$

LOCUS

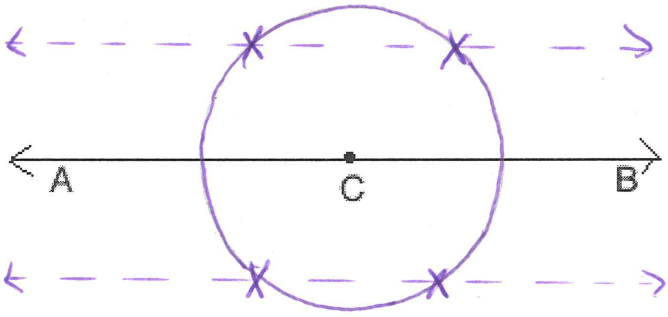
17) In the diagram below AB || CD and are 12 units apart. How many points are equidistant from the two lines and 5 units from point H? Sketch a picture that shows your answer.

0 points



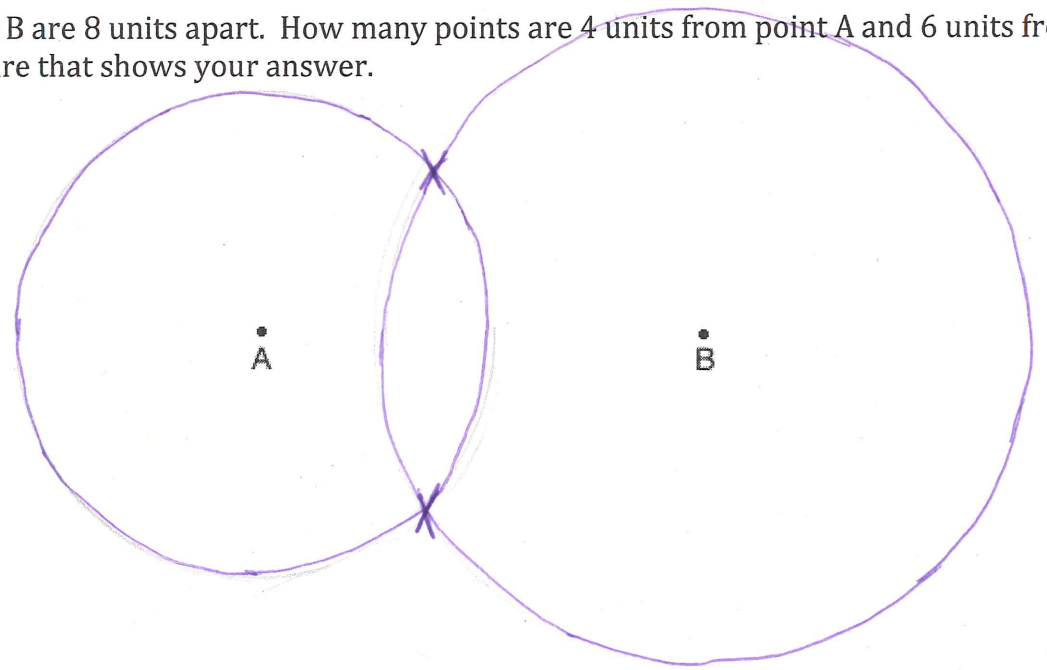
18) How many points are 3 units from the line AB and 4 units from point C? Sketch a picture that shows your answer.

4 points

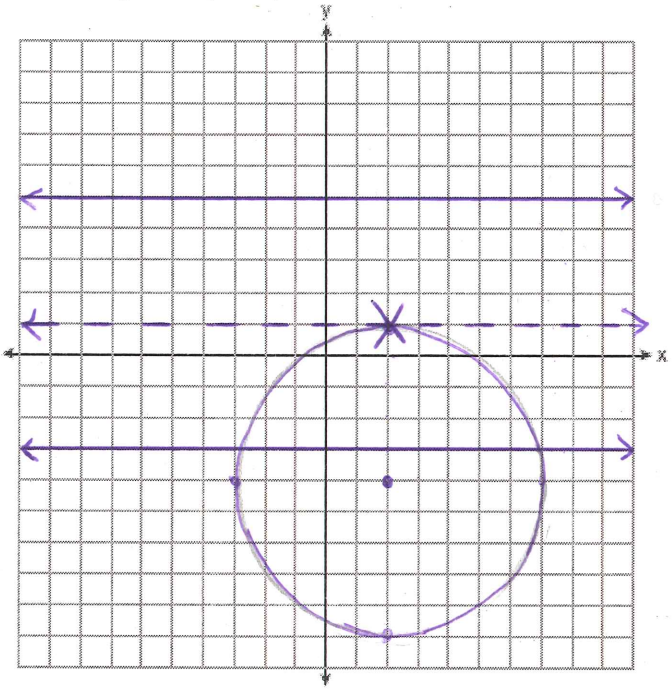


19) Points A and B are 8 units apart. How many points are 4 units from point A and 6 units from point B? Sketch a picture that shows your answer.

2 points

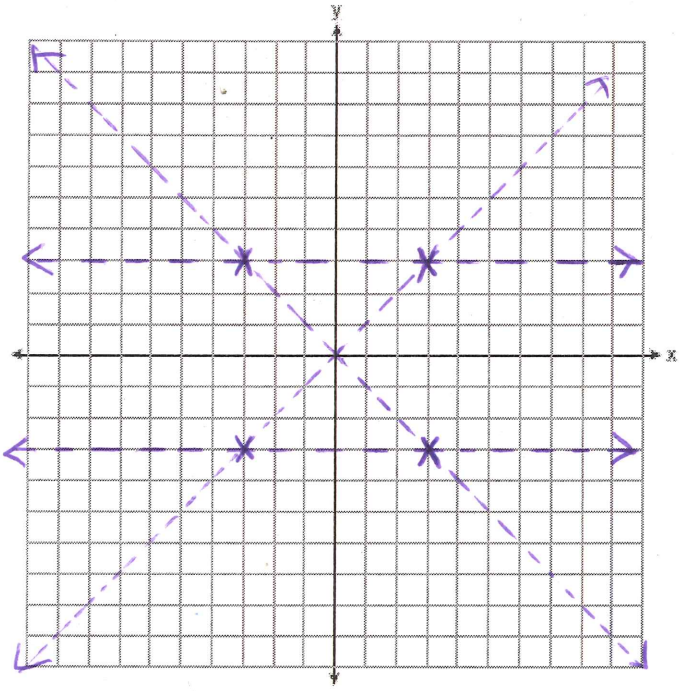


20) Sketch the locus of points equidistant from the lines y = 5 and y = -3 and the points 5 units away from the point (2, -4).



(2, 1)

21) Sketch the locus of points equidistant from the *x* and *y* axes and 3 units away from the x-axis. Identify the coordinates of the locus.



(3, 3)

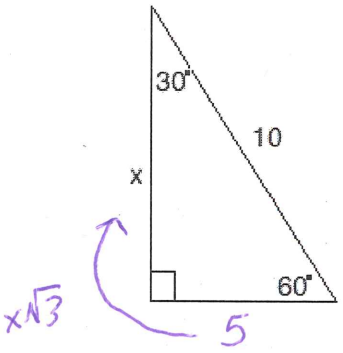
(-3, 3)

(-3, -3)

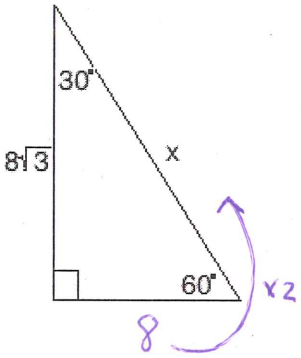
(3, -3)

SPECIAL RIGHT TRIANGLES AND PYTHAGOREAN THEOREM

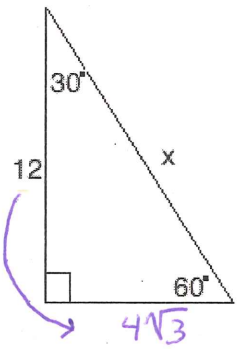
22) Determine the value of x in the special right triangles below. If necessary, write your answer in simplest radical form.



$x = 5\sqrt{3}$



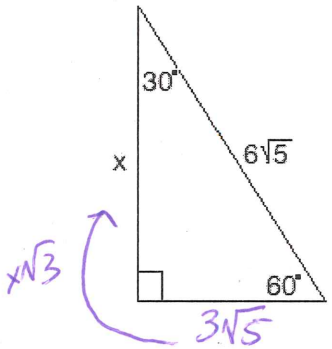
$x = 16$



$\frac{12}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{12\sqrt{3}}{3} = 4\sqrt{3}$

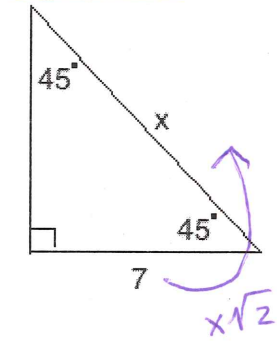
$x = 2(4\sqrt{3})$

$x = 8\sqrt{3}$

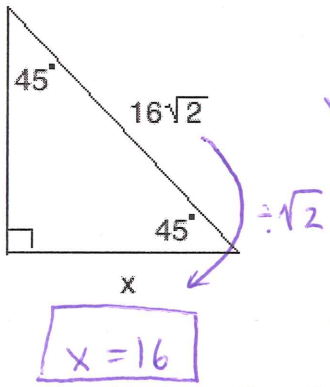


$3\sqrt{5} \cdot \sqrt{3}$

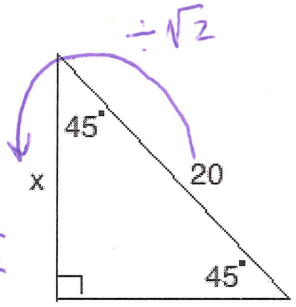
$x = 3\sqrt{15}$



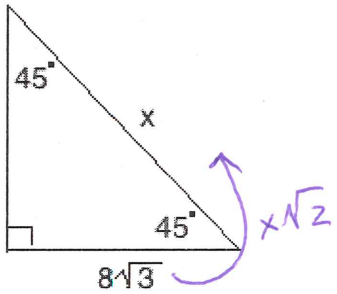
$x = 7\sqrt{2}$



$x = 16$



$\frac{20}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{20\sqrt{2}}{2} = 10\sqrt{2}$



$8\sqrt{3} \cdot \sqrt{2}$

$x = 8\sqrt{6}$

23) Side lengths of triangles are listed below. Classify them as acute, right, or obtuse.

a) {2, 7, 8}

$2^2 + 7^2 \stackrel{?}{=} 8^2$

$53 < 64$

OBTUSE

b) {10, 24, 26}

$10^2 + 24^2 \stackrel{?}{=} 26^2$

$676 = 676$

RIGHT

c) {8, 9, 10}

$8^2 + 9^2 \stackrel{?}{=} 10^2$

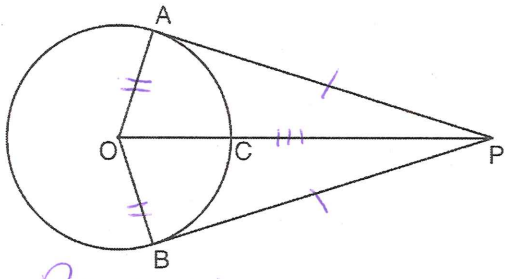
$145 > 100$

ACUTE

PROOFS

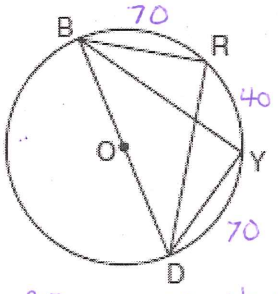
24) Given: Circle O
Tangents AP and BP
Radii OA and OB

Prove: $m\overset{\frown}{AC} = m\overset{\frown}{BC}$



Statements	Reasons
1) Tangents AP & BP	1) Given
2) $\overline{AP} \cong \overline{BP}$	2) Tangents from the same point are $\cong$
3) Radii OA & OB	3) Given
4) $\overline{OA} \cong \overline{OB}$	4) All radii in a circle are $\cong$
5) $\overline{OP} \cong \overline{OP}$	5) Reflexive Property
6) $\triangle AOP \cong \triangle BOP$	6) SSS
7) $\angle AOP \cong \angle BOP$	7) CPCTC
8) $m\overset{\frown}{AC} \cong m\overset{\frown}{BC}$	8) $\cong$ central $\angle$s intercept $\cong$ arcs

25) In the accompanying diagram, $m\overset{\frown}{BR} = 70$, $m\overset{\frown}{YD} = 70$, and $\overline{BOD}$ is the diameter of circle *O*. Write an explanation or a proof that shows $\triangle RBD$ and $\triangle YBD$ are congruent.



Since $m\overset{\frown}{BR} = 70$, $m\angle BDR = 35$ since it is an inscribed angle. Similarly, since $m\overset{\frown}{YD} = 70$, $m\angle YBD = 35$. Therefore, $\angle BDR = \angle YBD$ by substitution. Since a diameter cuts a circle in half, $m\overset{\frown}{BR} + m\overset{\frown}{RY} + m\overset{\frown}{DY} = 180$. By substitution, $70 + m\overset{\frown}{RY} + 70 = 180$. Simplifying, $m\overset{\frown}{RY} + 140 = 180$. By Subtraction, $m\overset{\frown}{RY} = 40$. By the arc addition postulate, $m\overset{\frown}{RD} = 110$ and $m\overset{\frown}{BY} = 110$. Therefore, the inscribed angles $m\angle RBD = 55$ and $m\angle BDY = 55$. By substitution, $m\angle RBD = m\angle BDY$. By the reflexive property $\overline{BD} \cong \overline{BD}$. Therefore, by ASA, $\triangle RBD \cong \triangle YBD$.