Geometry – Test Review (Covering Chapters 1, 2, 3, 5, 7, 9, 10, and some extra stuff)

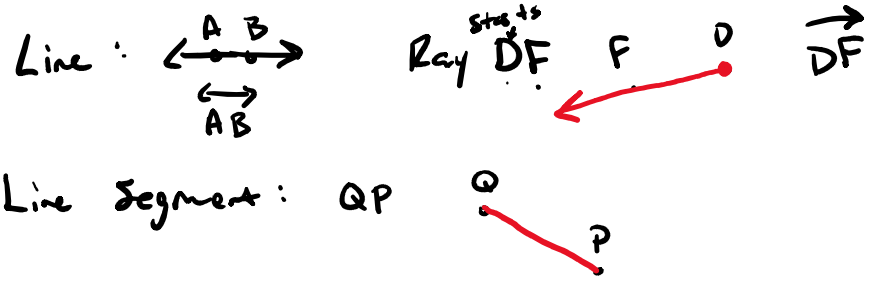
*This review contains a list of concepts that I will be testing you over. To practice these concepts, I have included practice problems or recommended homework problems that can be found in your book. **You** must decide for **yourself** which of the problems to do, based on your own understanding of the material. There are far too many problems listed to do them all. Once you get a handle on a particular problem type, move on.*

As you can see by the length of this review, you are beginning to be expected to know a Lot of content. While I sympathize with your complaints about having to memorize so much, it simply can't be helped. My job is to prepare you for the ACT and there's a lot of material on it.

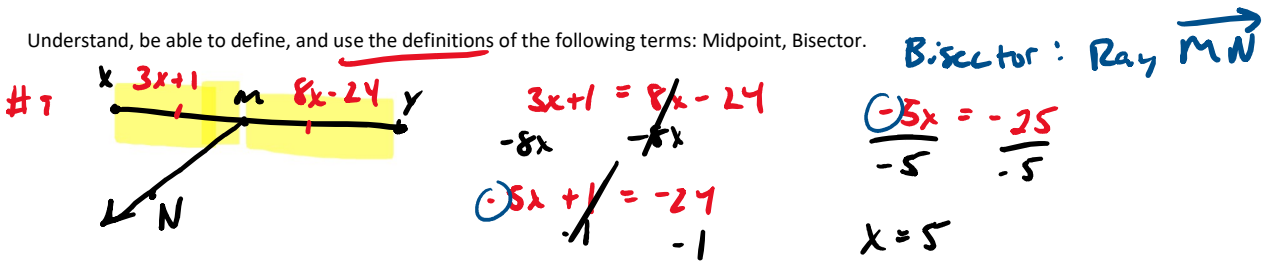
READ THIS SECTION! *To make these tests not seem so overwhelming, I'll allow you the FRONT SIDE ONLY of one sheet of standard 8.5 by 11in. paper to write **any** review material you think will need when taking the test. You can use that review sheet when working on the test. If you'd like recommendations on what to put on your paper I'd be happy to help. You'll be turning these sheets in with your tests.*

Chapter 1 Content:

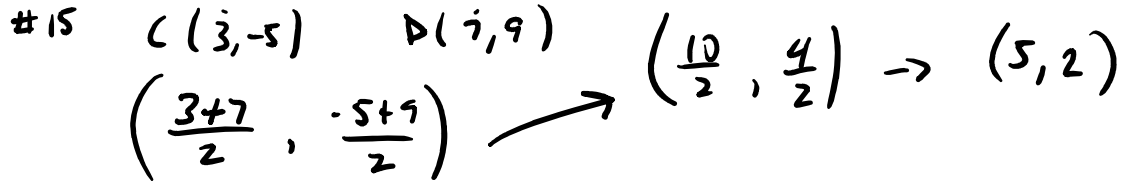
1. Be able to identify (label), define, and sketch Lines, Rays, and Line Segments



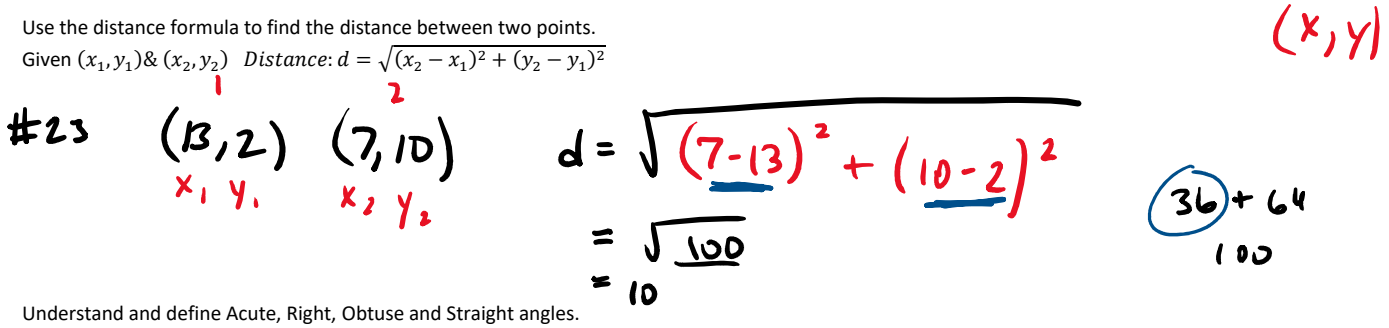
2. Understand, be able to define, and use the definitions of the following terms: Midpoint, Bisector.



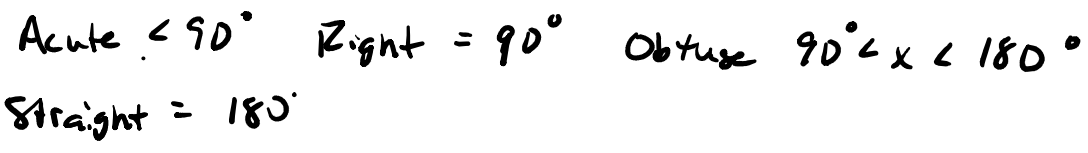
3. Use the midpoint formula to find the midpoint between two points.
   Given (x_1, y_1) & (x_2, y_2) $Midpoint$: $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$



4. Use the distance formula to find the distance between two points.
   Given (x_1, y_1) & (x_2, y_2) $Distance$: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

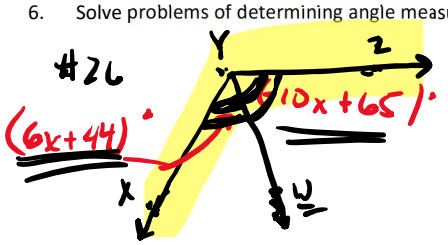


5. Understand and define Acute, Right, Obtuse and Straight angles.



6. Solve problems of determining angle measures by using previous vocabulary and algebra skills

#26



$m\angle XYZ = 117°$ Find x

$(6x+44) + (-10x+65) = 117$

$-4x + 109 = 117$

$-4x + 105 = 117$

$-4x = 8$

$x = -2$

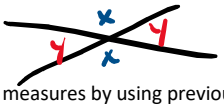
7. Understand and define Complimentary, Supplementary, Adjacent Angles, Linear Pairs, and Vertical Angles

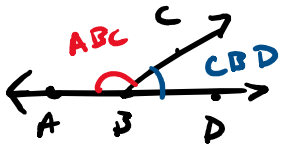
Complimentary: Add to 90° Supplementary: add to 180°

Adjacent Angles: 2 Angles that Share a side

Linear Pair: 2 Angles that Share a side & add to 180°

Vertical Angles:





8. Solve problems of determining angle measures by using previous vocabulary and algebra skills.

#7 pg 50 $\angle 1$ is the compliment of $\angle 2$.

$m\angle 1 = 23°$ Find $m\angle 2$

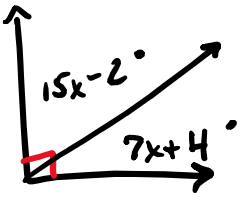
$\angle 1 + \angle 2 = 90$

$23 + x = 90$

$x = 67°$

$m\angle 2 = 67°$

#12.



Find x.

$15x - 2 + 7x + 4 = 90$

$22x + 2 = 90$

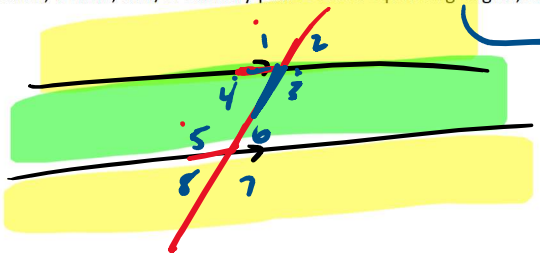
$-2 \quad -2$

$\frac{22x}{22} = \frac{88}{22}$

$x = 4$

Chapter 3 Content:

9. Label, Define, and/or Identify pairs of Corresponding angles, Alternate Exterior angles, Alternate Interior Angles, and Consecutive Interior Angles



1,5 2,6 1,7 2,8 4,6 3,5 3,6 4,5

Congruent.

Add to 180

10. Determine the slope of a line given a Graph or two points the line crosses
    - The slope formula will NOT be provided for you. You need to Memorize it.

Slope Formula: $\frac{y_2 - y_1}{x_2 - x_1}$

$(-4, 7)$ $(3, -6)$

$x_1 \; y_1$ $x_2 \; y_2$

$\frac{-6 - 7}{3 - -4} = \frac{-13}{3+4} = \boxed{\frac{-13}{7}}$

11. Determine the slope of a line given information regarding a second parallel/perpendicular line.

$y = mx + b$

★ Slope for Parallel : Same

Perpendicular : opposite Reciprocal

- Line m & N are perpendicular. Line N is $y = \frac{1}{3}x + 7$

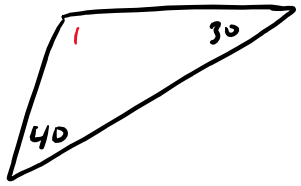
What is the slope of M?

Slope of N: $\frac{1}{3}$ Slope of m: -3

Chapter 5 Content:

12. Be able to define and classify triangles as Scalene, Isosceles, Equilateral and Equiangular.

#12



$\angle 1 + 40^\circ + 30^\circ = 180$

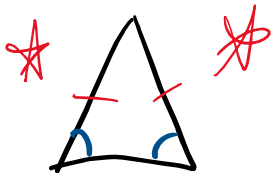
$\angle 1 + 70^\circ = 180$

$-70 \quad -70$

$\angle 1 = 110^\circ$

Scalene:

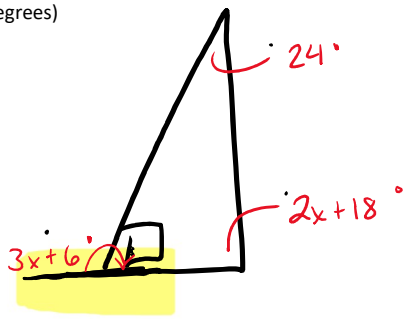
Isosceles



Base Angles

13. Solve for missing angles or sides of a triangle using facts about triangle interior angles (they add to 180 degrees), and straight angles (they also add to 180 degrees)

#17



$24 + 2x + 18 + \square = 180$ -D

$3x + 6 + \square = 180$ -D

★ $24 + 2x + 18 = 180 - D$

★ $3x + 6 = 180 - D$

$42 = x + 6$

$-6 \quad -6$

$x = 36$

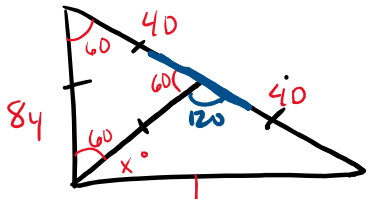
$24 + 2x + 18 = 3x + 6$

$42 + 2x = 3x + 6$

$-2x \quad -2x$

14. Use facts about Equilateral and Isosceles triangles to solve for missing angle measure or side lengths (base angles congruent, etc…)

#15.



Equiangular Δs are Equilateral

$\frac{40}{8} = \frac{84}{8}$ $\quad y = 5$

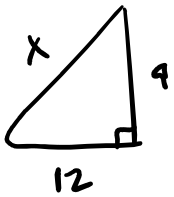
$180 - 120$

60

$X = 30^\circ$

Extra Content: (in hindsight this is mostly chapter 9 material that I covered early)

15. Solve for a missing 3rd side of a triangle using the Pythagorean Theorem
    - $leg^2 + leg^2 = hypotenuse^2$



$9^2 + 12^2 = x^2$

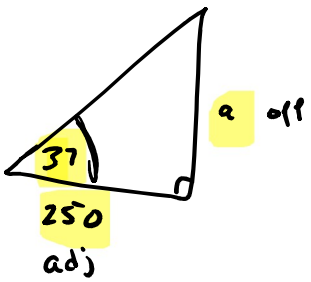
$81 + 144 = x^2$

$\sqrt{225} = \sqrt{x^2}$

$x = 15$

16. Use Sine, Cosine, and Tangent to find missing side lengths of a right triangle when one side and one side length are given. (SOH CAH TOA)

#49



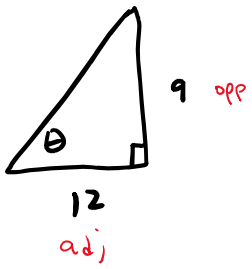
250. $\tan 37^\circ = \frac{a}{250}$ · 250

$250 \tan 37 = a$

O / A

17. Use Inverse trig functions to determine missing angles of a right triangle.

#1



TOA

$\tan\theta = \frac{9}{12}$

$\tan^{-1}\left(\frac{9}{12}\right) = \theta$

θ: theta

18. Use a formula sheet for area/volume/surface area to solve problems that involve one missing variable.

Chapter 7 Content:

19. Determine the sum of the interior angles of any convex polygon given its number of sides.
    - Sum = (n – 2) * 180

Ex: 22 sided

# of sides is N

$\text{Sum} = (n-2)\cdot 180^\circ$

$= (22-2)\cdot 180^\circ$

$= 20 \cdot 180^\circ$

Sum = 3600°

20. Use the sum of the interior angles of a polygon to determine the number of sides the polygon has.

Sum = 5760° sides = ?

$\frac{5760}{180} = \frac{(n-2)\cdot 180}{180}$

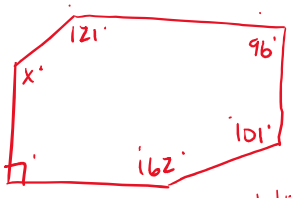
$32 = n-2$

$+2 \quad +2$

n = 34

21. Solve problems involving polygon interior angles

#17



n = 6

$\text{sum} = (n-2)\cdot 180$

$= (6-2)\cdot 180$

$= 4 \cdot 180$

$= 720^\circ$

96 + 101 + 162 + 90 + 121

720

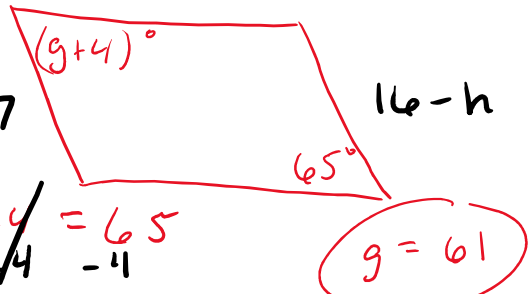
−570

150°

22. Solve for missing sides or angles of a parallelogram

#6

$h = 9$



$g + 4 = 65$

$-4 \quad -4$

$g = 61$

$15h$

$16 - 1h = 7$

$-16 \quad -16$

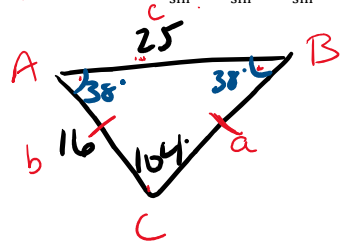
$\frac{-1h}{-1} = \frac{-9}{-1}$

$h = 9$

Chapter 9 Content:

23. Use the Law of Sines to solve problems involving missing sides and angles involving oblique triangles.
    - ★ Law of Sines: $\frac{a}{\sin} = \frac{b}{\sin} = \frac{c}{\sin}$ (You can flip it, based on what you want to solve for. Put what you're solving for on top)

#14



$A = 38°$

$a = 16$

$180 - 104 - 38 = 38$

$\frac{\sin B}{16} = \frac{16 \cdot \sin 104}{25}$

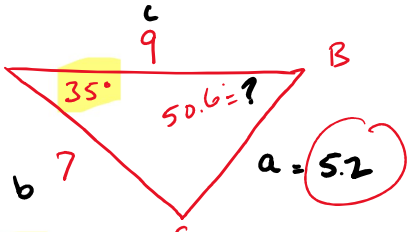
$\sin(B) = \frac{16 \sin 104}{25}$

$\sin^{-1}\left(\frac{16 \sin 104}{25}\right) = B$

$B \approx 38°$

24. Use the Law of Cosines to solve problems involving missing sides and angles involving oblique triangles
    - Law of Cosines: $a^2 = b^2 + c^2 - 2bc\cos A$, $b^2 = a^2 + c^2 - 2ac\cos B$, $c^2 = a^2 + b^2 - 2ab\cos C$ (use whichever based on the info you were given in the problem) ★ ★

#19



$C = 180 - 85.6 = 94.4°$

$7^2 = 5.2^2 + 9^2 - 2(5.2)(9)\cos B$

$49 = 108.04 - 93.6\cos B$

$-108.4 \quad -108.04$

$\frac{-59.4}{-93.6} = \frac{-93.6\cos B}{-93.6}$

$a^2 = b^2 + c^2 - 2bc\cos A$

$a^2 = 7^2 + 9^2 - 2(7)(9)\cos 35°$

$\sqrt{a^2} = \sqrt{26.79}$

$a \approx 5.2$

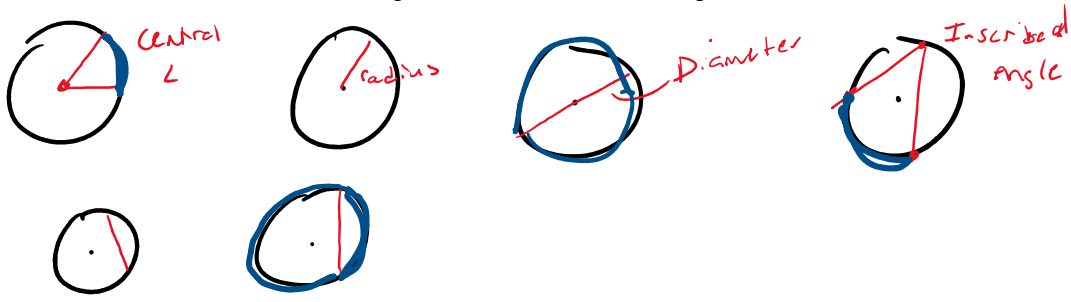
$.634615 = \cos B$

$\cos^{-1}(.634615) = B$

$B = 50.6°$

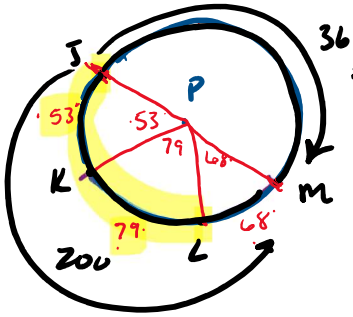
Chapter 10 Content:

25. Define and use the terms: Central Angle, Radius, Diameter, Inscribed Angle, Chord, Arc



26. Use knowledge of central angles to solve problems involving finding arc and central angle measures in a circle.

#15



360 - 200 = 160

$\overset{\frown}{JL} = 132°$

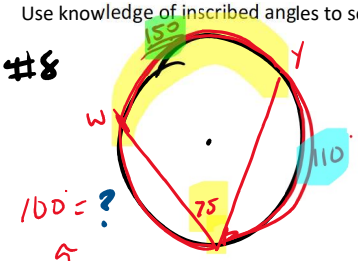
$\overset{\frown}{KM} = 79 + 68 = 147°$

$\overset{\frown}{JLM} = 53 + 79 + 68° = 200°$

$\overset{\frown}{JM} = 160°$

27. Use knowledge of inscribed angles to solve problems involving finding arc and inscribed angle measures in a circle.

#8



150 + 110

260

360 - 260 = 100°

28. Write the equation of a circle when given the center and radius, or a graph.

C: (-2, 6) r: 8

$(x+2)^2 + (y-6)^2 = 64$ (r^2)

29. Find the center and radius of a circle when given the equation.

$x^2 + (y+7)^2 = 100$

C: (0, -7) r: 10

<u>Problems to Practice.</u>

<u>The problems listed below are numbered. The numbers correspond to the concept number listed above. For Example. If you want to practice problems for concept #6 above, work out the problems on #6 below.</u>

1. Pg 8: #'s 3, 4, 11-16

2 & 3. Pg 24-25: #'s 3-10, 15-18

4. Pg 25: #'s 23-30

5. Just define those words for practice. Be able to verbally explain what they mean using exact language.

6. Pg 42: #'s 21-30

7. Pg 50: #'s 3-10, 15-18

8. Pg 50: #'s 11-14

9. Pg 117-118: #'s 11-18, 25-28

10-11. Use the 3.5 Worksheet I printed for you to review these concepts.

12. Pg 212: #'s 3-10

13. Pg 212: #'s 11-18

14. Pg 232: #'s 7-16

15. Find the 3rd side of each of the triangles from problems 1-8 below using the Pythagorean theorem.

16. Solve for the missing side length using sine, cosine, or tangent in problems 49-54 below. (the examples with triangles)

17. Solve for the missing angle Theta in numbers 1-8 below using inverse trig functions.

18. Do the problems given on the next page. Use a formula sheet to assist you. (You won't have to memorize any formulas except the common ones. Area of triangle, circle, rectangle)

19. Pg 328: #'s 3-6

20. Pg 328: #'s 7-10

21. Pg 328: #'s 11-22

22. Pg 336: #'s 3-8, 17-18

23. Pg 463: #'s 9-18

24. Pg 463: #'s 19-24

25. Refer to your notes from 10.2 and 10.4

26. Pg 488: #'s 3-17

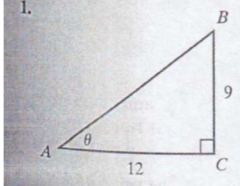
27. Pg 502: #'s 3, 4, 6, 8, 9-12

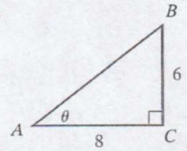
28. Do numbers 31-40 on the next page.

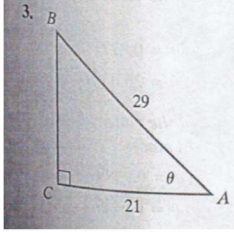
29. Do numbers 43-52 on the next page (NOT the triangles ones). The instructions are "State the center and radius of the circle whose equation is given."

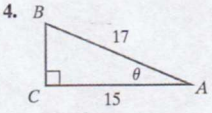
Practice Exercises

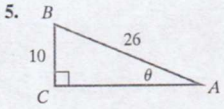
In Exercises 1–8, use the Pythagorean Theorem to find the length of the missing side of each right triangle. Then find the value of each of the six trigonometric functions of θ.

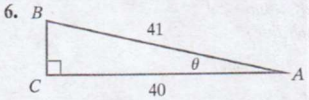
1. 

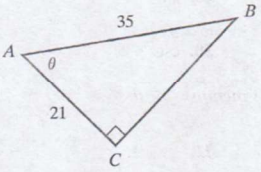
2. 

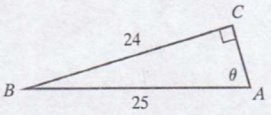
3. 

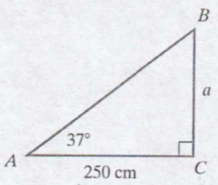
4. 

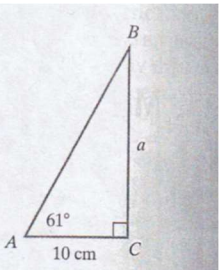
5. 

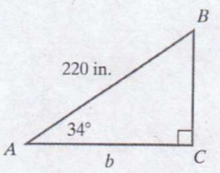
6. 

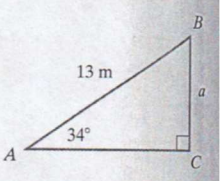
7. 

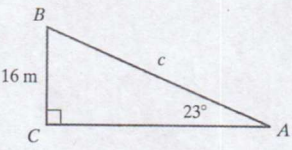
8. 

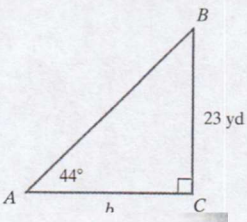
49. 

50. 

51. 

52. 

53. 

54. 

In Exercises 31–40, write the standard form of the equation of the circle with the given center and radius.

31. Center $(0, 0), r = 7$
32. Center $(0, 0), r = 8$
33. Center $(3, 2), r = 5$
34. Center $(2, -1), r = 4$
35. Center $(-1, 4), r = 2$
36. Center $(-3, 5), r = 3$
37. Center $(-3, -1), r = \sqrt{3}$
38. Center $(-5, -3), r = \sqrt{5}$
39. Center $(-4, 0), r = 10$
40. Center $(-2, 0), r = 6$

43. $(x - 3)^2 + (y - 1)^2 = 36$
44. $(x - 2)^2 + (y - 3)^2 = 16$
45. $(x + 3)^2 + (y - 2)^2 = 4$
46. $(x + 1)^2 + (y - 4)^2 = 25$
47. $(x + 2)^2 + (y + 2)^2 = 4$
48. $(x + 4)^2 + (y + 5)^2 = 36$
49. $x^2 + (y - 1)^2 = 1$
50. $x^2 + (y - 2)^2 = 4$
51. $(x + 1)^2 + y^2 = 25$
52. $(x + 2)^2 + y^2 = 16$

Problems for #18.

1. Find the length of a rectangle with width of 9cm and an area of $54cm^2$.
2. Find the volume of a sphere with a radius of 7ft.
3. Find the height of a triangle with an area of $88in^2$ and base of 16in.
4. Find the area of the circle with a radius of $9mm$.
5. Find the surface area of a cube with a side length of $4m$.
6. Find the radius of the short axis of an ellipse if the area is $66\pi\ in^2$and the radius of the long axis is 11 in.
7. Find the height of a cylinder with a volume of $112\pi\ cm^3$ and a radius of 4 cm.
8. Find the base area of a pyramid with a volume of $\frac{160}{3}\ cm^3$ and height of 8 cm.
9. Find the base of the triangle with height of 7m and an area of $42m^2$
10. Find the surface area of the cylinder with height of 10cm and radius of 3cm. Leave your answer in terms of pi.