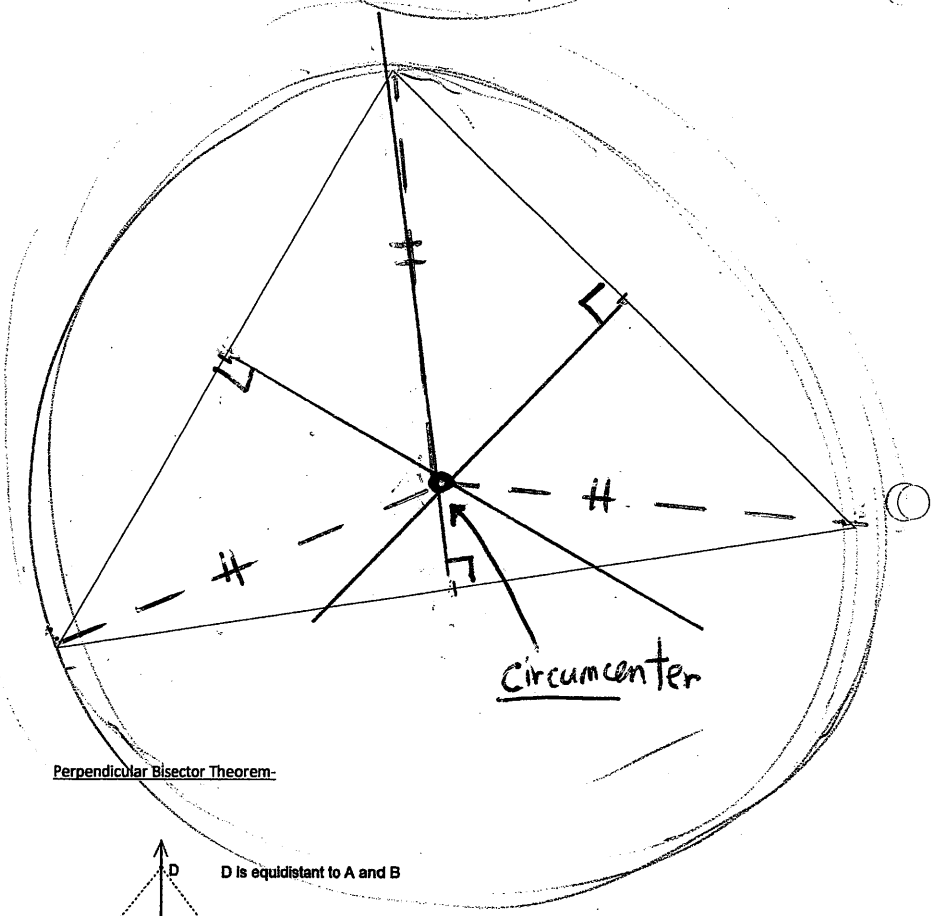
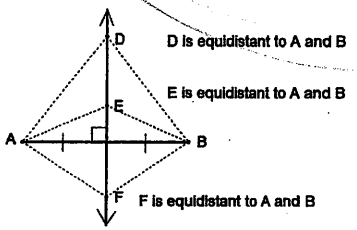
Perpendicular Bisectors in Triangles



Perpendicular Bisector Theorem-



D is equidistant to A and B

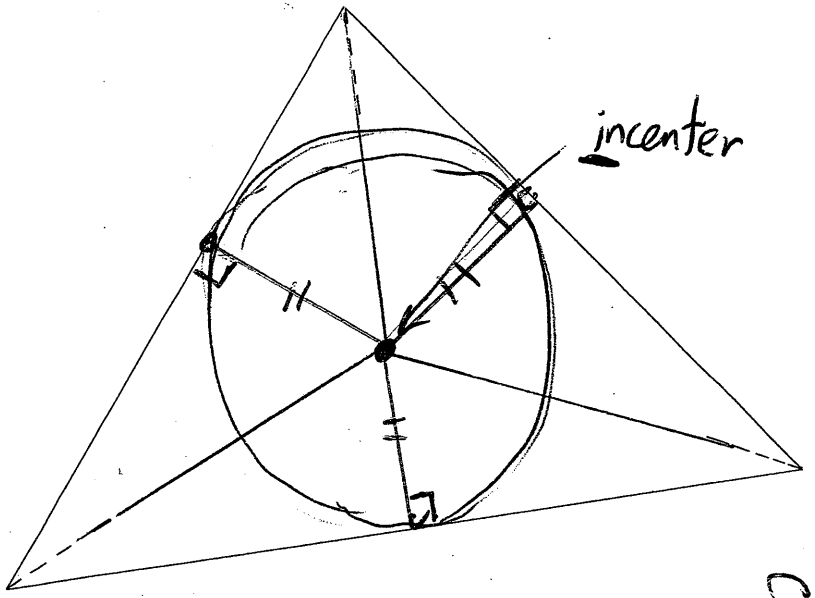
E is equidistant to A and B

F is equidistant to A and B

Concurrent lines-

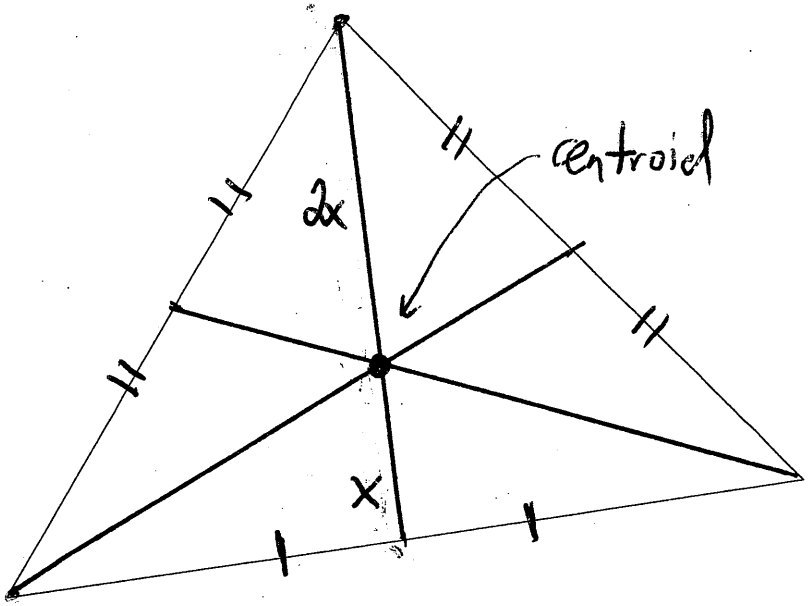
Point of Concurrency-

Angle Bisectors in Triangles

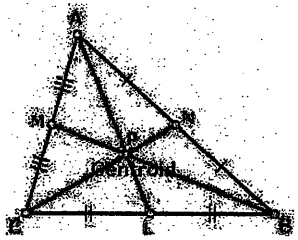


Geometry Review Course Key Spring 2016

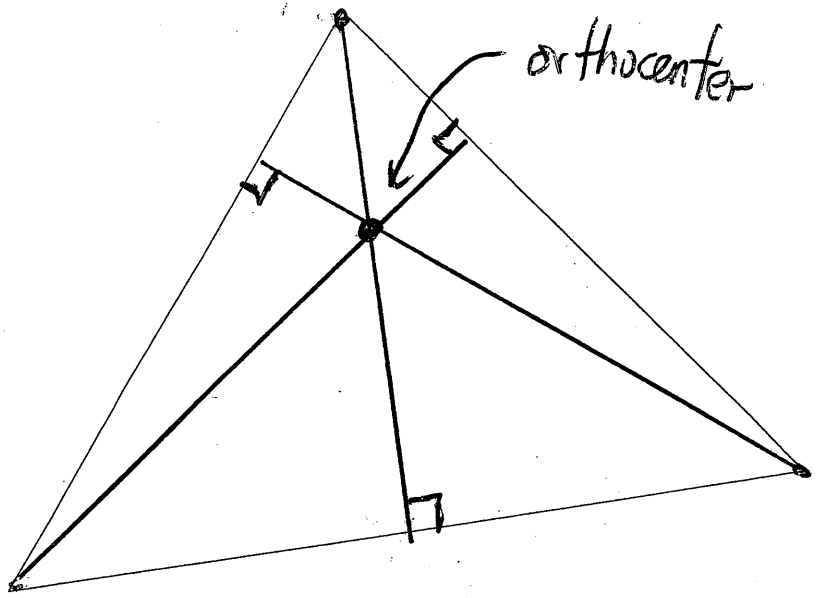
Medians of Triangles



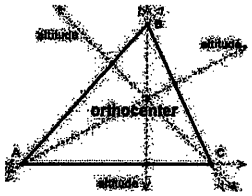
Centroid Theorem-



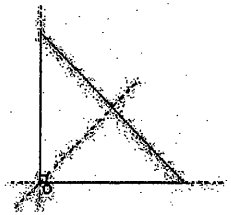
Altitudes in Triangles



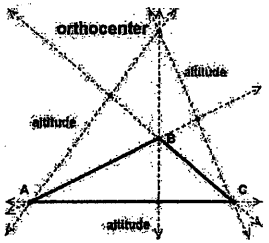
Acute



Right



Obtuse



Ex 1 In the above triangle, if AD = 10, AB = 26, find BD.

Name _____ Date _____ Period _____

Geometry
Points of Concurrency Homework

cribe how each of the points of concurrency is found. Be specific!

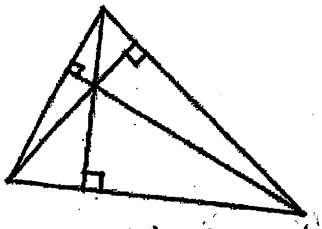
Centroid POC for median

Incenter POC for angle bisector

Circumcenter POC for ⊥ bisector

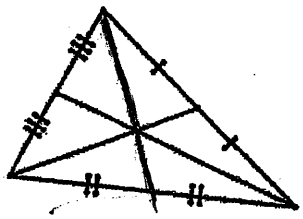
Orthocenter POC for Altitudes

ach figure below, tell what point of concurrency is shown and what constructions form that point:



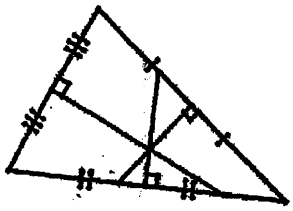
Point: orthocenter

Formed by: Altitude



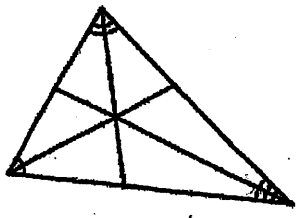
Point: centroid

Formed by: median



nt: circumcenter

med by: ⊥ bisector

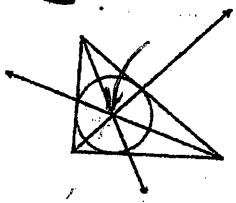


Point: incenter

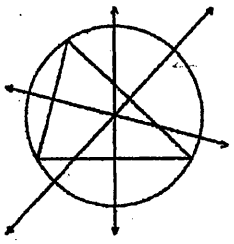
Formed by: Angle bisector

Important Questions (use your graphic organizer to help):

1. Which points of concurrency are always inside the triangle? incenter centroid
2. Which point of concurrency is always on the vertex of a right triangle? orthocenter
3. Which point of concurrency is always on the midpoint of the hypotenuse in a right triangle? _____
4. Which points of concurrency are always outside of an obtuse triangle? outside
5. Which point of concurrency is the center of gravity in a triangle? centroid
6. Which point of concurrency is equidistant from every vertex? circumcenter
7. Which point of concurrency is the center of an inscribed circle as shown below? incenter



8. Which point of concurrency is the center of a circumscribed circle as shown below? circumcenter

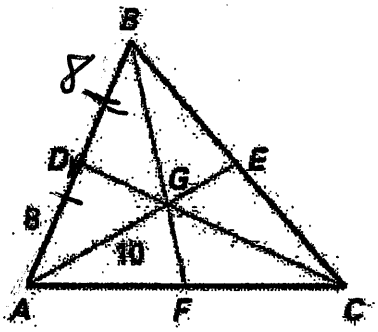


6 2(6)

Point G is the Centroid of ΔABC. AD = 8, AG = 10 and CD = 18. Find the length of the given segment.

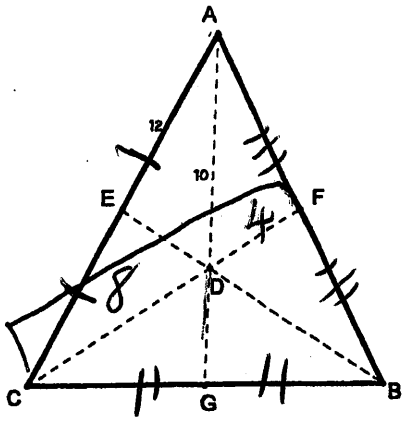
12+6

9. BD 8
10. AB 16
11. EG 5
12. AE 15
13. CG 12
14. DG 6



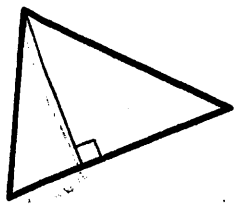
D is the centroid of ΔABC, AE = 12, AD = 10, CF = 12. Find the length of each segment.

15. DG 5
16. AG 15
17. EC 12
18. AC 24
19. DF 4
20. CD 8

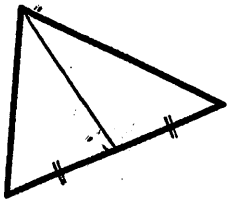


Name: _____ **Geometry – Points of Concurrency Worksheet**

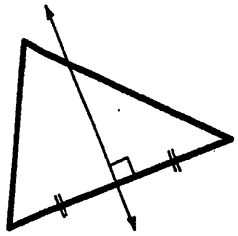
Circle the letter with the name of the segment/line/ray shown.

1. 

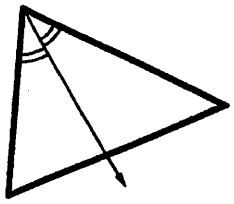
(a) perpendicular bisector
(b) angle bisector
(c) median
(d) altitude

2. 

(a) perpendicular bisector
(b) angle bisector
(c) median
(d) altitude

3. 

(a) perpendicular bisector
(b) angle bisector
(c) median
(d) altitude

4. 

(a) perpendicular bisector
(b) angle bisector
(c) median
(d) altitude

Circle the letter with the name of the correct point of concurrency.

5. The three altitudes of a triangle intersect at the _____.

(a) circumcenter (b) incenter (c) centroid (d) orthocenter

6. The three medians of a triangle intersect at the _____.

(a) circumcenter (b) incenter (c) centroid (d) orthocenter

7. The three perpendicular bisectors of a triangle intersect at the _____.

(a) circumcenter (b) incenter (c) centroid (d) orthocenter

8. The three angle bisectors of a triangle intersect at the _____.

(a) circumcenter (b) incenter (c) centroid (d) orthocenter

9. It is equidistant from the three vertices of the triangle.

(a) circumcenter (b) incenter (c) centroid (d) orthocenter

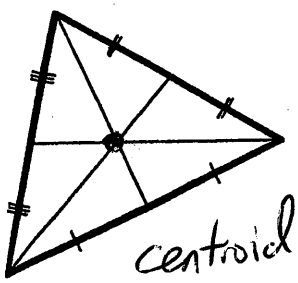
10. It is equidistant from the three sides of the triangle.

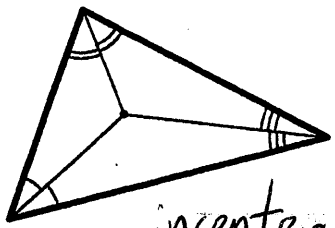
(a) circumcenter (b) incenter (c) centroid (d) orthocenter

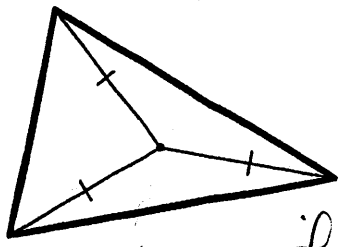
11. It divides each median into two sections at a 2:1 ratio.

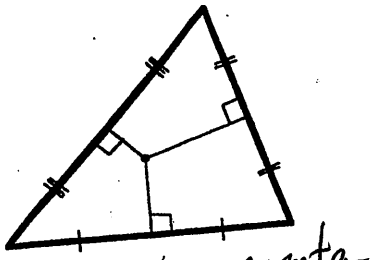
(a) circumcenter (b) incenter (c) centroid (d) orthocenter

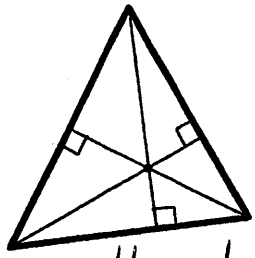
Name the point of concurrency shown.

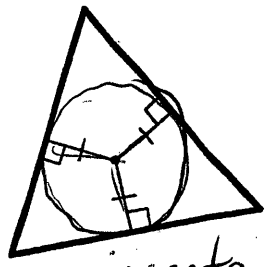
12. 
centroid

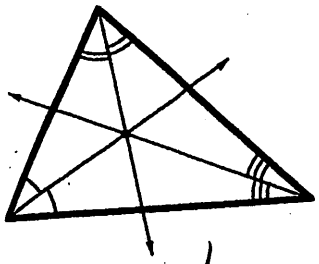
13. 
incenter

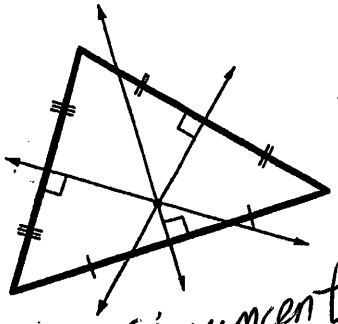
14. 
circumcenter

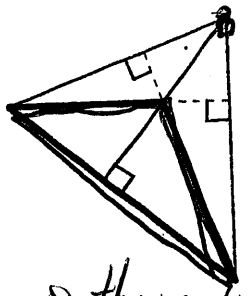
15. 
circumcenter

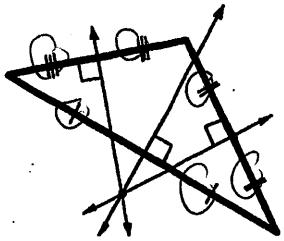
16. 
orthocenter

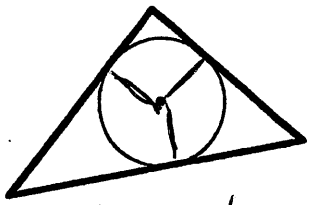
17. 
incenter

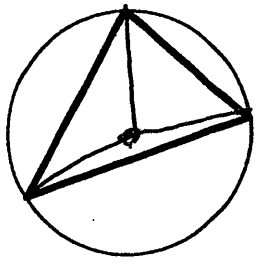
18. 
incenter

19. 
circumcenter

20. 
orthocenter

21. 
circumcenter

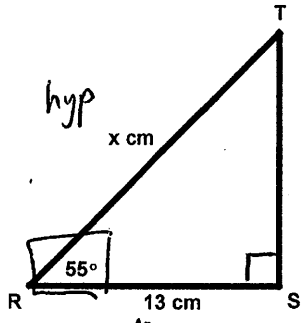
22. 
incenter

23. 
circumcenter

Name _____ Date: _____ Period: Key

Analytic Geometry **Right Triangle Trigonometry Practice**

1. What is the value of x? Round your answer to the nearest thousandth.

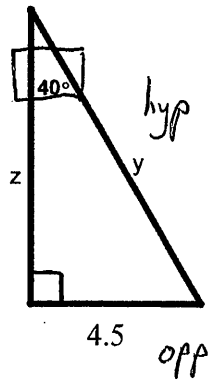


$\frac{\cos 55}{1} = \frac{13}{x}$

$\frac{x}{1} = \frac{13}{\cos 55}$

$x = 22.665$ cm

2. Find the lengths of y and z in the diagram below.

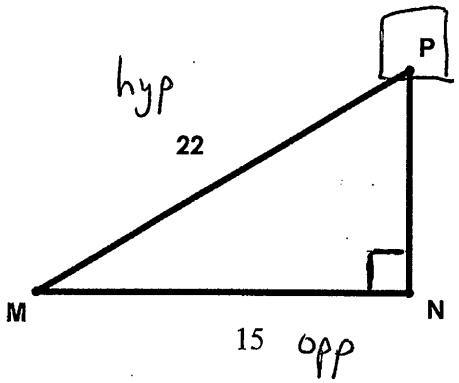


$\frac{\sin 40}{1} = \frac{4.5}{y}$

$\frac{y}{1} = \frac{4.5}{\sin 40}$

$y = 7.000$

3. What is the measure of $\angle P$?

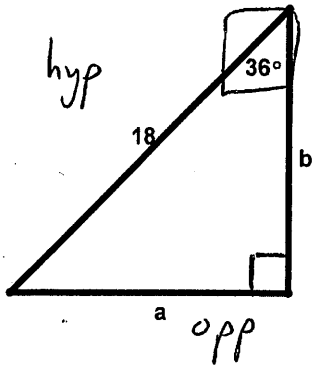


$\sin P = \frac{15}{22}$

$P = \sin^{-1}\left(\frac{15}{22}\right)$

$P = 42.986°$

4. What is the value of a and b to the nearest tenth?



$a^2 + b^2 = 18^2$

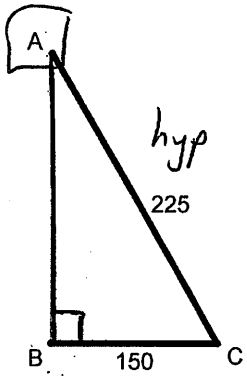
$10.58^2 + b^2 = 18^2$

$b = 14.562$

$\frac{\sin 36}{1} = \frac{a}{18}$

$a = 18\sin 36 = 10.580$

5. What is the measure of $\angle A$ to the nearest degree?

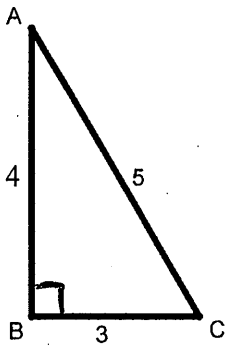


$\sin A = \frac{150}{225}$

$A = \sin^{-1}\left(\frac{150}{225}\right)$

$A = 41.810°$

6. Suppose ΔABC is a right triangle with ∠B the right angle. Explain the relationship between Tangent of angle A and Tangent of angle C.



$\tan A = \frac{3}{4}$

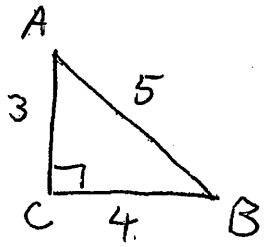
$\tan C = \frac{4}{3}$

] reciprocals of each other.

7. Explain the relationships between the sine and cosine of complementary (the 2 acute angles) angles. (Use triangle ABC above and find sinA and cosC.

$\sin A = \frac{3}{5}$ $\cos C = \frac{3}{5}$ The Adjacent of C is also the opposite of A.

8. In right ΔACB, AC = 3, BC = 4, and AB = 5. Draw a figure.



A. Find the exact value of sin B. $= 3/5$

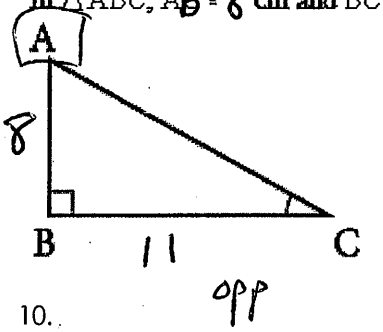
B. Find the exact value of cos A. $= 3/5$

C. Find the exact value of tan A. $= 4/3$

D. Find measurement of ∠A (to the nearest degree). $\sin A = \frac{4}{5}$ $A = \sin^{-1}(4/5)$

$A = 53.130°$

9. In △ABC, AB = 8 cm and BC = 11 cm. Determine the tangent ratio of ∠A, to the nearest thousandth.



adj

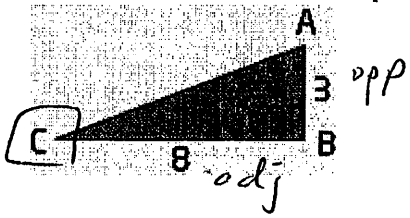
opp

$\tan A = \frac{11}{8}$

$A = 53.972°$

$A = \tan^{-1}(11/8)$

10. Determine the measure of ∠C, to the nearest degree.



opp

adj

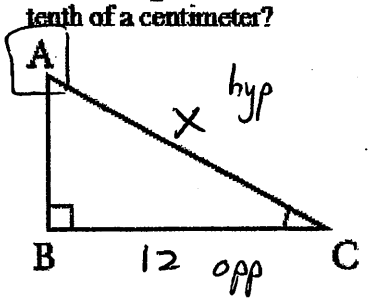
$\tan C = \left(\frac{3}{8}\right)$

$C = 20.556°$

$C = \tan^{-1}(3/8)$

11.

In the triangle, BC = 12 cm and $\sin A = 0.58\overline{3}$. What is the length of the hypotenuse, to the nearest tenth of a centimeter?



$\sin A = \frac{12}{x}$

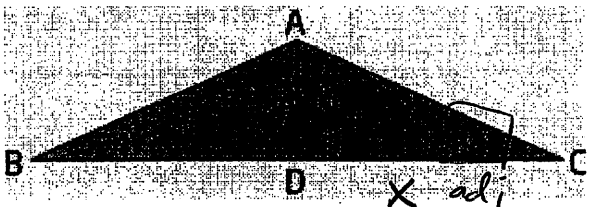
$\frac{0.583}{1} = \frac{12}{x}$

$\frac{x}{1} = \frac{12}{0.583}$

$x = 20.583\text{ cm}$

12.

A roof is shaped like an isosceles triangle. The slope of the roof makes an angle of 24° with the horizontal, and has an altitude of 3.5 m. Determine the width of the roof, to the nearest thousandth of a meter.



$\frac{\tan 24}{1} = \frac{3.5}{x}$

$\frac{x}{1} = \frac{3.5}{\tan 24}$

$x = 7.861$

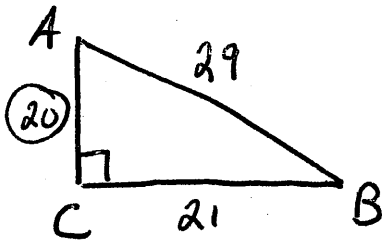
$2(7.861)$

$x = 7.861$

width = 15.722m

13.

10. In right ΔABC, $\sin A = \frac{21}{29}$ and angle C is a right angle. Draw a figure. **Write all trigonometric ratios as simplified fractions.**



$a^2 + b^2 = c^2$

$21^2 + b^2 = 29^2$

$b^2 = 29^2 - 21^2$

$b^2 = 400$

$b = 20$

A) $\tan A = \frac{Opp}{Adj} = \frac{21}{20}$

E) $\cos B = \frac{21}{29}$

F) $\sin B = \frac{20}{29}$

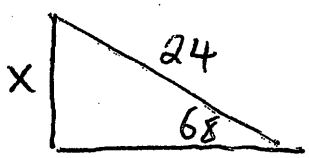
G) Find the measure of angle B to the nearest thousandth. 43.603°

$\sin B = \frac{20}{29}$

$B = \sin^{-1}\left(\frac{20}{29}\right)$

$B = 43.603°$

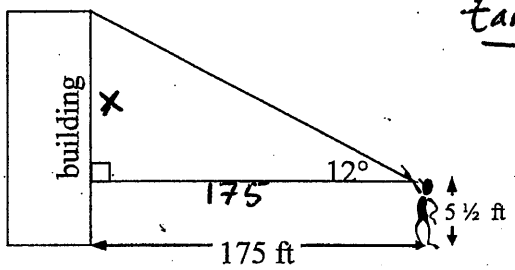
14. A 24 foot ladder leans against a building and makes an angle of 68° with the ground. To the nearest foot, how far up from the bottom of the building is the top of the ladder?



$\frac{\sin 68}{1} = \frac{x}{24}$ $\quad x = 24\sin 68$

$x = 22.252$ ft

15. A man that is 5 ½ feet tall walks 175 feet from a building and looks at the highest point on the building. The angle formed by the person's line of sight and the horizontal is 12°. To the nearest foot, how tall is the building?



$\frac{\tan 12}{1} = \frac{x}{175}$

$x = 175\tan 12$

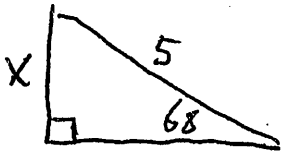
$x = 37.197$

building height $= 37.197 + 5.5$

$= 42.697$

building $= 42.697$ ft.

16. You are building a tent. The rope from the top of the tent pole to the ground measures 5 ft long. The angle of elevation is 68°.



$\frac{\sin 68}{1} = \frac{x}{5}$

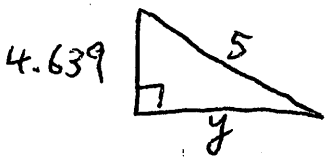
$x = 5\sin 68$

$x = 4.639$ ft.

A. Find the height of the pole to the nearest thousandth.

$x = 4.639$ ft.

B. Find the distance from the base of the pole to the stake to the nearest thousandth.

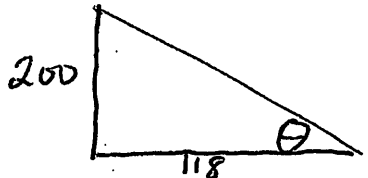


$y^2 + 4.639^2 = 5^2$

$y^2 = 3.508$

$y = 1.873$ ft.

17. If a 200 foot tree casts a 118 foot shadow, what is the angle of elevation of the sun? Sketch a diagram, set up an equation and solve.



$\tan\theta = \frac{200}{118}$

$\theta = \tan^{-1}\left(\frac{200}{118}\right)$

$\theta = 59.459°$

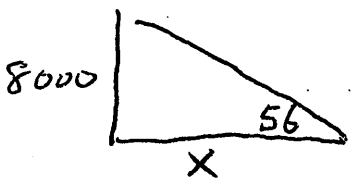
18 a) $6028 - 5396$

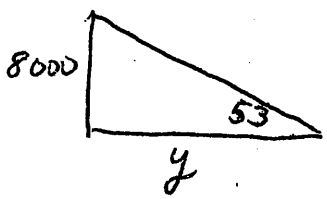
632.364 ft

b) Speed $= \frac{d}{t} = \frac{632.364}{13}$

48.64 ft/sec.

18. A plane is flying away from you. Right now, you can see it at an angle of elevation of 56°. Thirteen seconds later, you can see it an angle of 53°. If you know it's at an altitude of 8,000 feet, how far has it traveled in that time? B) How fast is it traveling?





$\frac{\tan 56}{1} = \frac{8000}{x}$ $\quad \frac{x}{1} = \frac{8000}{\tan 56}$

$x = 5396.068$ ft

$\frac{\tan 53}{1} = \frac{8000}{y}$ $\quad \frac{y}{1} = \frac{8000}{\tan 53}$

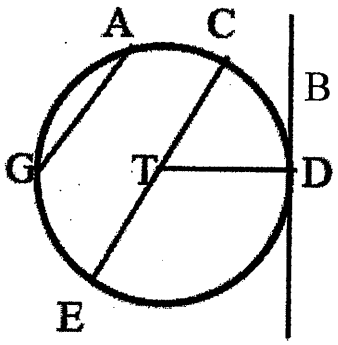
$y = 6028.432$

eometry
Ch. 10 Circles Review

Name Key
Date ____ Period ____

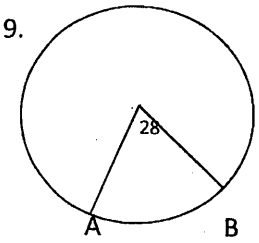
r the following questions regarding circle T, identify the part in the diagram.

1. A chord $\overline{AG}$
2. A diameter $\overline{CE}$
3. A central angle $\angle CTD$ or $\angle DTE$
4. A radius $\overline{TC}$
5. A tangent line $\overleftrightarrow{BD}$
6. A minor arc $\overset{\frown}{CD}$, $\overset{\frown}{AC}$, $\overset{\frown}{GE}$
7. A major arc $\overset{\frown}{GEC}$
8. A semicircle $\overset{\frown}{CE}$ or $\overset{\frown}{CDE}$



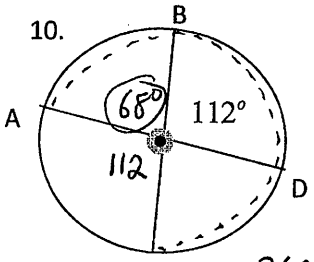
For the following circles, find the missing measure or measures

9.



$m\overset{\frown}{AB}$ = 28°

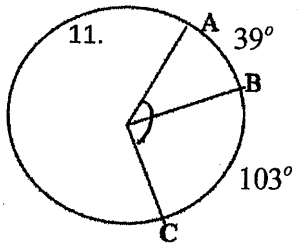
10.



360−112

$m\overset{\frown}{AB}$ = 68° $m\overset{\frown}{ADC}$ = 248°

11.

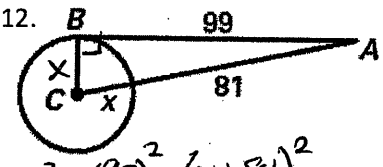


39+103

$m\overset{\frown}{AC}$ = 142°

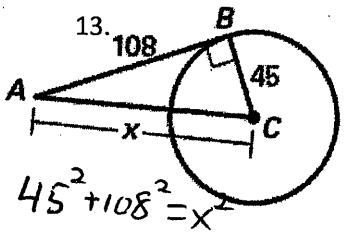
Using your knowledge of circles, solve for x. Assume segments appearing to be tangent to the circle are tangents.

12.



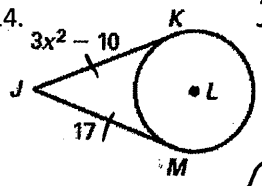
$x^2+(99)^2=(x+81)^2$

13.



$45^2+108^2=x^2$

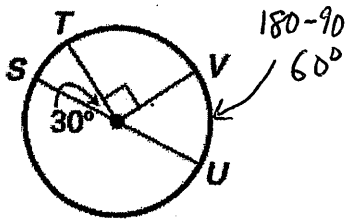
14.



$3x^2-10=17$
$3x^2=27$
$x^2=9$
$x=3$

Solve for the indicated arc measure or angle.

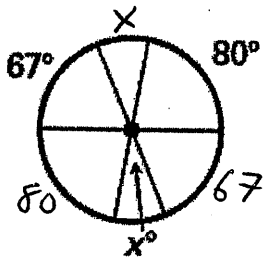
15.



180−90−30
60°

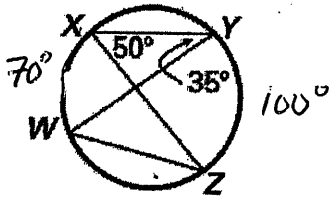
$m\overset{\frown}{TU}$ = 90+60
= 150°

16.



X =
2(67)+2(80)+2x = 360
134+160+2x = 360
2x = 66
x = 33°

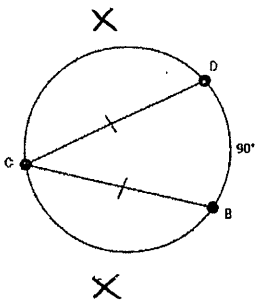
17.



100°

$m\overset{\frown}{XW}$ = 70° ∠XZW = 50°
$m\overset{\frown}{YZ}$ = 160° $m\overset{\frown}{XY}$ =

18. Find $m\overset{\frown}{CD}$

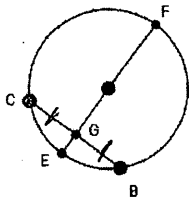


$2x+90=360$

$2x=270$

$x=135°$

19. If $\overline{CB} \perp \overline{EF}$, CG=2x+10, and GB=4x+2. What is the length of $\overline{CB}$?



$2x+10=4x+2$

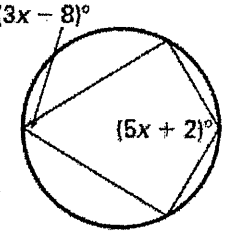
$8=2x$

$4=x$

$\overline{CB}=2[18]=36$

Solve for the indicated arc measure or angle

20. $(3x-8)°$, $(5x+2)°$

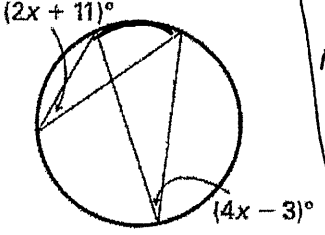


$5x+2+3x-8=180$

$8x-6=180$

$8x=186$ $x=23.25$

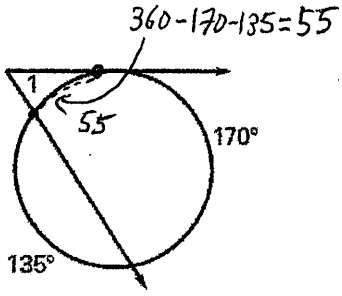
21. $(2x+11)°$, $(4x-3)°$



$4x-3=2x+11$

$2x=14$ $x=7$

22.

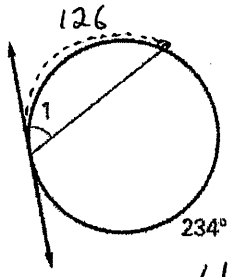


$m\angle 1=\frac{1}{2}(170-55)$

$=\frac{1}{2}(115)$

$=57.5°$

23.

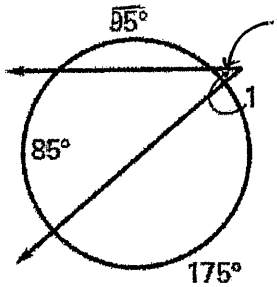


$360-234=126$

$m\angle 1=\frac{1}{2}(126)$

$=63°$

24.

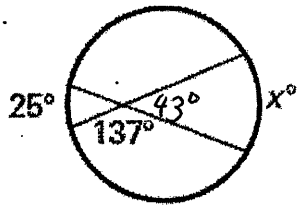


$m\angle 1=\frac{1}{2}(85-5)$

$=\frac{1}{2}(80)$

$=40°$

25.



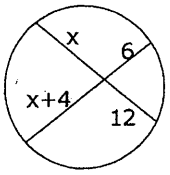
$43=\frac{1}{2}(x+25)$

$86=x+25$

$61°=x$

Find the value of x in the figures below.

26.



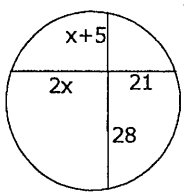
$12x=6(x+4)$

$12x=6x+24$

$6x=24$

$x=4$

27.



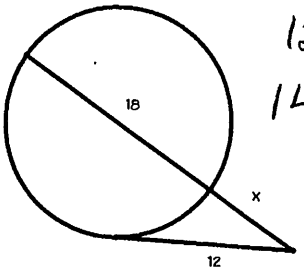
$2x(21)=28(x+5)$

$42x=28x+140$

$14x=140$

$x=10$

28.

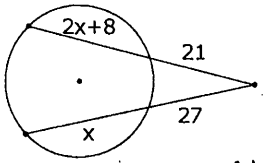


$12^2=x(x+18)$

$144=x^2+18x$

$x^2+18x-144=0$

29.



$27(x+27)=21(2x+8+21)$

$27x+729=42x+609$

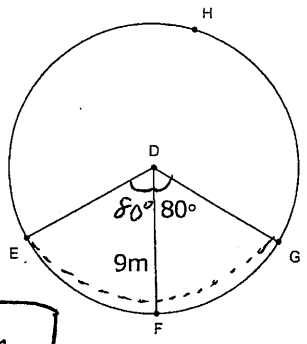
$120=15x$ $x=8$

30. In Circle D; $\angle EDF \cong \angle FDG$. Find the indicated measures.

$\frac{L}{2\pi r} = \frac{\overset{\frown}{Arc}}{360}$

a. Circumference of circle D $C = 2\pi r$

$C = 2\pi(9) = \boxed{18\pi \text{ m}}$



b. Arc length of $\overset{\frown}{EFG}$ $\frac{L}{18\pi} = \frac{160}{360}$

$\frac{L}{18\pi} = \frac{4}{9}$

$9L = 72\pi$

$\boxed{L = 8\pi \text{ meters}}$

31. What is the degree measure of an arc of a circle with a radius of 4 cm and an arc length of 3π cm?

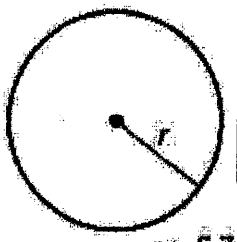
$\frac{L}{2\pi r} = \frac{\overset{\frown}{AB}}{360^\circ}$ | $\frac{3\pi}{2\pi(4)} = \frac{\overset{\frown}{AB}}{360^\circ}$ | $8\overset{\frown}{AB} = 3(360)$

$\frac{3}{8} = \frac{\overset{\frown}{AB}}{360}$ | $8\overset{\frown}{AB} = 1080$

$\boxed{\overset{\frown}{AB} = 135^\circ}$

Find the circumference. Leave answer in exact form.

32.

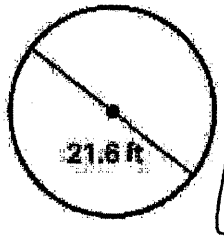


$C = 2\pi r$

$C = 2\pi(5.7)$

$\boxed{C = 11.4\pi \text{ cm}}$

33.



$C = \pi d$

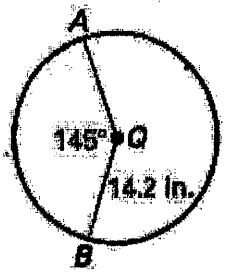
$C = \pi(21.6)$

$\boxed{C = 21.6\pi \text{ ft}}$

Find the length of $\overset{\frown}{AB}$. **Please answer to the nearest thousandth.**

$\frac{L}{2\pi r} = \frac{\overset{\frown}{AB}}{360^\circ}$

34.



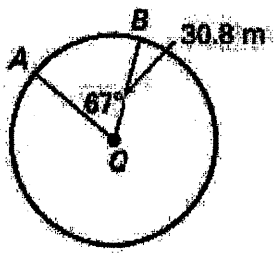
$\frac{L}{2\pi(14.2)} = \frac{145^\circ}{360^\circ}$

$\frac{L}{28.4\pi} = \frac{29}{72}$

$72L = 29 \cdot 28.4\pi$

$\boxed{L = 11.439\pi \approx 35.936 \text{ in.}}$

35.



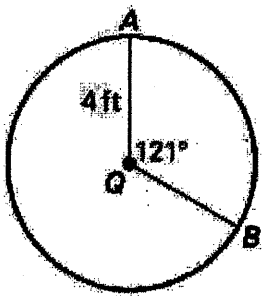
$\frac{L}{2\pi(30.8)} = \frac{67^\circ}{360^\circ}$

$360L = 4127.2\pi$

$\boxed{L = 11.464\pi \text{ m}}$

$\approx 36.017 \text{ m}$

36.



$\frac{L}{2\pi(4)} = \frac{121^\circ}{360^\circ}$

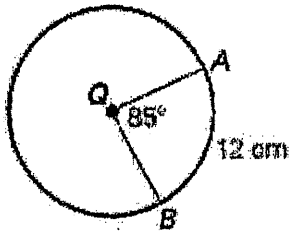
$360L = 968\pi$

$L = 2.689\pi$

$= 8.447 \text{ ft}$

Find the indicated measure. $\frac{L}{C} = \frac{\overset{\frown}{AB}}{360}$

37. Circumference of $\odot Q$



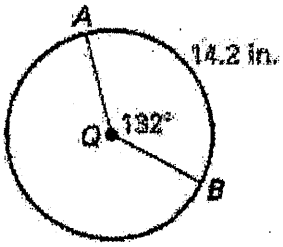
$\frac{12}{C} = \frac{85}{360}$

$17C = 324$

$C = 19.058$ cm

$\frac{12}{C} = \frac{17}{27}$

38. Radius of $\odot Q$



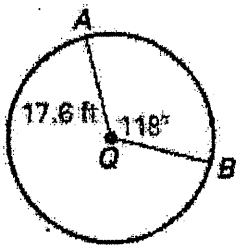
$\frac{14.2}{2\pi r} = \frac{132}{360}$

$\frac{14.2}{2\pi r} = \frac{11}{30}$

$22\pi r = 426$

$r = 6.164$ in.

39. Length of $\overset{\frown}{AB}$



$\frac{L}{2\pi(17.6)} = \frac{118}{360}$

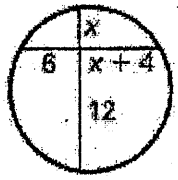
$\frac{L}{110.584} = \frac{59}{180}$

$180L = 6524.459$

$L = 36.247$ ft.

Find the value of x.

40.



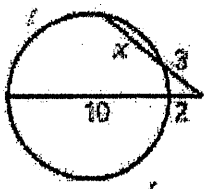
$12x = 6(x+4)$

$12x = 6x + 24$

$6x = 24$

$x = 4$

41.



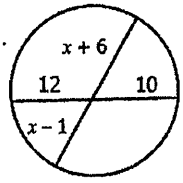
$3(3+x) = 2(12)$

$9 + 3x = 24$

$3x = 15$

$x = 5$

42.

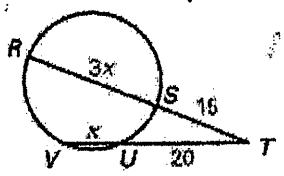


$(x-1)(x+6) = 10(12)$

$x^2 - 1x + 6x - 6 = 120$

$x^2 + 5x - 126 = 0$

43.



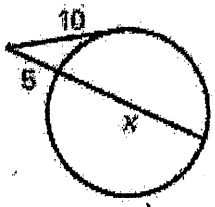
$15(3x+15) = 20(x+20)$

$45x + 225 = 20x + 400$

$25x = 175$

$x = 7$

44.



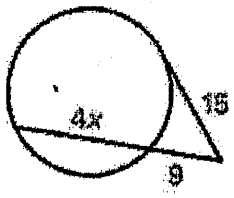
$100 = 5(5+x)$

$20 = 5 + x$

$20 = 5 + x$

$15 = x$

45.



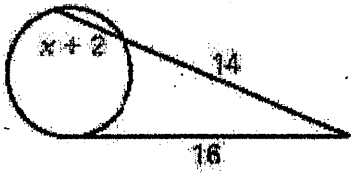
$15^2 = 9(4x+9)$

$225 = 36x + 81$

$144 = 36x$

$4 = x$

46.



$14(x+2+14) = 16^2$

$14(x+16) = 256$

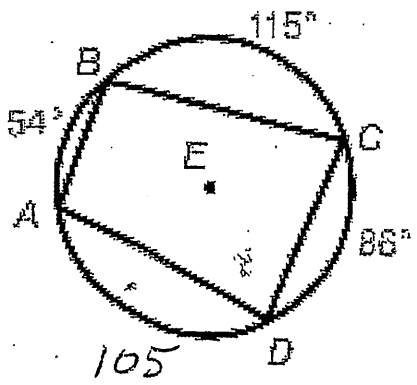
$14x + 224 = 256$

$14x = 32$

$x = 2.286$

Chapter 10 Review 2 Key

1 Quadrilateral $ABCD$ is inscribed in $\odot E$



Find:

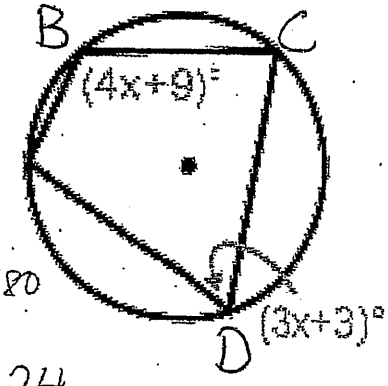
a) $m\angle A = 100.5$

b) $m\angle B = 95.5$

c) $m\angle C = 79.5$

d) $m\angle D = 84.5$

2.



$4x+9+3x+3=180$

$x=24$

Find:

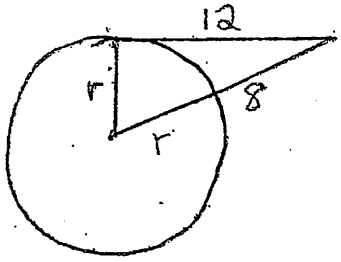
a) $m\angle B$ 105

b) $m\angle D$ 75

c) Find $m\overset{\frown}{ADC}$ 210

d) Find $m\overset{\frown}{ABC}$ 150°

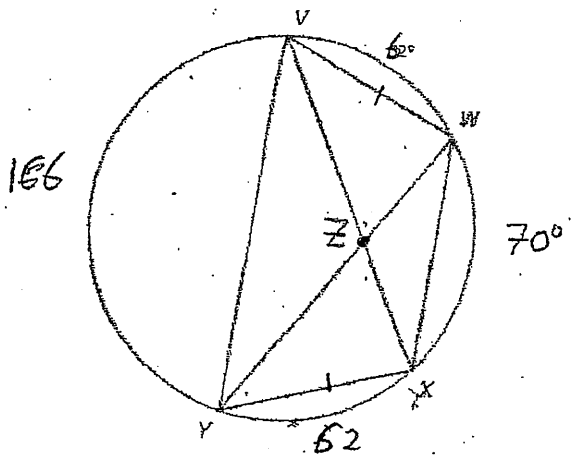
3. Find r



$r^2 + 12^2 = (r+8)^2$

$r=5$

3. Fill in all arcs and angle measures.

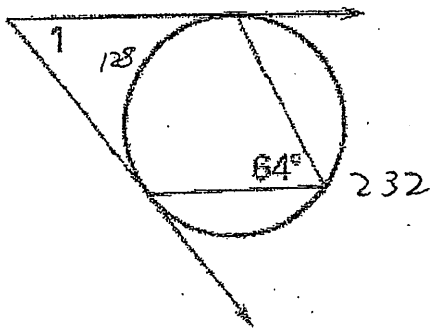


a. Find $m\angle VZW$ 62

b. Find $m\overset{\frown}{WX}$ 70°

c. Find $m\overset{\frown}{VY}$ 166

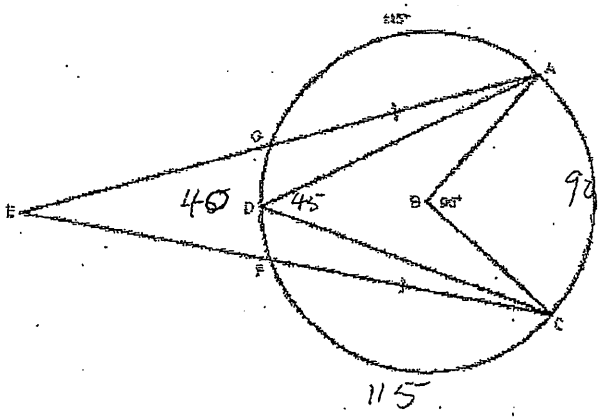
d. Find $m\angle WYX$ 35



Find $m\angle 1$

$m\angle 1 = \frac{1}{2}(232 - 128)$

$m\angle 1 = 52°$

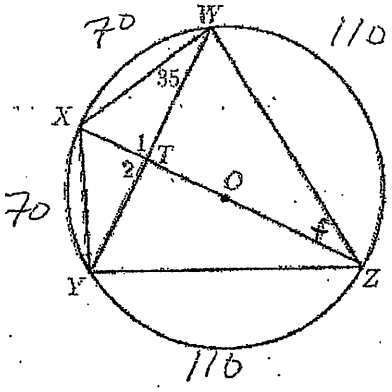


$m\overset{\frown}{FG} =$ 40°

$m\angle AEC =$ 25

$m\angle ADC =$ 45

Given circle with centre O. $\overline{WT} = \overline{TY}$ and $\overset{\frown}{XWT} = 35°$



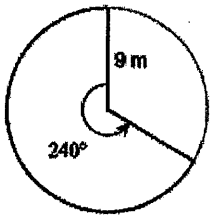
$m\angle 1 =$ 90° $m\angle 2 =$ 90°

$m\angle f =$ 70 $m\angle WYZ =$ 55

Geometry Area and Volume Quiz Review Worksheet 2 No circle, no π **Key**

Find the area of each sector. Formula $\frac{S}{\pi r^2} = \frac{\theta}{360}$

1)

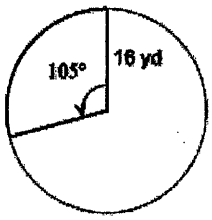


$\frac{S}{\pi(9)^2} = \frac{240}{360}$

$\frac{S}{81\pi} = \frac{2}{3}$ $3S = 162\pi$

$S = 54\pi\ m^2$

2)



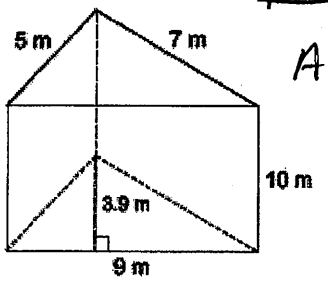
$\frac{S}{\pi(16)^2} = \frac{105}{360}$

$\frac{S}{256\pi} = \frac{7}{24}$

$S = \frac{224\pi}{3}\ yd^2$

Find the volume of each figure. Round your answers to the nearest hundredth, if necessary.

3)

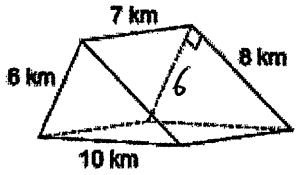


prism $V = B \cdot h$

$A = \frac{1}{2}(9)(3.9) \cdot 10$

$V = 175.5\ m^3$

4)

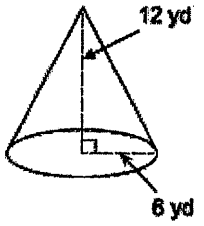


prism $V = B \cdot h$

$V = \frac{1}{2}(6)(8) \cdot 7$

$V = 168\ km^3$

5)

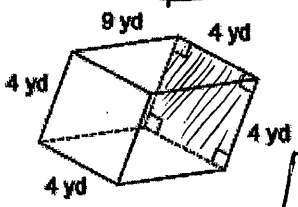


Cone $V = \frac{1}{3}\pi r^2 \cdot h$

$V = \frac{1}{3}\pi(6)^2 \cdot 12$

$V = 144\pi\ yd^3$

6)

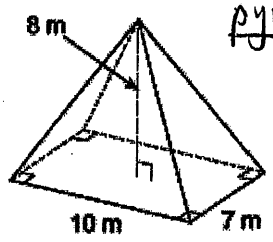


prism $V = B \cdot h$

$V = (4)(4) \cdot 9$

$V = 144\ yd^3$

7)

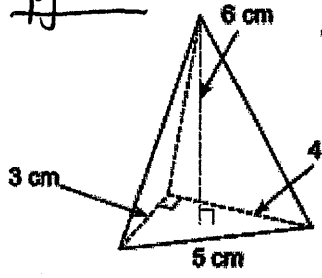


pyramid: $V = \frac{1}{3} \cdot B \cdot h$

$V = \frac{1}{3}(10)(7) \cdot 8$

$V = \frac{560}{3}\ m^3$

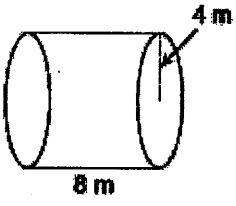
8) pyramid: $V = \frac{1}{3}Bh$



$V = \frac{1}{3} \cdot \frac{1}{2}(3)(4) \cdot 6$

$V = 12\ cm^3$

9)

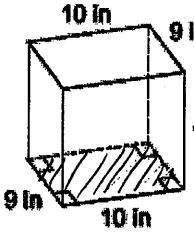


cylinder: $V = \pi r^2 h$

$V = \pi(4)^2 \cdot 8$

$V = 128\pi\ m^3$

10)

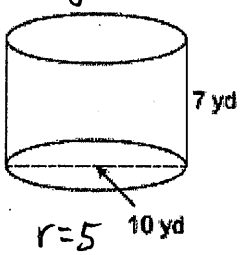


prism: $V = B \cdot h$

$V = 9 \cdot 10 \cdot 10$

$V = 900\ in^3$

11) cylinder $V = \pi r^2 h$

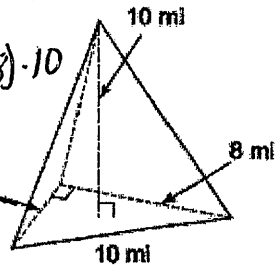


$r = 5$

$V = \pi(5)^2(7)$

$V = 175\pi \text{ yd}^3$

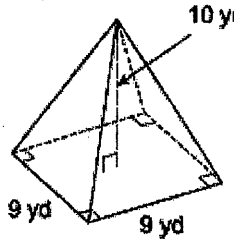
12) pyramid: $V = \frac{1}{3}Bh$



$V = \frac{1}{3} \cdot \frac{1}{2}(6)(8) \cdot 10$

$V = 80 \text{ mi}^3$

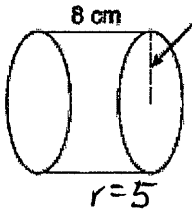
13) pyramid: $V = \frac{1}{3}Bh$



$V = \frac{1}{3}(9)^2 \cdot 10$

$V = 270 \text{ yd}^3$

14) cylinder: $V = \pi r^2 h$

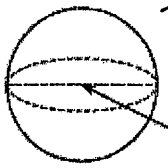


$r = 5$

$V = \pi(5)^2(8)$

$V = 200\pi \text{ cm}^3$

15) sphere: $V = \frac{4}{3}\pi r^3$

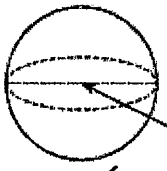


$r = 2$

$V = \frac{4}{3}\pi(2)^3$

$V = \frac{32}{3}\pi \text{ m}^3$

16) sphere: $V = \frac{4}{3}\pi r^3$



$r = 6$

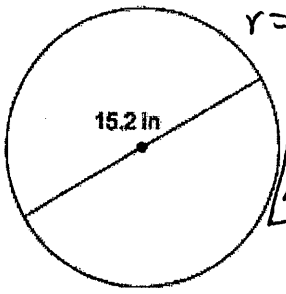
$V = \frac{4}{3}\pi(6)^3$

$V = 288\pi \text{ mi}^3$

Find the area of each. Use your calculator's value of π. Round your answer to the nearest tenth.

circle: $A = \pi r^2$

17)



$r = 7.6$

$A = \pi(7.6)^2$

$A = 57.76\pi \text{ in}^2$

18) radius = 10.6 cm

$A = \pi r^2$

$A = \pi(10.6)^2$

$A = 112.36\pi \text{ cm}^2$

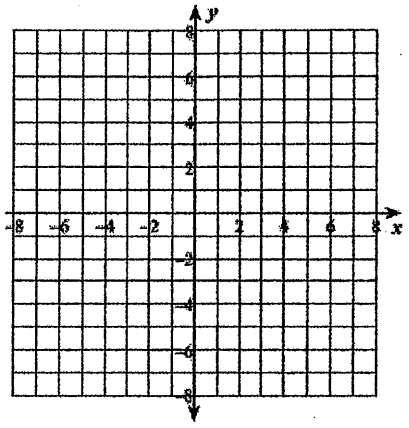
$\approx 353 \text{ cm}^2$

Area		Volume	
Triangle	$A = \frac{1}{2}bh$	Cylinder	$V = \pi r^2 h$
Rectangle	$A = bh$	Pyramid	$V = \frac{1}{3}Bh$
Circle	$A = \pi r^2$	Cone	$V = \frac{1}{3}\pi r^2 h$
Area of a Sector of a Circle		Sphere	$V = \frac{4}{3}\pi r^3$
Area of Sector $= \frac{\pi r^2 \theta}{360}$	$\frac{S}{\pi r^2} = \frac{\theta}{360}$	Prism	$V = Bh$

Geometry Circles, Slope of Lines, Line Segment Partitions Review #1 Name: Key

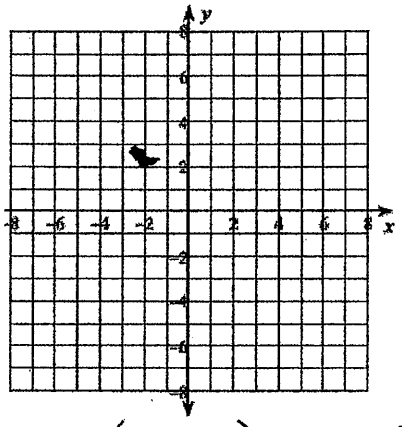
1. Identify the center and the radius of the circle. Then sketch the graph

$(x+2)^2+(y-4)^2=1$ C: (-2, 4)



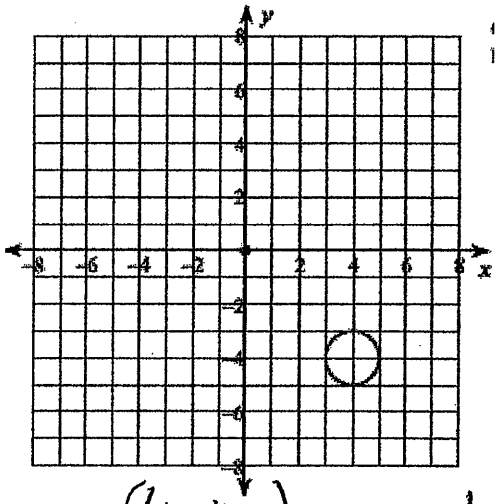
Center: (-2, 4) Radius 1

$(x-3)^2+(y+3)^2=4$



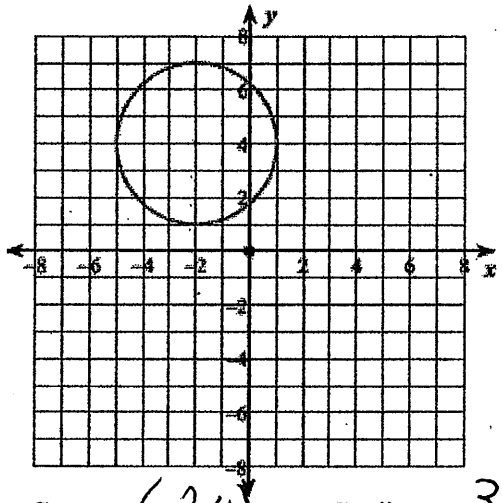
Center: (3, -3) Radius 2

2. Write the equation of the circle in standard form, given the graph below:



Center (4, -4) Radius: 1

Circle Equation: $(x-4)^2+(y+4)^2=1$



Center (-2, 4) Radius: 3

Circle Equation: $(x+2)^2+(y-4)^2=9$

3. Write the equation of the circle in standard form given that center: (4, -8) Radius: 3

$(x-4)^2+(y+8)^2=9$

4. The equation of the circle is $(x-1)^2+(y+5)^2=25$. Tell whether each point is on the circle, in the interior of the circle, or in the exterior of the circle:

a) (1, 0)

$(1-1)^2+(0+5)^2=25$ ✓

on the circle

b) (-3, -1)

$(-3-1)^2+(-1+5)^2$ outside circle

$4^2+4^2=32>25$

5. Write the below equation in standard form. Then identify the center and the radius of the circle:

$x^2 + y^2 - 24x - 16y + 204 = 0$

$x^2 - 24x + 144 + y^2 - 16y + 64 = -204 + 144 + 64$

x -12 | y -8

$(x-12)^2 + (y-8)^2 = 4$

Standard form: $(x-12)^2 + (y-8)^2 = 4$

Center: (12, 8) Radius: 2

Write the standard form of the equation of the line described.

6. through: (-2, 10), perpendicular to $y = 3x - 3$ $m_1 = 3$ $m_2 = -\frac{1}{3}$

$y = mx + b$

$10 = -\frac{1}{3}(-2) + b$ | $10 = \frac{2}{3} + b$ | $\frac{28}{3} = b$ | $y = 3x + \frac{28}{3}$

7. through: (1, -5), parallel to $y = -\frac{1}{5}x - 2$ $m_1 = -\frac{1}{5}$

$y = mx + b$

$-5 = -\frac{1}{5}(1) + b$ | $b = -24/5$ | $y = -\frac{1}{5}x - \frac{24}{5}$

8. Given the points A(-2, 4) and B(7, -2), find the coordinates of the point P on directed line segment $\overline{AB}$ that partitions $\overline{AB}$ in the ratio 1:2. ratio $= \frac{1}{3}$

$\Delta x = 7 - (-2) = 9$

$\Delta y = -2 - 4 = -6$

x-coord: $\frac{1}{3}(9) + -2 = 1$

y-coord: $\frac{1}{3}(-6) + 4 = 2$ | P(1, 2)

9. Find the coordinates of point P that lies on the line segment $\overline{MQ}$, M(-9, -5), Q(3, 5), and partitions the segment at a ratio of 2 to 5 ratio $= \frac{2}{7}$

$\Delta x = 3 - (-9) = 12$

$\Delta y = 5 - (-5) = 10$

x-coord: $\frac{2}{7}(12) - 9 = \frac{-39}{7}$

y-coord: $\frac{2}{7}(10) - 5 = \frac{-15}{7}$ | $P\left(\frac{-39}{7}, \frac{-15}{7}\right)$

Geometry **Completing the Square Review and Circle Equations Worksheet 2**

Key

Recall: Circle Equation in Standard Form: $(x-h)^2+(y-k)^2=r^2$ **Center: (h, k) Radius: r**

Write the below equations in standard form, then identify center and radius of circle:

1) $x^2+y^2+14x-22y+150=0$

$x^2+14x+\underline{49}+y^2-22y+\underline{121}=-150+\underline{49}+\underline{121}$

	x +7
x	
+7	49

	y −11
y	
−11	121

$(x+7)^2+(y-11)^2=20$

$C:(-7,11)\quad r=\sqrt{20}=2\sqrt{5}$

2) $x^2+y^2-2x+16y-16=0$

$x^2-2x+\underline{1}+y^2+16y+\underline{64}=16+\underline{1}+\underline{64}$

	x −1
x	
−1	1

	y +8
y	
+8	

$(x-1)^2+(y+8)^2=81$

$C:(1,-8)\quad r=9$

3) $x^2+y^2-4x-18y+60=0$

$x^2-4x+\underline{4}+y^2-18y+\underline{81}=-60+\underline{4}+\underline{81}$

	x −2
x	
−2	4

	y −9
y	
−9	81

$(x-2)^2+(y-9)^2=25$

$C:(2,9)\quad r=5$

4) $x^2+y^2-26x-16y+229=0$

$x^2-26x+\underline{169}+y^2-16y+\underline{64}=-229+\underline{169}+\underline{64}$

	x −13
x	
−13	169

	y −8
y	
−8	64

$(x-13)^2+(y-8)^2=4$

$C:(13,8)\quad r=2$

5) $x^2+y^2+20x+32y+351=0$

$x^2+20x+\underline{100}+y^2+32y+\underline{256}=-351+\underline{100}+\underline{256}$

	x 10
x	x^2
10	100

	y +16
y	
+16	

$(x+10)^2+(y+16)^2=5$

$C:(-10,-16)\quad r=\sqrt{5}$

6) $x^2+y^2-6x+24y+128=0$

$x^2-6x+\underline{9}+y^2+24y+\underline{144}=-128+\underline{9}+\underline{144}$

	x −3
x	
−3	9

	y 12
y	
12	144

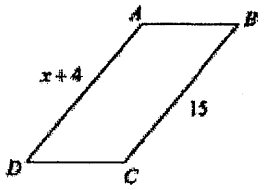
$(x-3)^2+(y+12)^2=25$

$C:(3,-12)\quad r=5$

Quadrilaterals and Polygons REVIEW Name Key Date_____ Period____

Solve for x. The figure below is a parallelogram:

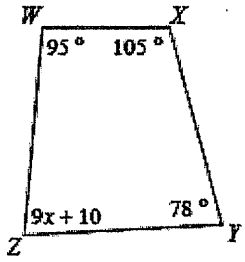
1.



$x+4=15$

$x=11$

2.



$180\cdot(\#\text{ of sides}-2)$

$180\cdot 2=360$

$95+105+78+9x+10=360$

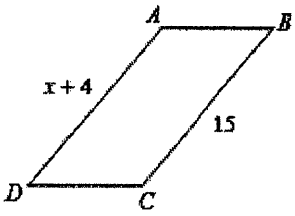
$9x+288=360$

$9x=72$

$x=8$

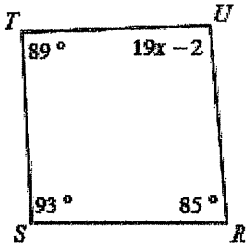
Solve for x. The figure below is a parallelogram:

3.



$x=11$

4.



$267+19x-2=360$

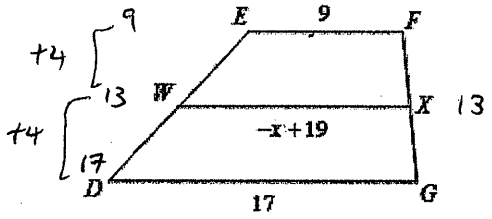
$19x=95$

$x=5$

Solve for x. The figure below is a trapezoid:

midsegment $=\frac{1}{2}(\text{base}+\text{base})$

5.



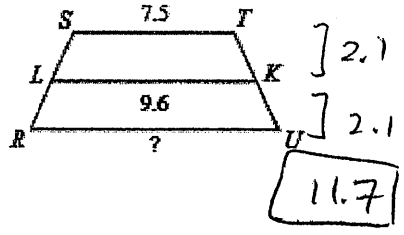
$-x+19=13$

$-x=-6$

$x=6$

Find the length of the base indicated by the trapezoid

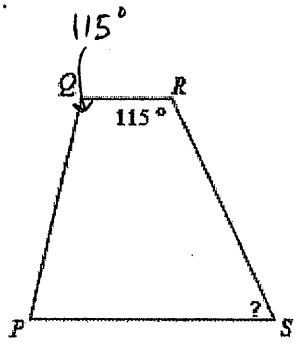
6.



11.7

Find the measurement of the missing angles indicated for each trapezoid

7.



$m\angle S$ 65

$m\angle Q$ 115°

$m\angle P$ 65°

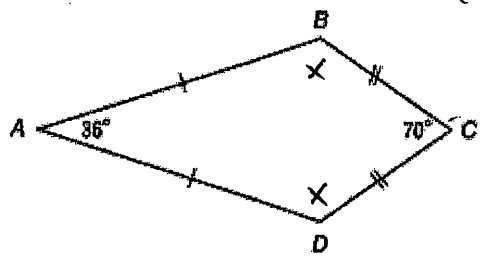
Find the indicated angle measures:

$2x+36+70=360$

$2x=254$

$x=127$

8.

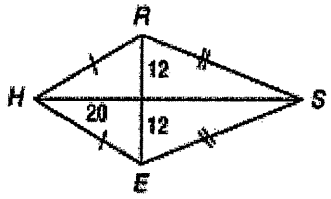


$m\angle B$ 127

$m\angle D$ 127

Find the indicated side lengths of the kite below:

9.

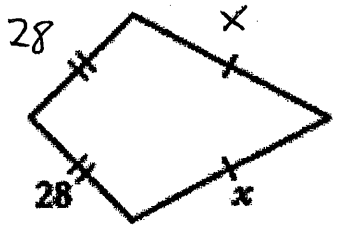


$RH =$ $4\sqrt{34}$

$12^2+20^2=RH^2$

$RH=\sqrt{544}$

10. The perimeter of this kite is **116**. Find x.



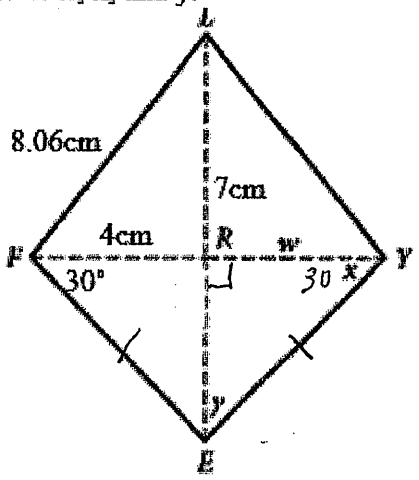
$56+2x=116$

$2x=60$

$x=30$

11.

FLYE is a kite with FL = LY.
Find w, x, and y.

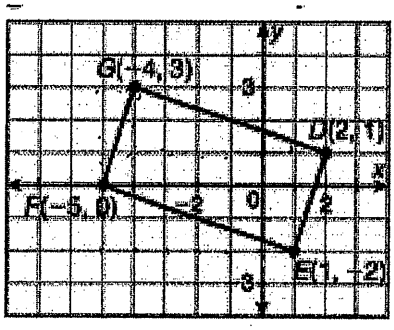


$w = 4$

$x = 30^\circ$

$y = 60^\circ$

12. Use distance and slope to verify whether parallelogram below is a rectangle, rhombus, or a square.



$DE = \sqrt{1+3^2} = \sqrt{10}$

$EF = \sqrt{2^2+6^2} = \sqrt{40} = 2\sqrt{10}$

$FG = \sqrt{1^2+3^2} = \sqrt{10}$

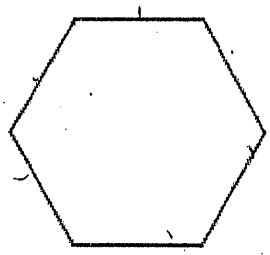
$DG = \sqrt{2^2+6^2} = \sqrt{40}$

$m_{ED} = 3/1$ $m_{DG} = -1/3$

$m_{FG} = 3/1$ $m_{EF} = -1/3$

13. Find the measure of one interior angle in each polygon. Round your answer to the nearest tenth if necessary.

$n = 6$



$$\frac{180(4)}{6} = 120^\circ$$

14. If the sum of the interior angles is 2340°, find the number of sides for the polygon.

$S = 2340$

$S = 180(n-2)$

$2340 = 180n - 360$

$2700 = 180n$

$\boxed{n = 15}$

15. If each of the exterior angles is 30°, find the number of sides for the polygon

$Angle = \frac{360}{n}$ $Angle = \frac{360}{30} = 12$ sides

16. If each of the interior angles is 135°, find the number of sides for the polygon

$angle = \frac{180(n-2)}{n}$ $\frac{135}{1} = \frac{180(n-2)}{n}$ | $135n = 180n - 360$ | $45n = 360$ | $n = 8$

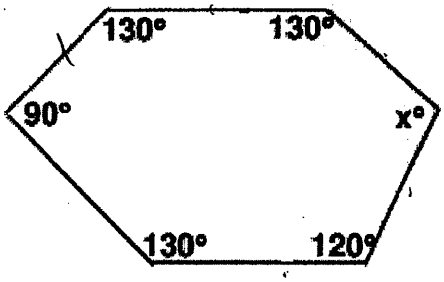
17. Find the other endpoint of the line segment with the given endpoint and midpoint.

Endpoint: (8, -8), midpoint: (5, 3)

$$\begin{array}{c} -3\left[\begin{array}{cc} 8 & \underline{14} \end{array}\right]11 \\ M\left[\begin{array}{cc} 5 & 3 \end{array}\right] \\ -3\left[\begin{array}{cc} \underline{2} & -8 \end{array}\right]11 \end{array}$$

(2, 14)

18. Solve for x:

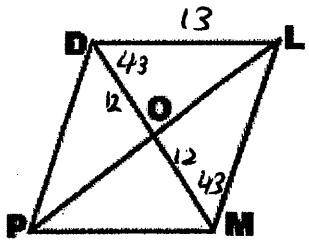


$n = 6$ $180(4) = 720$

$90 + 130(3) + 120 + x = 720$

$x + 600 = 720$ $x = 120°$

19. In rhombus DLMP, DM = 24, m∠LDO = 43°, and DL = 13. Find each of the following.



a) OM = 12

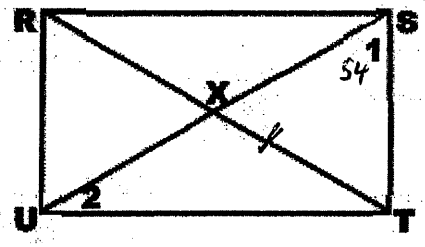
b) m∠DOL = 90°

c) m∠DLO = 47°

d) m∠DML = 43°

e) DP = 13

20. Use the following rectangle for parts a and b



a) m∠1 = 54°, find m∠2.

36°

b) If XT = 2y – 3 and US = 32, solve for y.

$XT + XT = US$

$2(2y - 3) = 32$

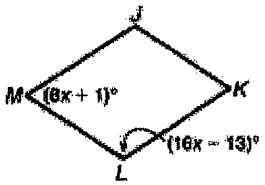
$4y - 6 = 32$

$4y = 38$

$y = 9.5$

21.

In $\square JKLM$, what is the value of $m\angle K$?



F 15°
H 65°
G 57°
J 115°

$16x-13+8x+1=180$

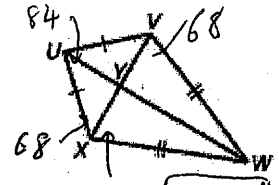
$24x-12=180$

$24x=192$

$x=8$

22.

In kite $UVWX$, $m\angle XUV = 84°$, and $m\angle WVX = 68°$. What is $m\angle VWX$?

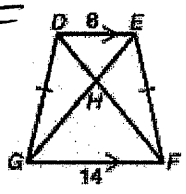


$136+136+84+x=360$

F 22°
G 42°
H 44°
J 45°

23.

$GE = 5x + 2$ and $DF = 8x - 7$.
What is GE?



$8x-7=5x+2$

$3x=9$

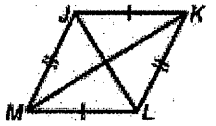
$x=3$

$GE = 5(3)+2$

A 16
B 17
C 18
D 19

24.

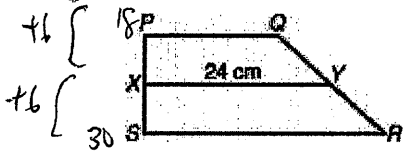
What additional information would allow you to conclude that $JKLM$ is a rhombus?



F $\overline{JK} \parallel \overline{ML}$ and $\overline{JM} \parallel \overline{KL}$.
G $\overline{JM} \cong \overline{JK}$
H $\overline{JL}$ and $\overline{MK}$ bisect each other.
J $\overline{JL} \cong \overline{MK}$

25.

In trapezoid $PQRS$, if $\overline{YX}$ is the midsegment, what could be the lengths of $\overline{PQ}$ and $\overline{SR}$?



F 4 cm and 8 cm
G 9 cm and 15 cm
H 17 cm and 31 cm
J 18 m and 30 m

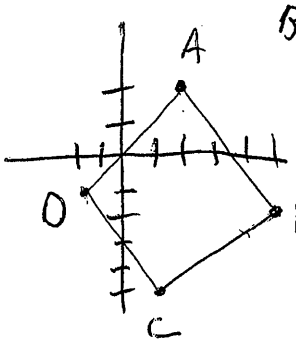
26.

Which is the best name for the quadrilateral with vertices at (2, 2), (5, −2), (1, −5), and (−2, −1)?

A parallelogram
B rectangle
C rhombus
D square

$AB = 3^2+4^2 = 5$

$BC = 4^2+3^2 = 5$



$m_{AB} = -4/3$

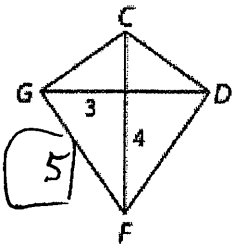
$m_{BC} = 3/4$

Square

If $CDFG$ is a kite, find each measure.

27.

GF



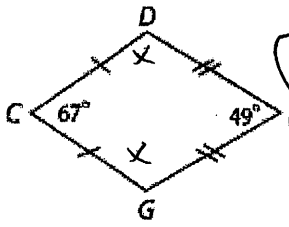
28.

$2x+67+49=360$

$m\angle D$

$2x=244$

$x=122^\circ$



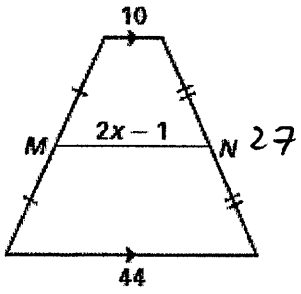
Find the value of x:

29.

$2x-1=27$

$2x=28$

$x=14$

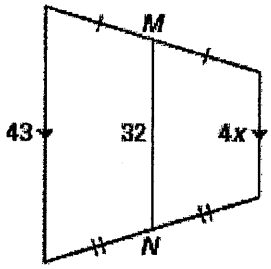


30.

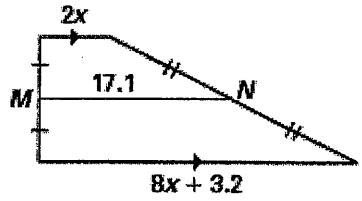
11 11 21

$4x=21$

$x=5.25$



31.



$17.1=\frac{1}{2}(2x+8x+3.2)$

$17.1=5x+1.6$

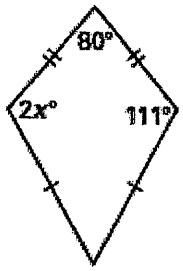
$15.5=5x$

$x=3.1$

32.

$2x=111$

$x=55.5$



WXYZ is a square. If $WT = 3$, find each measure.

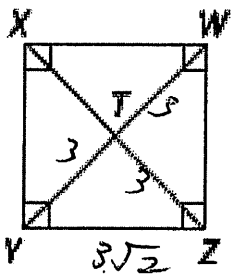
33.

a) $m\angle WYX =$ 45°

b) YZ = $3\sqrt{2}$

c) $m\angle WTZ =$ 90°

d) XZ = 6



CCGPS Analytic Geometry Probability Test Review 2 Combinations

Key

1. The math club is electing new officers. There are 4 candidates for president, 5 candidates for vice-president, 2 candidates for secretary, and 1 candidate for treasurer. How many different combinations of officers are possible?

$4 \cdot 5 \cdot 2 \cdot 1 = 40$ combinations

2. A piggybank contains 2 quarters, 3 dimes, 4 nickels, and 5 pennies. One coin is removed at random.

a) What is the probability that the coin is a dime? $\frac{3}{14}$

b) What is the probability that the coin is a dime **or** a nickel? $\frac{3}{14} + \frac{4}{14} = \frac{7}{14}$ or $\frac{1}{2}$

c) What is the probability that you choose a nickel **and** then a nickel? (without replacement) $\frac{4}{14} \cdot \frac{3}{13} = \boxed{\frac{6}{91}}$

d) What is the probability that the coin is not a quarter? $\frac{12}{14} = \boxed{\frac{6}{7}}$

3. Each of the letters of the word "ALGEBRA " is on a separate card. The cards have been mixed and placed in a box. If you select one card at random, what is the probability that its letter will be "A"?

$\frac{2}{7}$

4. A card is randomly selected from a standard deck of 52 cards. Find the indicated probability.
Hint: There are 4 jacks, 4 queens, 4 kings, 4 aces, 13 diamonds, 13 spades, 13 clubs, 13 hearts, 36 numbered cards, 26 red cards, and 26 black cards.

a) P(Face card) $\frac{12}{52} = \boxed{\frac{3}{13}}$

b) P(Ace or a Diamond) $\frac{4}{52} + \frac{13}{52} - \frac{1}{52} = \frac{16}{52} = \boxed{\frac{4}{13}}$

c) P(Black and Ace) looking for the overlap $\frac{2}{52}$ or $\boxed{\frac{1}{26}}$

d) P(Black card or Face card) $\frac{26}{52} + \frac{12}{52} - \frac{6}{52} = \frac{32}{52} = \boxed{\frac{8}{13}}$

5. Two cards are randomly selected from a standard deck of 52 cards (WITH REPLACEMENT). Find the indicated probability. **Hint: There are 4 jacks, 4 queens, 4 kings, 4 aces, 13 diamonds, 13 spades, 13 clubs, 13 hearts, 36 numbered cards, 26 red cards, and 26 black cards.**

a) P(Jack and Heart)

$\frac{4}{52} \cdot \frac{13}{52} = \boxed{\frac{1}{52}}$

b) P(Diamond and Diamond and Diamond)

$\frac{13}{52} \cdot \frac{13}{52} \cdot \frac{13}{52} = \boxed{\frac{1}{64}}$

c) P(Red and King)

$\frac{26}{52} \cdot \frac{4}{52} = \boxed{\frac{1}{26}}$

d) P(Black card and Numbered card)

$\frac{26}{52} \cdot \frac{36}{52} = \boxed{\frac{9}{26}}$

6. Two cards are randomly selected from a standard deck of 52 cards (**WITHOUT** REPLACEMENT). Find the indicated probability. **Hint: There are 4 jacks, 4 queens, 4 kings, 4 aces, 13 diamonds, 13 spades, 13 clubs, 13 hearts, 36 numbered cards, 26 red cards, and 26 black cards.**

a) P(Jack of Hearts and Heart)

$\frac{1}{52} \cdot \frac{12}{51} = \boxed{\frac{1}{221}}$

b) P(Face card and Face card and Ace)

$\frac{12}{52} \cdot \frac{11}{51} \cdot \frac{4}{50} = \boxed{\frac{22}{5525}}$

d) P(Black Card and Red King)

$\frac{26}{52} \cdot \frac{2}{51} = \boxed{\frac{1}{51}}$

d) P(Black Jack and Numbered card)

$\frac{2}{52} \cdot \frac{36}{51} = \boxed{\frac{6}{221}}$

0.47

7. The probability that a student plays tennis is 47%. The probability that a student plays tennis and Lacrosse is 16%. What is the probability that student plays Lacrosse, given that they play tennis?

0.16

$\frac{0.16}{0.47} = \boxed{0.34}$

8. The probability that a high school senior drives to school is .81. The probability that a high school senior having a job and driving to school is .52. What is the probability that high school senior will have a job, given that they drive to school?

$\frac{0.52}{0.81} = \boxed{0.64}$

For #9 - 13, refer to the following table.

	Male	Female	Subtotal
Blue Eyes	40	20	60
Green Eyes	10	80	90
Subtotal	50	100	150

denominators

9) P (Male) = $\frac{50}{150} = \frac{1}{3}$

10. P (Green Eyes) = $\frac{90}{150} = \boxed{\frac{3}{5}}$

11.P(Green Eyes | Male) =

$\frac{10}{50}$ or $\boxed{\frac{1}{5}}$

12. P(Male | Green Eyes) = $\frac{10}{90} = \boxed{\frac{1}{9}}$

13) Male and Green eyes are dependent

$P(M|G) \neq P(G|M)$

CCGPS Analytic Geometry Probability Test Review 3

Key

1. A deli has a lunch special which consists of a sandwich, soup, dessert and drink for $4.99. They offer the following choices: **Sandwich**: chicken salad, ham, and tuna, and roast beef **Soup**: tomato, chicken noodle, vegetable **Dessert**: cookie and pie **Drink**: tea, coffee, coke, diet coke and sprite. How many lunch specials are there?

$4 \cdot 3 \cdot 2 \cdot 5 =$ 120 lunch combinations

2. ***In a bag there are 3 red marbles, 2 yellow marbles, and 1 blue marble. After a marble is selected, it is replaced. Using this new situation, find the probability of each outcome listed above.*** 6 total

a) a red marble and then a yellow marble $\frac{3}{6} \cdot \frac{2}{6} = \frac{1}{6}$

b) a blue marble and then a yellow marble $\frac{1}{6} \cdot \frac{2}{6} = \frac{1}{18}$

c) a red marble and then a blue marble $\frac{3}{6} \cdot \frac{1}{6} = \frac{1}{12}$

d) any color marble except yellow and then a yellow marble $\frac{4}{6} \cdot \frac{2}{6} = \frac{2}{9}$

e) a red marble three times in a row $\frac{3}{6} \cdot \frac{3}{6} \cdot \frac{3}{6} = \frac{1}{8}$

f) a red or blue marble $\frac{3}{6} + \frac{1}{6} = \frac{4}{6} = \frac{2}{3}$

3. In a bag there are 4 red marbles, 2 yellow, and 5 blue marbles. After a marble is selected, it is **NOT** replaced. Find the probability of each outcome below: 11 total

a. a red marble and then a yellow marble $\frac{4}{11} \cdot \frac{2}{10} = \frac{4}{55}$

b a blue marble and then a yellow marble $\frac{5}{11} \cdot \frac{2}{10} = \frac{1}{11}$

c a red marble and then a blue marble $\frac{4}{11} \cdot \frac{5}{10} = \frac{2}{11}$

d any color marble except yellow and then a yellow marble $\frac{9}{11} \cdot \frac{2}{10} = \frac{9}{55}$

e a red marble three times in a row $\frac{4}{11} \cdot \frac{3}{10} \cdot \frac{2}{9} = \frac{4}{165}$

4. Each of the letters of the word "GEOMETRY" is on a separate card. The cards have been mixed and placed in a box. If you select one card at random, what is the probability that its letter will be "E or a consonant"?

$\frac{2}{8} + \frac{5}{8} = \frac{7}{8}$

5. A card is randomly selected from a standard deck of 52 cards. Find the indicated probability. **Hint: There are 4 jacks, 4 queens, 4 kings, 4 aces, 13 diamonds, 13 spades, 13 clubs, 13 hearts, 36 numbered cards, 26 red cards, and 26 black cards.**

a) P(Face cards or Odd numbered cards) $\frac{12}{52} + \frac{16}{52} = \frac{28}{52} = \boxed{\frac{7}{13}}$

b) P(Face card and Spades) $\boxed{\frac{3}{52}}$

c) P(Red or Face Cards) $\frac{26}{52} + \frac{12}{52} - \frac{6}{52}$ $\boxed{\frac{8}{13}}$

d) P(Diamonds or even cards) $\frac{13}{52} + \frac{20}{52} - \frac{5}{52}$ $\boxed{\frac{7}{13}}$

6. Two cards are randomly selected from a standard deck of 52 cards (WITH REPLACEMENT). Find the indicated probability. **Hint: There are 4 jacks, 4 queens, 4 kings, 4 aces, 13 diamonds, 13 spades, 13 clubs, 13 hearts, 36 numbered cards, 26 red cards, and 26 black cards.**

a) P(Face cards and Odd numbered cards) $\frac{12}{52} \cdot \frac{16}{52}$ $\boxed{\frac{12}{169}}$

b) P(Face card and Spades) $\frac{12}{52} \cdot \frac{13}{52}$ $\boxed{\frac{3}{52}}$

c. P(Red and Face Cards) $\frac{26}{52} \cdot \frac{12}{52}$ $\boxed{\frac{3}{26}}$

d) P(even card 3 times) $\frac{20}{52} \cdot \frac{20}{52} \cdot \frac{26}{52} = \boxed{\frac{125}{2197} = 0.0568}$

7) Two cards are randomly selected from a standard deck of 52 cards (**WITHOUT** REPLACEMENT). Find the indicated probability. **Hint: There are 4 jacks, 4 queens, 4 kings, 4 aces, 13 diamonds, 13 spades, 13 clubs, 13 hearts, 36 numbered cards, 26 red cards, and 26 black cards.**

a. P(Face cards and Odd numbered cards) $\frac{12}{52} \cdot \frac{16}{51} = \frac{16}{221}$

b) P(Face card and Spades) Spades $\frac{3}{52} \cdot \frac{12}{51} = \frac{3}{221}$

(c) ~~P(Red and Face Cards)~~ ~~Hearts~~ P(Hearts face card and Red) $\frac{3}{52} \cdot \frac{25}{51}$

d) P(even card 3 times) $\frac{20}{52} \cdot \frac{19}{51} \cdot \frac{18}{50}$

8) The probability that a student plays tennis is 56%. The probability that a student plays tennis and Lacrosse is 26%. What is the probability that student plays Lacrosse, given that they play tennis? $\frac{0.26}{0.56}$ $\boxed{\frac{13}{28}}$

For #9 - 12, refer to the following table.

	Male	Female	Subtotal
Blue Eyes	40	20	60
Green Eyes	10	80	90
Subtotal	50	100	150

9) P (Female) = $\frac{100}{150}$ $\boxed{\frac{2}{3}}$

10. P (Green Eyes) = $\frac{90}{150}$ $\boxed{\frac{3}{5}}$

11.P(Green Eyes | Female) = $\frac{8}{10}$ $\boxed{\frac{4}{5}}$

12. P(Female | Green Eyes) = $\frac{8}{9}$

13] Dependent b/c $P(G|F) \neq P(F|Green)$