Name: Key
Geometry

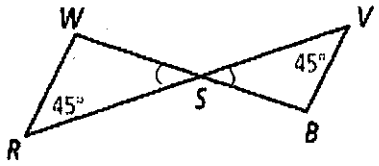
Date: _____
Band: _____

June 2015 Practice PBA

Unit 6: Similarity

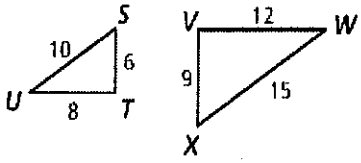
Are the two triangles similar? How do you know?

1.



Similar. AA~ Postulate.

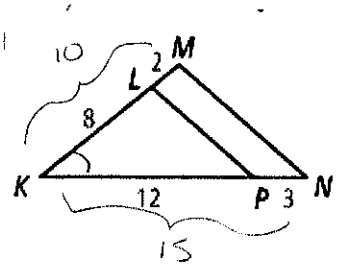
2.



$\frac{6}{9} = \frac{8}{12} = \frac{10}{15} = \frac{2}{3}$

Similar. SSS~ Thrm.

3.

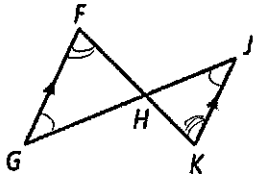


$\frac{8}{10} = \frac{4}{5} = \frac{12}{15}$

Similar. SAS~ Thrm

4. Given: $\overline{FG} \parallel \overline{KJ}$
Prove: $\Delta FGH \sim \Delta KJH$

$\overline{FG} \parallel \overline{KJ}$ (Given) → $\angle F \cong \angle K$, $\angle G \cong \angle J$ (Alt. Int. ∠'s Thrm) → $\Delta FGH \sim \Delta KJH$ (AA~ Post.)



Unit 7: Right Triangles & Trigonometry

The lengths of the sides of a triangle are given. Classify each triangle as *acute, right,* or *obtuse*.

5. 6, 11, and 14

$6^2 + 11^2 \square 14^2$

$36 + 121 \square 196$

$157 \boxed{<} 196$

obtuse

6. 7, 8, and 9

$7^2 + 8^2 \square 9^2$

$49 + 64 \square 81$

$113 \boxed{>} 81$

acute

45-45-90

hyp = $\sqrt{2}$ · leg

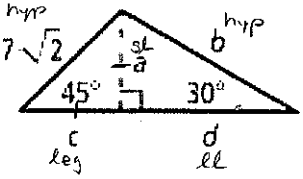
30-60-90

hyp = 2 · short leg

long leg = $\sqrt{3}$ · short leg

Find the value of each variable. If your answer is not an integer, express it in simplest radical form.

7.



$7\sqrt{2} = \sqrt{2} \cdot c$

$7 = c$

$a = 7$

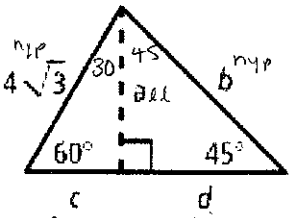
$b = 2 \cdot 7$

$b = 14$

$d = \sqrt{3} \cdot 7$

$d = 7\sqrt{3}$

8.



$4\sqrt{3} = 2 \cdot c$

$2\sqrt{3} = c$

$a = \sqrt{3} \cdot 2\sqrt{3}$

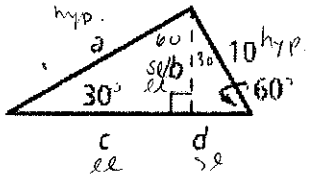
$a = 6$

$d = 6$

$b = \sqrt{2} \cdot 6$

$b = 6\sqrt{2}$

9.



$10 = 2 \cdot d$,

$5 = d$

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

$b = 5\sqrt{3}$

$a = 2 \cdot 5\sqrt{3}$

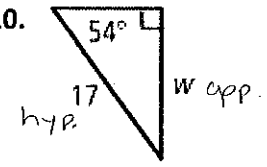
$a = 10\sqrt{3}$

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

$c = 15$

Find the value of *w* to the nearest tenth.

10.

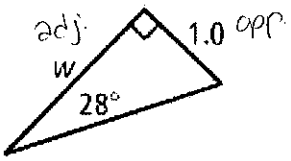


$\sin 54 = \frac{w}{17}$

$w = 17 \sin 54$

$w \approx 13.8$

11.

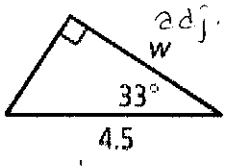


$\tan 28 = \frac{1}{w}$

$w = \frac{1}{\tan 28}$

$w \approx 1.9$

12.



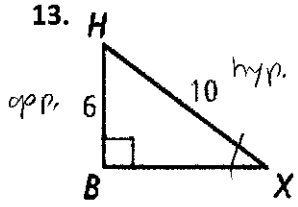
$\cos 33 = \frac{w}{4.5}$

$w = 4.5 \cos 33$

$w \approx 3.8$

What is $m\angle X$ to the nearest degree?

13.

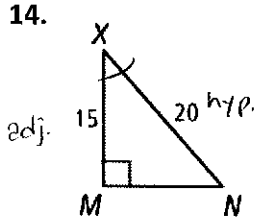


$\sin X = \frac{6}{10}$

$X = \sin^{-1}\left(\frac{6}{10}\right)$

$X \approx 37°$

14.



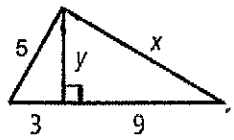
$\cos X = \frac{15}{20}$

$X = \cos^{-1}\left(\frac{15}{20}\right)$

$X \approx 41°$

Find the value of each variable. If your answer is not an integer, express it in simplest radical form.

15.



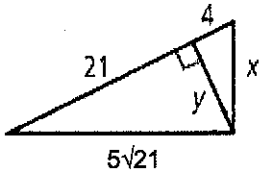
$3^2+y^2=5^2$ $\quad 9^2+4^2=x^2$

$9+y^2=25$ $\quad 81+16=x^2$

$y^2=16$ $\quad 97=x^2$

$\boxed{y=4}$ $\quad \boxed{x=\sqrt{97}}$

16.



$21^2+y^2=(5\sqrt{21})^2$ $\quad 4^2+(2\sqrt{21})^2=x^2$

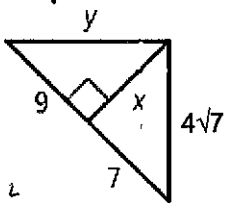
$441+y^2=525$ $\quad 16+84=x^2$

$y^2=84$ $\quad 100=x^2$

$y=\sqrt{84}$ $\quad \boxed{x=10}$

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

17.



$9^2+(3\sqrt{7})^2=y^2$

$81+63=y^2$

$144=y^2$

$\boxed{12=y}$

$x^2+7^2=(4\sqrt{7})^2$

$x^2+49=112$

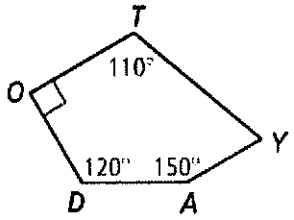
$x^2=63$

$x=\sqrt{63}$

$\boxed{x=3\sqrt{7}}$

Unit 8: Polygons & Quadrilaterals

18. What is the $m\angle Y$ in pentagon $TODAY$?



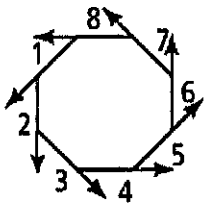
$110+90+120+150+m\angle Y=540$

$\boxed{m\angle Y=70°}$

19. What is $m\angle 1$ in the regular octagon at the right?

$m\angle 1=\frac{360}{8}$

$\boxed{m\angle 1=45°}$



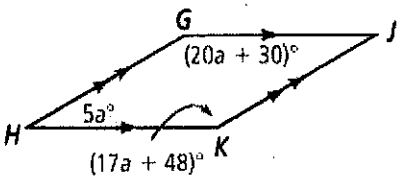
20. The interior angle measure of a regular polygon is 140°. What is the measure of an exterior angle? How many sides does the polygon have?

exterior angle: $180-140=\boxed{40°}$

#sides: $\frac{360}{40}=\boxed{9 \text{ sides}}$

Find the value of a. Then find each [redacted] angle measure.

21



$20a+30=17a+48$

$3a=18$

$\boxed{a=6}$

$5a=\boxed{30°}$

$20a+30=17a+48=\boxed{150°}$

22. Prove that Quadrilateral $PART$ is a parallelogram using coordinate geometry. Show all of your computational work.

opp. sides ∥ or opp. sides ≅ or diag. bis. each other

$m_{PT} = \frac{4}{2} = 2$

$m_{AR} = \frac{4}{2} = 2$

$m_{PA} = \frac{2}{6} = \frac{1}{3}$

$m_{TR} = \frac{2}{6} = \frac{1}{3}$

$PT = \sqrt{(-5-\bar{3})^2+(-4-0)^2} = \sqrt{20}$

$AR = \sqrt{(3-1)^2+(2-\bar{2})^2} = \sqrt{20}$

$PA = \sqrt{(-3-3)^2+(0-2)^2} = \sqrt{40}$

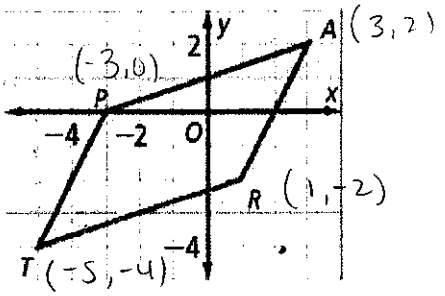
$TR = \sqrt{(-5-1)^2+(-4-\bar{2})^2} = \sqrt{40}$

$M_{PR} = \left(\frac{-3+1}{2}, \frac{0-2}{2}\right)$

$M_{PR} = (-1,-1)$

$M_{AT} = \left(\frac{-5+3}{2}, \frac{-4+2}{2}\right)$

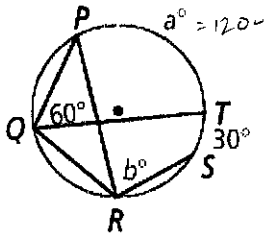
$M_{AT} = (-1,-1)$



Unit 9: Circles

Find the value of each variable. For each circle, the dot represents the center.

23.



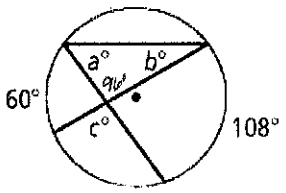
$60 = \frac{1}{2}a$

$a = 120°$

$b = \frac{1}{2}(150)$

$b = 75°$

24.

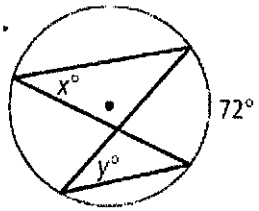


$a = \frac{1}{2}(108)$ $b = \frac{1}{2}(60)$

$a = 54°$ $b = 30°$

$c = 96°$

25.



$x = \frac{1}{2}(72)$

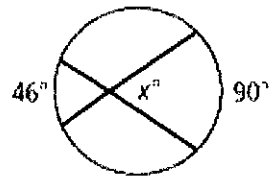
$x = 36°$

$y = \frac{1}{2}(72)$

$y = 36°$

Find the value of each variable.

26.

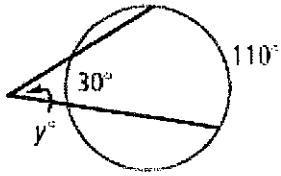


$x = \frac{1}{2}(90+46)$

$x = \frac{1}{2}(136)$

$x = 68°$

27.

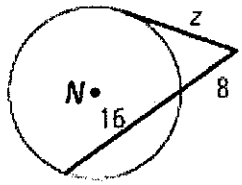


$y = \frac{1}{2}(110-30)$

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

$y = 40°$

28.



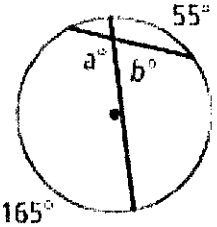
$z^2 = 8(8+16)$

$z^2 = 8(24)$

$z^2 = 192$

$z = 8\sqrt{3}$

29.



$a = \frac{1}{2}(165+55)$

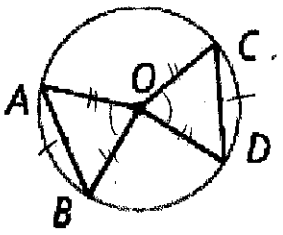
$a = \frac{1}{2}(220)$

$a = 110°$

$b = 180 - 110$

$b = 70°$

30. Given: ⊙ O with arcs $AB \cong CD$
Prove: $\Delta AOB \cong \Delta COD$



⊙O with arcs $\overset{\frown}{AB} \cong \overset{\frown}{CD}$ → $\overline{AB} \cong \overline{CD}$ (≅ arcs have ≅ chords) → $\Delta AOB \cong \Delta COD$ (SSS)

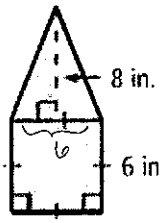
Given → $\angle AOB \cong \angle COD$ (≅ arcs have ≅ central ∠'s) → $\Delta AOB \cong \Delta COD$ (SAS)

$\overline{AO} \cong \overline{OB} \cong \overline{OC} \cong \overline{OD}$ (All radii are ≅) → $\Delta AOB \cong \Delta COD$ (SSS)

Unit 10: Area

What is the area of each polygon?

31.



Δ Area $= \frac{1}{2}bh$

$\Delta = \frac{1}{2}(6)(8)$

$\Delta = 24$

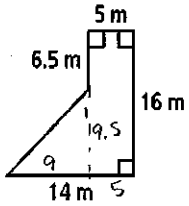
□ Area $= s^2$

$\square = 6^2$

$\square = 36$

$\Delta + \square = 24 + 36 = \boxed{60\ in^2}$

32.



Δ Area $= \frac{1}{2}bh$

$\Delta = \frac{1}{2}(9)(9.5)$

$\Delta = 42.75$

□ Area $= bh$

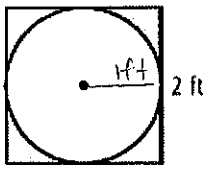
$\square = 5(16)$

$\square = 80$

$\Delta + \square = 42.75 + 80 = \boxed{122.75\ m^2}$

Find the area of the shaded region, Leave your answer in terms of π and in simplest radical form.

33.



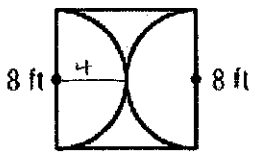
Area = □ − ○

$A = s^2 - \pi r^2$

$A = 2^2 - \pi(1)^2$

$A = \boxed{4 - \pi\ ft^2}$

34.



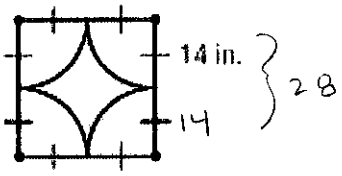
Area = □ − ○

$A = s^2 - \pi r^2$

$A = 8^2 - \pi(4)^2$

$A = \boxed{64 - 16\pi\ ft^2}$

35.



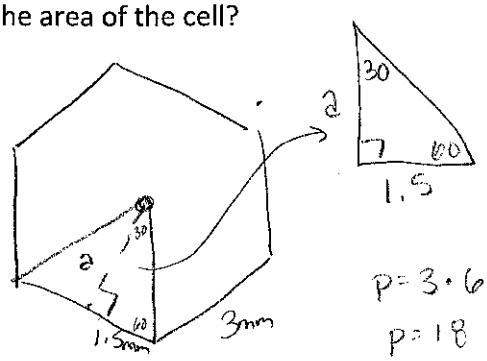
Area = □ − ○

$A = s^2 - \pi r^2$

$A = 28^2 - \pi(14)^2$

$A = \boxed{784 - 196\pi\ in^2}$

36. A honeycomb is made up of regular hexagonal cells. The length of a side of a cell is 3 mm. What is the area of the cell?



$a = \sqrt{3} \cdot 1.5$

$a = 1.5\sqrt{3}$

$P = 3 \cdot 6$

$P = 18$

$A = \frac{1}{2}ap$

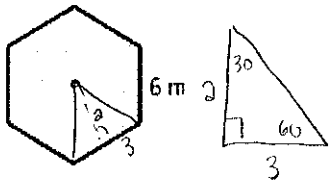
$A = \frac{1}{2}(1.5\sqrt{3})(18)$

$A = 13.5\sqrt{3}$

$A \approx 23.4 mm^2$

Find the area of each regular polygon. Round your answer to the nearest tenth.

37.



$a = \sqrt{3} \cdot 3 = 3\sqrt{3}$

$P = 6 \cdot 6 = 36$

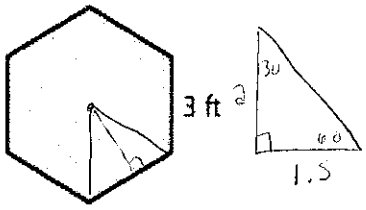
$A = \frac{1}{2}ap$

$A = \frac{1}{2}(3\sqrt{3})(36)$

$A = 54\sqrt{3}$

$A \approx 93.5 m^2$

38.



$a = \sqrt{3} \cdot 1.5 = 1.5\sqrt{3}$

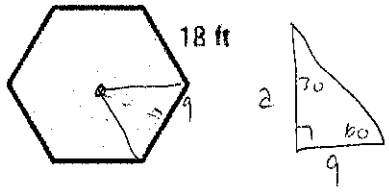
$P = 6 \cdot 3 = 18$

$A = \frac{1}{2}ap$

$A = \frac{1}{2}(1.5\sqrt{3})(18)$

$A \approx 23.4 ft^2$

39.



$a = \sqrt{3} \cdot 9 = 9\sqrt{3}$

$P = 18 \cdot 6 = 108$

$A = \frac{1}{2}ap$

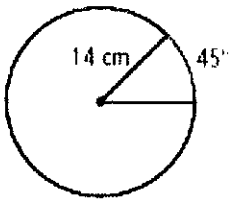
$A = \frac{1}{2}(9\sqrt{3})(108)$

$A = 486\sqrt{3}$

$A \approx 841.8 ft^2$

Find the length of each arc shown in red. Leave your answer in terms of π.

40.

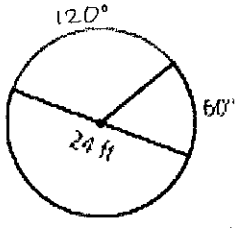


$\text{arc length} = \frac{45}{360} \cdot 2\pi(14)$

$= 0.125 \cdot 28\pi$

$= 3.5\pi$ cm

41.

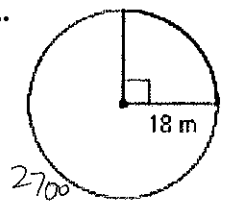


$\text{arc length} = \frac{120}{360} \cdot \pi(24)$

$= \frac{1}{3} \cdot 24\pi$

$= 8\pi$ ft

42.

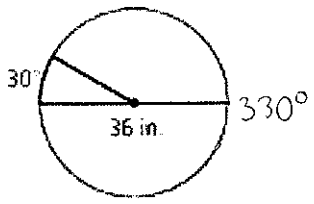


$\text{arc length} = \frac{270}{360} \cdot 2\pi(18)$

$= \frac{3}{4} \cdot 36\pi$

$= 27\pi$ m

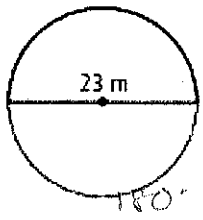
43.



arc length = $\frac{330}{360} \cdot \pi(36)$

$= 33\pi$ in

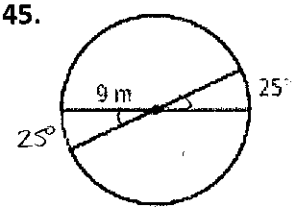
44.



arc length = $\frac{180}{360} \cdot \pi(23)$

$= 11.5\pi$ m

45.

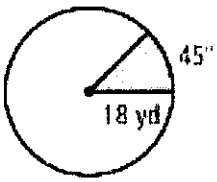


arc length = $\frac{25}{360} \cdot 2\pi(9)$

$= 1.25\pi$ m

Find the area of each shaded sector of a circle. Leave your answer in terms of π.

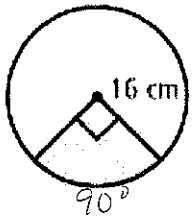
46.



Sector area = $\frac{45}{360} \cdot \pi(18)^2$

$= 40.5\pi$ yd^2

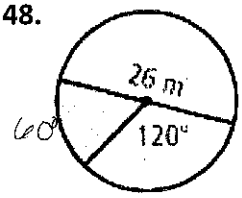
47.



Sector area = $\frac{90}{360} \cdot \pi(16)^2$

$= 64\pi$ cm^2

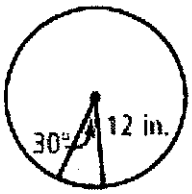
48.



Sector area = $\frac{60}{360} \cdot \pi(13)^2$

$= 28.16\pi$ m

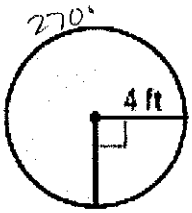
49.



Sector area = $\frac{30}{360} \cdot \pi(12)^2$

$= 12\pi$ in^2

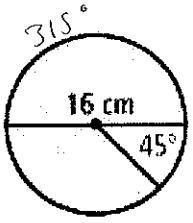
50.



Sector area = $\frac{270}{360} \cdot \pi(4)^2$

$= 12\pi$ ft^2

51.



Sector area = $\frac{315}{360} \cdot \pi(8)^2$

$= 56\pi$ cm^2