Bryant - Geometry
Semester 2 Final Review

Name Mikey

Hour ____

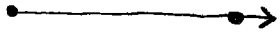
**Show all necessary work!**

## Chapter 1

Sketch a picture for each of the following. Then describe the figure in words.

1. $\overline{PQ}$ : Line segment; has endpoints

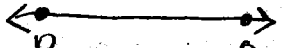

2. $\overrightarrow{PQ}$ : Ray; endpoint @ P; goes through Q.



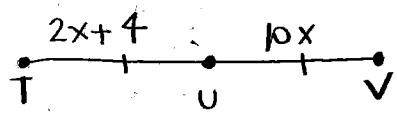
3. PQ

Distance between P & Q

4. $\overleftrightarrow{PQ}$ : Line; continues through Pts. P & Q



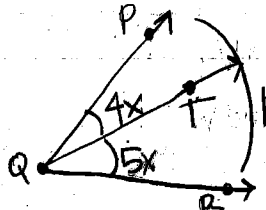

5. U is the midpoint of $\overline{TV}$.
TU = 2x + 4 and UV = 10x. Find TV.




$2x+4=10x$
$4=8x$
$x=\frac{1}{2}$

$TV=2x+4+10x$
$TV=12x+4$
$TV=12(\frac{1}{2})+4=$ **10**

6. T is in the interior of $\angle PQR$.
$m\angle PQR = 10x - 13$. $m\angle PQT = 4x$
and $m\angle TQR = 5x$. Find $m\angle PQR$.




$5x+4x=10x-13$
$9x=10x-13$
$x=13$
$m\angle PQR=10(13)-13$
$130-13$
$m\angle PQR=117°$

7. An angle measures three times the measure of its supplementary angle. Find the measure of both angles.

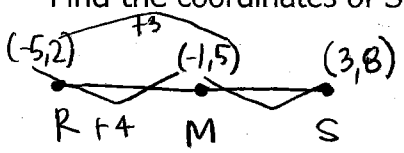
$x+y=180$
$x=3y$

$3y+y=180$
$4y=180$
$y=45$

$3(45)=135$

**45° & 135°**

8. M is the midpoint of $\overline{RS}$ and M has coordinates (–1, 5). R has coordinates (–5, 2). Find the coordinates of S.

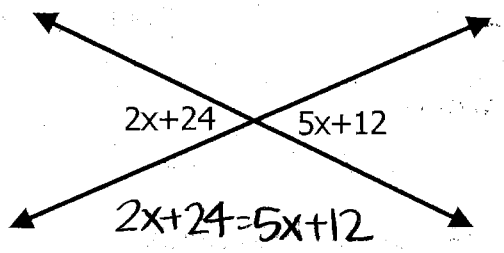



**(3,8)**

9. Use the distance formula to find the length of segment AB with endpoints A(–4, –3) and B(3, 5).

$AB=\sqrt{(3-(-4))^2+(5-3)^2}=\sqrt{7^2+8^2}=\sqrt{49+64}=\sqrt{113}\approx 10.6$

10. Solve for x. Show all work.

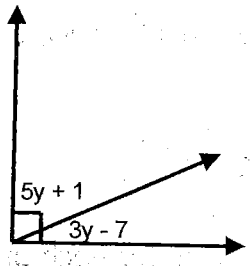



$2x+24=5x+12$

$12=3x$

$\boxed{x=4}$

11. Solve for y. Show all work.




$5y+1+3y-7=90$

$8y-6=90$

$8y=96$

$\boxed{y=12}$

**Chapter 3**

12. What is the slope formula? $\frac{y_1-y_2}{x_1-x_2}$ or $\frac{y_2-y_1}{x_2-x_1}$

13. What is the slope-intercept form of an equation?

$y=mx+b$

14. What is the midpoint formula?

$\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

15. What is the distance formula?

$d=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

16. Solve for x and y.

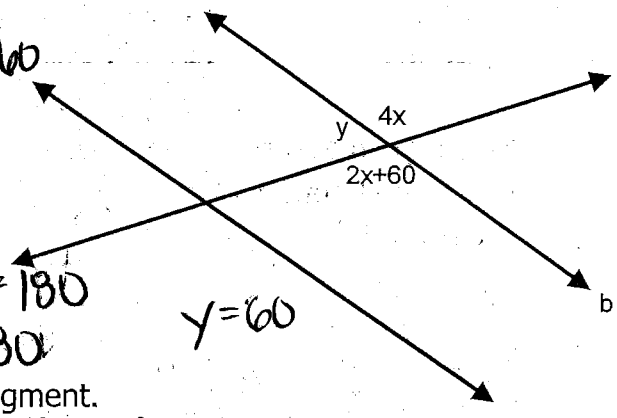
x: 30

y: 60

$4x=2x+60$

$2x=60$

$x=30$

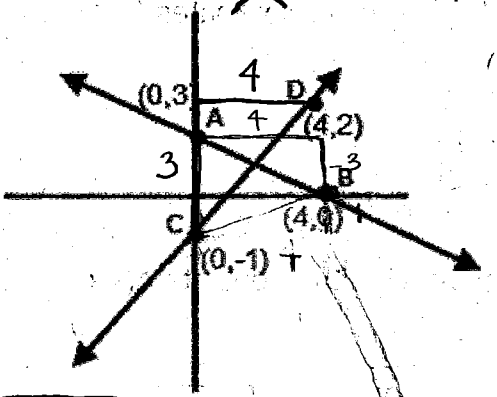



$y+4(30)=180$

$y+120=180$

$y=60$

17. Find AB and ~~BC~~ CD and the slope of each line segment.




AB: 5

CD: $\sqrt{5}$

Slope AB: $-\frac{3}{4}$

Slope CD: $\frac{3}{4}$

$AB=\sqrt{4^2+3^2}=\sqrt{16+9}=\sqrt{25}$

$CD=\sqrt{4^2+3^2}=\sqrt{16+9}=\sqrt{25}$

**Chapter 4**

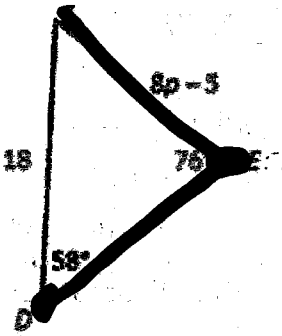
18. Use the congruence statement to find the missing variables. Δ[redacted]F ≅ Δ[redacted]

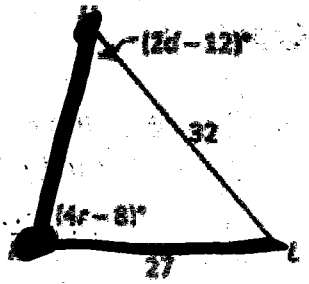
c: 10

d: 35

p: 4

r: 21




$4r-8=76$

$4r=84$

$r=21$

$8p-5=27$

$8p=32$

$p=4$

$5c-18=32$

$5c=50$

$c=10$

$2d-12=58$

$2d=70$

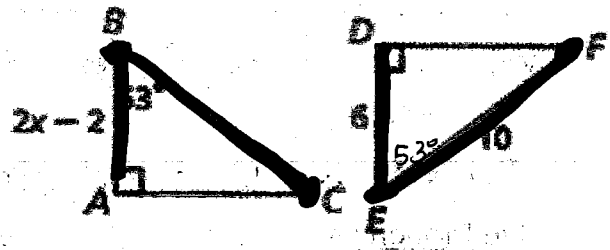
$d=35$

19. If Δ[redacted] ≅ Δ[redacted] find the value of x.

$2x-2=6$

$2x=8$

$\boxed{x=4}$




20. If ΔABC ≅ ΔDEF, find m∠F.

$m\angle B \cong m\angle E$

$\boxed{m\angle F = 37°}$

$m\angle D+m\angle E+m\angle F=180$

$90+53+m\angle F=180$

$m\angle F=180-(90+53)$

21. Use the Exterior Angle Theorem to solve for x and find the m∠PRS.

$9x+2=23+5x-1$

$9x+2=22+5x$

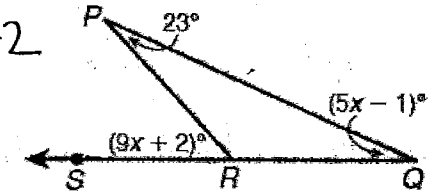
$4x=20$

$x=5$

$m\angle PRS=9(5)+2$

$=45+2$

$\boxed{m\angle PRS=47°}$




22. Find each side length.

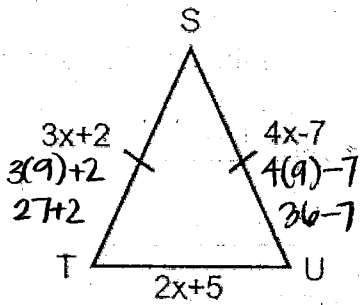
ST = 29

SU = 29

TU = 23

$4x-7=3x+2$

$x=9$




$2(9)+5$

$18+5$

23. The angle measures of a triangle are in the ratio 3:4:3. Find the angle measures of the triangle. $3x+4x+3x=180$

$10x=180$

$x=18$

54°, 72°, 54°

**Chapter 6**

24. Parallelogram Properties:

- opposite sides ≅
- opposite sides ∥
- opposite ∠s ≅
- consecutive ∠s supp.
- diagonals bisect each other

Rhombus Properties: All Parallelogram properties and...

- diagonals are ⊥
- diagonals bisect opp. ∠s
- all sides ≅

Rectangles Properties: All parallelogram properties and...

- all four ∠s = 90°
- diagonals ≅

What do we know about squares?

- All sides ≅
- Diagonals ⊥ & bisect each other

(*Everything above!!)

Kite Properties:

- 2 pairs of ≅ consecutive sides
- non-vertex ∠s are ≅
- diagonals are ⊥
- one diagonal is bisected

Trapezoid Properties:

- one pair of ∥ sides
- consecutive ∠s are supp.

25. What's the difference between a regular and irregular polygon?

A regular polygon has all congruent sides & interior ∠ measures.

26. Name the polygon by the number of sides.

a) 4 quadrilateral  b) 5 pentagon  c) 6 hexagon

d) 7 heptagon  e) 8 octagon  f) 12 do-decagon

27. Find the sum of the interior angles of a dodecagon.

$180 \cdot (12-2) = 180 \cdot 10 = 1800°$

28. Find the measure of one exterior angle of a regular heptagon.

$\frac{360}{7} =$ **51.4°**

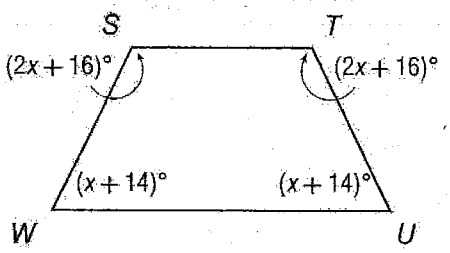
29. Find the measure of one interior angle of a regular octagon.

$180(8-2) = 180 \cdot 6 = 1080°$ $\quad \frac{1080}{8} =$ **135°/angle**

30. Find the sum of the measures of the exterior angles of a hexagon.

**360°**

31. Find the value of x.




$2(2x+16) + 2(x+14) = 360$

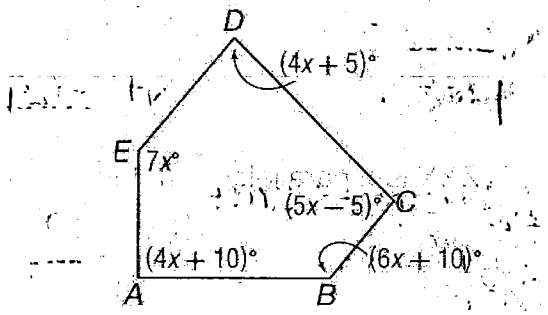
$4x+32+2x+28$

$6x+60=360$

$6x=300$

**X=50**

32. Solve for x. $180(3)=540°$



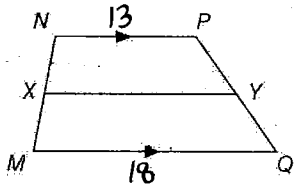

$4x+5x-5+6x+10+4x+10+7x=540$

$26x+20=540$

$26x=520$

**X=20**

33. If $NP = 13$ and $MQ = 18$, find $XY$.




$XY = \frac{13+18}{2} = \frac{31}{2}$

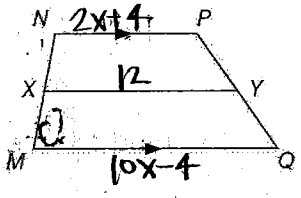
**XY=15.5**

34. In the following trapezoid, $NP = 2x + 4$, $MQ = 10x - 4$, and $XY = 12$. Solve for $x$.

$12 = \frac{2x+4+10x-4}{2}$

$24 = 12x$

$\boxed{x = 2}$



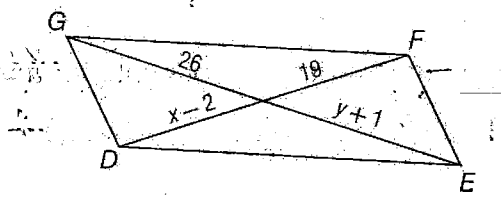

35. Figure is a parallelogram, Find $x$ and $y$.

$x - 2 = 19$

$\boxed{x = 21}$

$y + 1 = 26$

$\boxed{y = 25}$




36. $ABCD$ is a parallelogram, Find $x$ and $y$.

$x + 8 + 3x = 180$

$4x = 172$

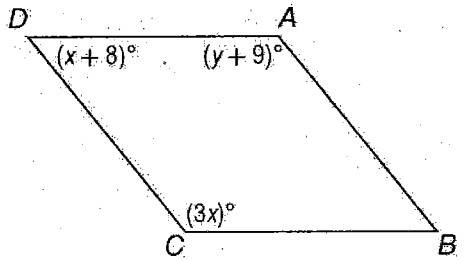
$\boxed{x = 43}$

$y + 9 = 3x$

$y + 9 = 3(43)$

$y + 9 = 129$

$\boxed{y = 120}$




37. $WZYX$ is a parallelogram, Find $a$ and $b$.

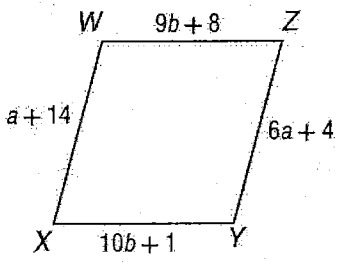
$a + 14 = 6a + 4$

$5a = 10$

$\boxed{a = 2}$

$9b + 8 = 10b + 1$

$\boxed{b = 7}$




**Chapter 7**

38. Solve the following proportion.

$\frac{x+1}{3} = \frac{x+2}{4}$

$3x + 6 = 4x + 4$

$\boxed{x = 2}$

39. Solve the following proportion.

$\frac{7}{8} = \frac{x+5}{x+4}$

$7x + 28 = 8x + 40$

$\boxed{x = -12}$

40. The ratio of the angle measures of a quadrilateral is 2:3:6:7. What are the angle measures?

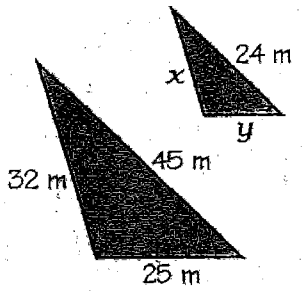
$2x+3x+6x+7x=360$

$18x=360$

$x=20$

$40°, 60°, 120°, 140°$

41. Find *x* and *y* in the following similar triangles.




$\frac{32}{x}=\frac{45}{24}$

$45x=32\cdot 24$

$45x=768$

$x=17.1$

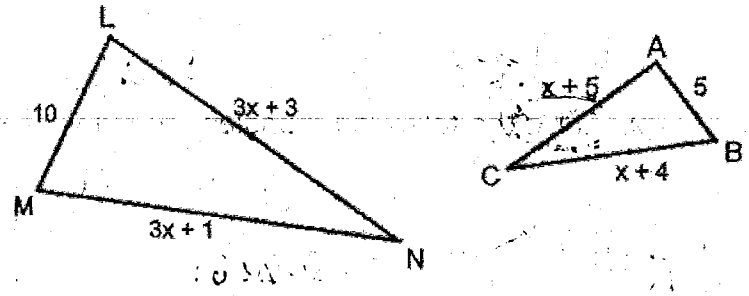
$\frac{25}{y}=\frac{45}{24}$

$45y=25\cdot 24$

$45y=600$

$y=13.3$

42. Given: $\triangle ABC \sim \triangle LMN$. What is AC? Show the work that supports your answer.




43. Thirty girls tried out for 15 spots on the basketball team. What is the ratio of open spots to the number of girls competing?

$\frac{\text{open}}{\text{girls}}: \frac{15}{30}=\frac{1}{2}$

44. The ratio of two complementary angles is 5:1. What are the measures of the two angles?

$5x+x=90$

$6x=90$

$x=15$

$15° \& 75°$

45. The ratio of two supplementary angles is 4:5. What are the measures of the two angles?

$4x+5x=180$

$9x=180$

$x=20$

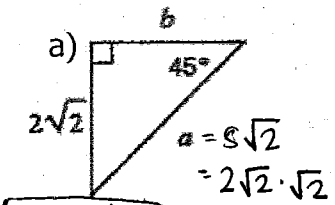
$80° \& 100°$

46. A soccer team won 22 games and lost 8. What is their win-loss ratio?

$\frac{W}{L}: \frac{22}{8} = \boxed{\frac{11}{4}}$

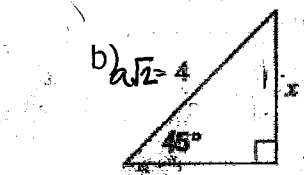
**Chapter 8**

47. Find the missing lengths of the following triangles.

a) 


$a = 4$

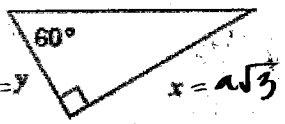
$b = 2\sqrt{2}$

b) 


$x = y = 2\sqrt{2}$

$4 = a\sqrt{2}$

$\frac{4\sqrt{2}}{2} = 2\sqrt{2}$

c) 


$8\sqrt{5} = 2a$

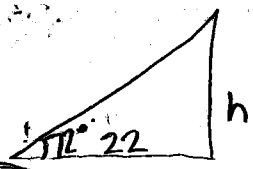
$a = 4\sqrt{5}$

$x = 4\sqrt{5} \cdot \sqrt{3}$

$y = 4\sqrt{5}$

$x = 4\sqrt{15}$

48. At 2:00pm, the shadow of a lighthouse is 22 feet long and its angle of elevation is 72°. How tall is the lighthouse?

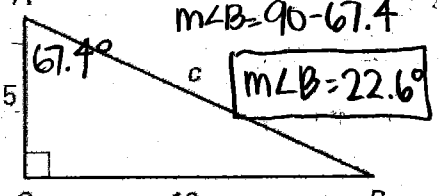



$\tan 72 = \frac{h}{22}$

$h = 22 \tan 72$

$h = 67.7$ feet

49. Solve the following triangles. Round your answers to the nearest tenth.

a. 


$\tan A = \frac{12}{5}$

$m\angle A = \tan^{-1}\left(\frac{12}{5}\right)$

$m\angle A = 67.4°$

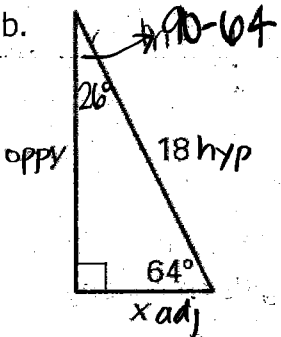
$m\angle B = 90 - 67.4$

$m\angle B = 22.6°$

$5^2 + 12^2 = c^2$

$25 + 144 = 169$

$c = 13$

b. 


$\sin 64 = \frac{y}{18}$

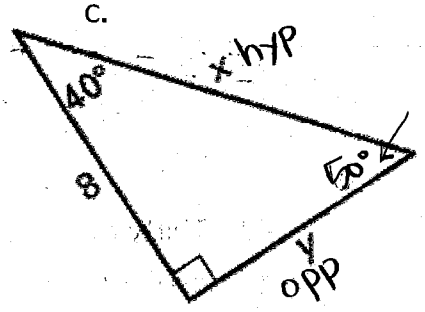
$y = 18 \sin 64$

$y = 16.2$

$\cos 64 = \frac{x}{18}$

$x = 18 \cos 64$

$x = 7.9$

c. 


$\tan 40 = \frac{y}{8}$

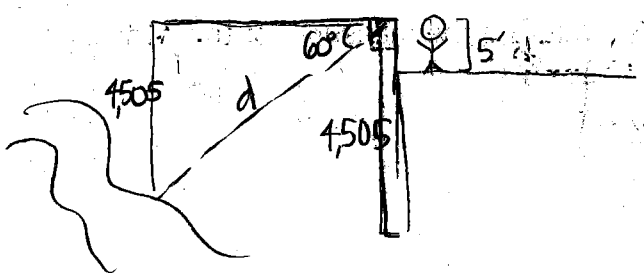
$y = 8 \tan 40$

$y = 6.7$

$x = \frac{8}{\cos 40}$

$x = 10.4$

50. Kailee, who is 5 feet tall, is standing on top of a canyon is that is 4,500 feet above a river. Her angle of depression to the river is 60°. What is the diagonal distance between Kailee and the river?




$\sin 60 = \frac{4505}{d}$

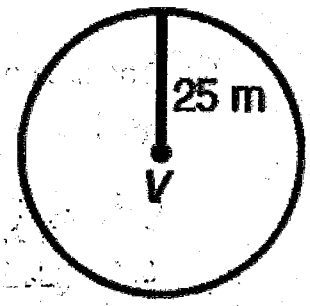
$d = \frac{4505}{\sin 60}$

$d = 5201.9$ ft

**Chapter 11**

Use circle V to answer #51-52.

51. Find the area of the circle. Leave your answer in terms of $\pi$.




$A=\pi r^2$

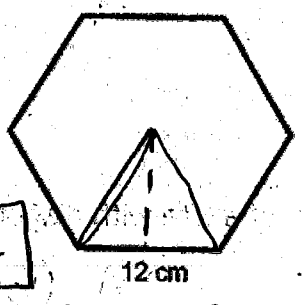
$A=(25)^2\pi$ $\quad$ $\boxed{A=625\pi\ m^2}$

52. Find the circumference of the circle. Leave your answer in terms of

$C=2\pi r$

$\boxed{C=50\pi\ m}$

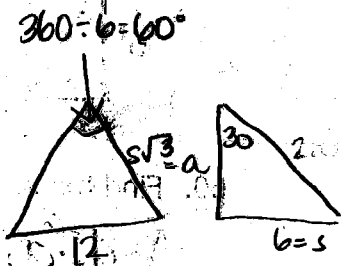
53. Find the area of the regular polygon.



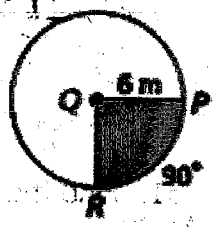

$P=12\cdot 6$ $\quad$ $A=\frac{1}{2}aP$

$P=72$ $\quad$ $A=\frac{1}{2}(6\sqrt{3})(72)$

$a=6\sqrt{3}$ $\quad$ $\boxed{A=216\sqrt{3}\approx 374.1\ cm^2}$



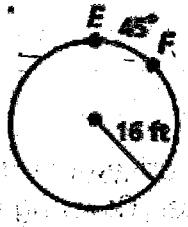

54. Find the area of Sector PQR. Leave your answers in terms of $\pi$




$\frac{A}{\pi r^2}=\frac{x}{360}\rightarrow\frac{A}{36\pi}=\frac{90}{360}=\frac{1}{4}$ $\quad$ $36\pi=4A$

$\boxed{A=9\pi\ m^2}$

55. Find the arc length of Arc EF. Leave your answers in terms of $\pi$.




$\frac{l}{2\pi r}=\frac{x}{360}\rightarrow\frac{l}{32\pi}=\frac{45}{360}$ $\quad$ $360l=1440\pi$

$\boxed{l=4\pi\ ft}$

56. The area of a trapezoid is 64 sq. in. One base is 10 in. and the height is 8 in. Find the length of the other base.

$A=\frac{1}{2}h(b_1+b_2)$ $\quad$ $64=\frac{1}{2}(8)(10+b_2)$

$\frac{64}{4}=\frac{4(10+b_2)}{4}$ $\quad$ $\boxed{b_2=6\ in}$

$16=10+b_2$

57. The area of a parallelogram is 84 sq. in. The base is 14 in. Find the height.

$A = b \cdot h$ $\quad 84 = 14h$

$\frac{84}{14} = \frac{14h}{14}$

$\boxed{h = 6 \text{ in}}$

58. The area of a triangle is 84 sq. in. The base is 12 in. Find the height.

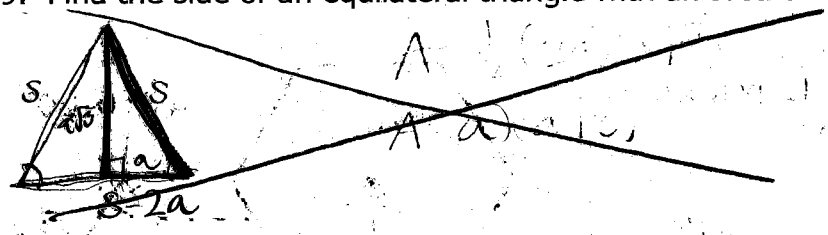
$84 = \frac{1}{2} b \cdot h$

$84 = \frac{1}{2}(12)(h)$

$84 = 6h$

$\boxed{h = 14 \text{ in}}$

59. Find the side of an equilateral triangle with an area of $16\sqrt{3}$ sq. in.

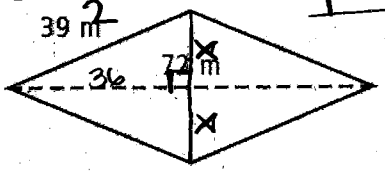



60. Find the area of a kite with diagonals (8x+7) cm and (14x−6) cm.

$A = \frac{d_1 \cdot d_2}{2}$ $\quad A = \frac{(8x+7)(14x-6)}{2} = \frac{112x^2 - 48x + 98x - 42}{2}$

$A = \frac{112x^2 + 50x - 42}{2}$ $\quad \boxed{A = 56x^2 + 25x - 21 \text{ cm}^2}$

61. Find the area of the rhombus.




$A = \frac{d_1 \cdot d_2}{2}$

$A = \frac{72 \cdot 30}{2}$ $\quad \boxed{1080 \text{ m}^2}$

$d_1 = 72$

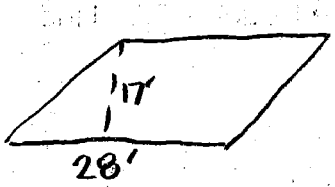
$d_2 = 2x = 30$

$39^2 = 36^2 + x^2$

$X = 225$

$x = 15$

62. A driveway is shaped like a parallelogram with a base of 28 feet and a height of 17 feet. Covering the driveway with crushed stone will cost $2.75 per square foot. How much will it cost to cover the driveway with crushed stone?




$A = b \cdot h$

$A = 28 \cdot 17$

$A = 476 \text{ ft}^2$

$\text{cost} = 2.75 \text{ per ft}^2$

$\text{cost} = 2.75(476)$

$\boxed{\$1309}$

63. Find the perimeter of a square in which A = 169 cm$^2$.

$A=s^2$

$169=s^2$

$s=13$

$P=4s$

$P=4\cdot 13$

$\boxed{P=52\text{ cm}}$

64. Find the perimeter of a rectangle with base (x+2) cm and height (x−1) cm.

$P=2b+2h$

$P=2(x+2)+2(x-1)$

$P=2x+4+2x-2$

$\boxed{P=4x+2\text{ cm}}$

65. Find the circumference of a circle with area $16x^2\pi\ in^2$.

$A=\pi r^2$

$\frac{16x^2\pi}{\pi}=\frac{\pi r^2}{\pi}$

$r^2=16x^2$ $\quad r=\sqrt{16x^2}=4x$

$C=2\pi r$

$C=2\pi(4x)$

$\boxed{C=8x\pi\text{ in}}$

66. Find the area of a triangle in which h = 7x in. and b = 6x in.

$A=\frac{1}{2}b\cdot h$

$A=\frac{1}{2}(6x)(7x)$

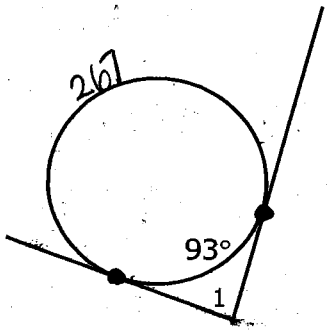
$A=3x\cdot 7x$

$\boxed{A=21x^2\ in^2}$

67. ~~Use Heron's Formula to find the area of a triangle with side lengths 7 in, 9 in, and 11 in.~~

**Chapter 10**

68. Solve for angle 1.

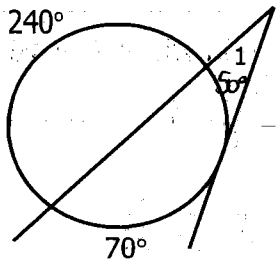



$m\angle 1=\frac{1}{2}(267-93)$

$m\angle 1=\frac{1}{2}(174)$

$m\angle 1=87°$

69. Solve for angle 1.

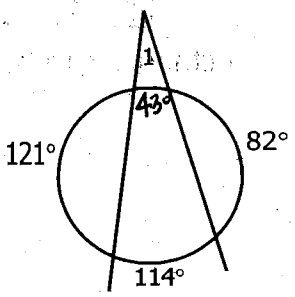



$m\angle 1 = \frac{1}{2}(70-50)$

$m\angle 1 = \frac{1}{2}(20)$

$\boxed{m\angle 1 = 10°}$

70. Solve for angle 1.

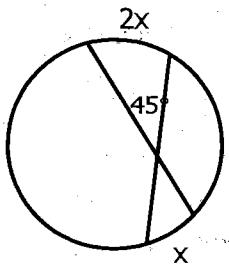



$m\angle 1 = \frac{1}{2}(114-43)$

$m\angle 1 = \frac{1}{2}(71)$

$\boxed{m\angle 1 = 35.5°}$

71. Solve for x.



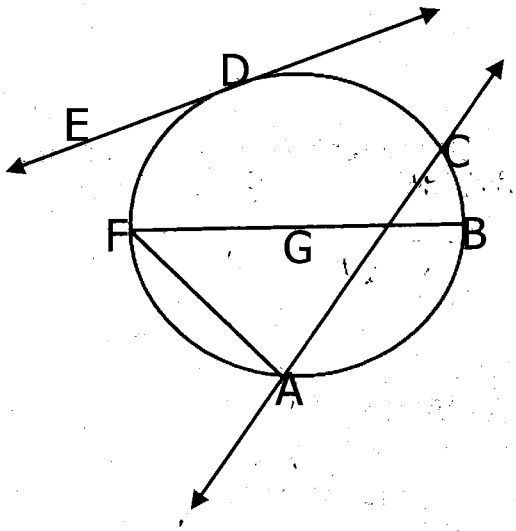

$m\angle 1 = \frac{1}{2}(x+y)$

$45 = \frac{1}{2}(2x+x)$

$90 = 3x$

$\boxed{x = 30}$

72. Give the correct name for each of the following:




$\overline{CA}$ secant

$\overline{CA}$ Chord

$\angle BFA$ Inscribed angle

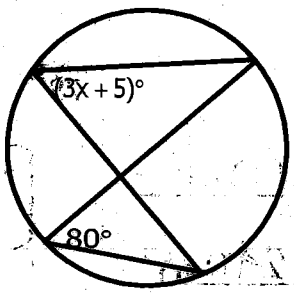
$\overset{\frown}{FDA}$ Major arc

$\overset{\frown}{CD}$ Arc (minor)

$\overline{DE}$ Tangent

$\overline{FG}$ Radius

73. Solve for x.

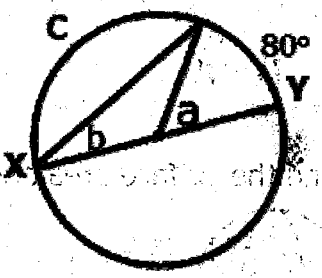



$3x+5=80$

$3x=75$

$\boxed{x=25}$

74. $\overline{XY}$ is a diameter. Find the measures of angles a, b, and arc c.




a = 80°

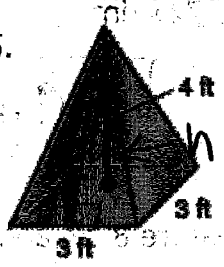
b = 40°

c = 100°

**Chapter ~~14~~ 12**

Find the surface area and volume of each figure below. Leave answer in terms of $\pi$.

75.




S = 33ft²

V = 11.1 ft³

$S=\frac{1}{2}Pl+B$

$P=3\cdot4$ $B=3^2$

$P=12$ $B=9$

$S=\frac{1}{2}(12)(4)+9$

$S=6\cdot4+9$

$S=24+9$

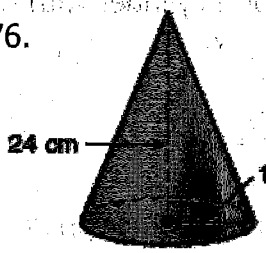
$V=\frac{Bh}{3}$

$V=\frac{(9)(3.7)}{3}$

$h^2=4^2-1.5^2$

$h=3.7$

76.




S = 360π cm²

V = 800π cm³

$S=\frac{1}{2}Pl+B$

$S=\frac{1}{2}(20\pi)(26)+100\pi$

$P=2\pi r$ $B=\pi r^2$

$P=20\pi$ $B=100\pi$

$l^2=24^2+10^2$

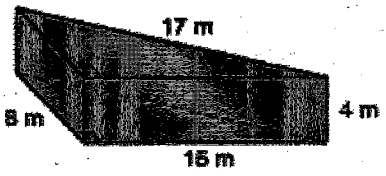
$l^2=676$

$l=26$

$V=\frac{Bh}{3}$

$V=\frac{(100\pi)(24)}{3}$

77.




S = 280 m²

V = 240 m³

$S = Ph + 2B$

$S = (40)(4) + 2(60) = 160 + 120$

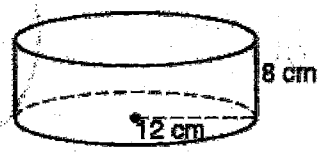
$P = 15 + 8 + 17$ $B = \frac{1}{2}(15)(8)$

$P = 40$ $B = 60$

$V = Bh$

$V = (60)(4)$

78.




S = 480π cm²

V = 1152π cm³

$S = Ph + 2B$

$S = (24\pi)(8) + 2(144\pi)$

$P = 2\pi r$ $B = \pi r^2$

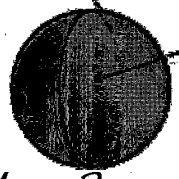
$P = 24\pi$ $B = 144\pi$

$192\pi + 288\pi$

$V = Bh$

$V = (144\pi)(8)$

79. Find the surface area and volume of the sphere to the nearest tenth.




S = 676π ft²

V = 2929.3π ft³

$S = 4\pi r^2$

$S = 4\pi(13)^2$

$V = \frac{4\pi r^3}{3}$ $V = \frac{4\pi(13)^3}{3}$

80. Find the height of a cylinder with radius 3 inches and surface area 72π in²

$S = 2\pi rh + 2\pi r^2$

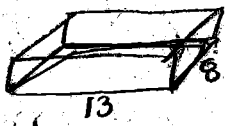
$72\pi = 2\pi(3)h + 2\pi(3)^2$

$72\pi = 6\pi h + 18\pi$

$\frac{54\pi}{6\pi} = \frac{6\pi h}{6\pi}$

**h = 9 in**

81. The volume of a rectangular prism is 572 cm³. The base edges measure 8 cm and 13 cm. Find the surface area.




$V = Bh$

$572 = 104h$

$h = 5.5$

$B = 13 \cdot 8$

$B = 104$

$S = Ph + 2B$ $P = 2(8) + 2(13)$

$S = 42(5.5) + 2(104)$ $P = 42$

$S = 231 + 208$

**S = 439 cm²**

82. Find the slant height of a square pyramid with base edge length 96 yd and surface area 19,200 yd².

$S = \frac{1}{2}Pl + B$

$19{,}200 = \frac{1}{2}(384)l + 9216$

$9984 = 192l$

**l = 52 yd**

$4.96 = 384$ $P = 4s$ $B = s^2 = 96^2 = 9216$

83. Find the radius of a cone with volume 2916π mm³ and height 27mm.

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

$2916 = \frac{1\pi r^2(27)}{3}$

$324 = r^2$

$\frac{2916\pi}{9\pi} = \frac{\pi r^2(9)}{9\pi}$

**r = 18 mm**