Name: Key Period: _____

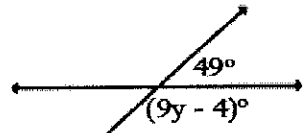
ANALYTIC GEOMETRY

MIDTERM REVIEW GUIDE

UNIT 1 REVIEW FOR ANALYTIC GEOMETRY MIDTERM

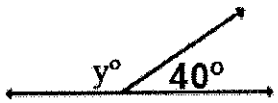
Solve for the missing variable:

3.



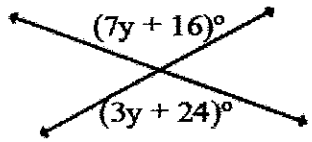
$9y-4+49=180$
$9y+45=180$
$-45 \quad -45$
$\frac{9y}{9}=\frac{135}{9}$ $y=15$

4.



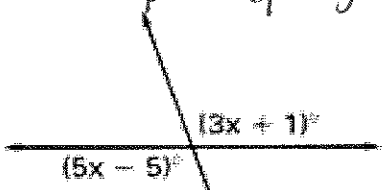
$y+40=180$
$-40 \quad -40$
$y=140$

5.



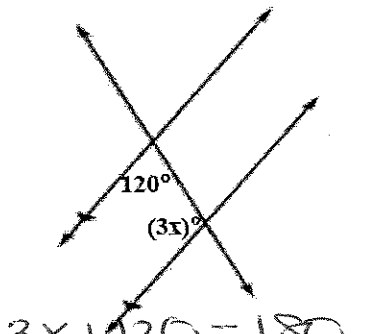
$7y+16=3y+24$
$-3y-16 \quad -3y-16$
$\frac{4y}{4}=\frac{8}{4}$ $y=2$

7.



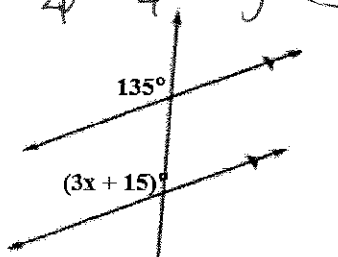
$5x-5=3x+1$
$-3x+5 \quad -3x+5$
$\frac{2x}{2}=\frac{6}{2}$
$x=3$

8.



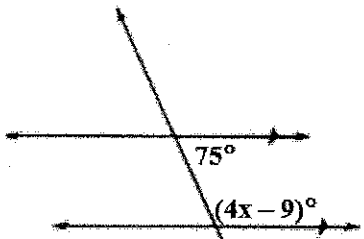
$3x+120=180$
$-120 \quad -120$
$\frac{3x}{3}=\frac{60}{3}$
$x=20$

9.



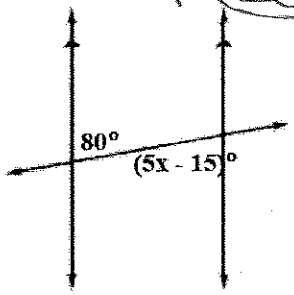
$3x+15=135$
$-15 \quad -15$
$\frac{3x}{3}=\frac{120}{3}$
$x=40$

10.



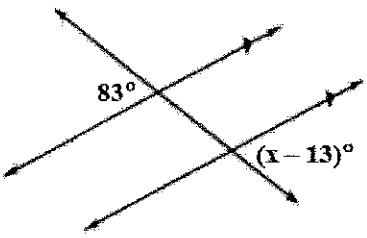
$75+4x-9=180$
$66+4x=180$
$-66 \quad -66$
$\frac{4x}{4}=\frac{114}{4}$
$x=28.5$

11.



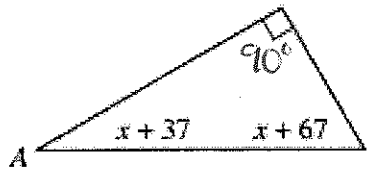
$5x-15=80$
$+15 \quad +15$
$\frac{5x}{5}=\frac{95}{5}$
$x=19$

12.



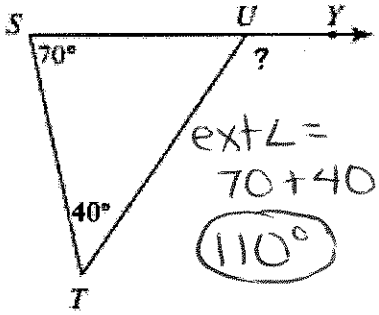
$x-13=83$
$+13 \quad +13$
$x=96$

13.



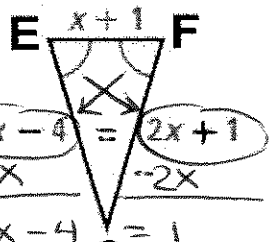
$x+37+x+67+90=180$
$2x+194=180$
$-194 \quad -194$
$\frac{2x}{2}=\frac{-14}{2}$
$x=-7$

14.

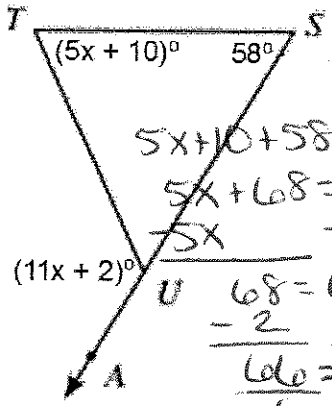


ext∠ =
$70+40$
$110°$

15.



$-2x \quad -2x$
$x-4=1$
$+4 \quad +4$
$x=5$

16. 

$5x+10+58=11x+2$

$5x+68=11x+2$

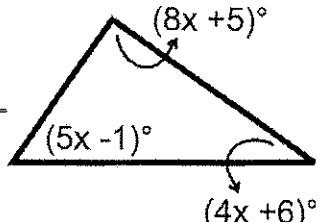
$-5x \quad -5x$

$68=6x+2$

$-2 \quad -2$

$\frac{66}{6}=\frac{6x}{6}$

$11=x$

17. 

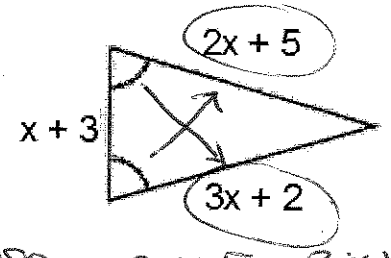
$8x+5+5x-1+4x+6=180$

$17x+10=180$

$-10 \quad -10$

$\frac{17x}{17}=\frac{170}{17}$

$x=10$

18. 

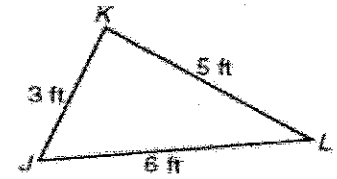
$2x+5=3x+2$

$-2x \quad -2x$

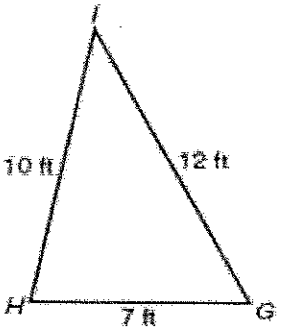
$\frac{5}{-2}=\frac{x+2}{-2}$

$3=x$

24. Are the triangles below similar? Why or Why not? Be sure to show your ratios if required.

a. 

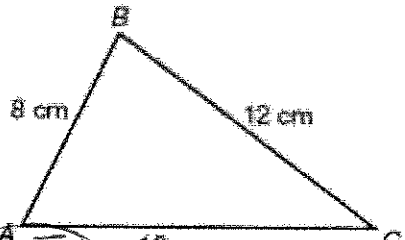
$\frac{3}{7}=.43$



$\frac{5}{10}=.5$

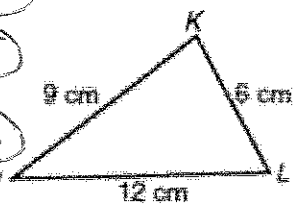
$\frac{6}{12}=.5$

Not similar because all 3 sides are not proportional

b. 

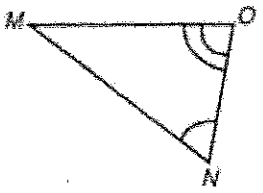
$\frac{8}{6}=1.3$

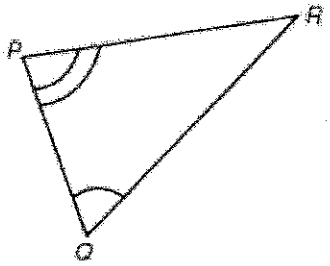
$\frac{12}{9}=1.3$



$\frac{16}{12}=1.3$

Similar using SSS Similarity Theorem

c. 



Similar using AA Similarity Postulate

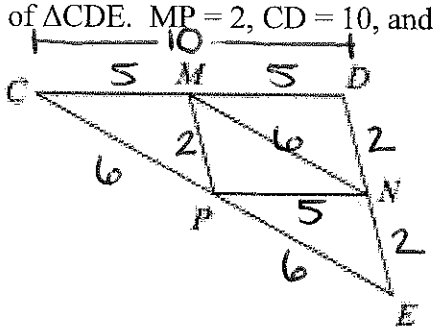
20. MP, MN, and PN are midsegments of ΔCDE. MP = 2, CD = 10, and PE = 6

PN // CD

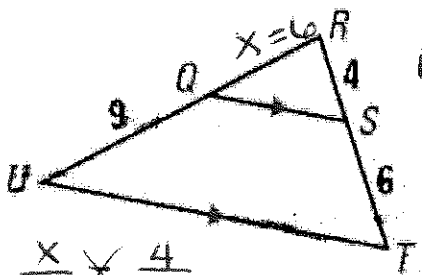
MN = 6

DE = 4

PN = 5



19. Find the length of UR.



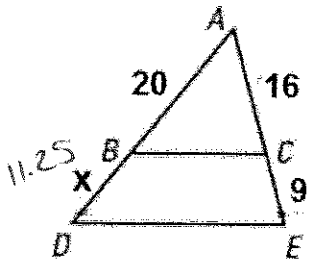
$UR=9+6$

$=15$

$\frac{x}{9}=\frac{4}{6}$

$\frac{6x}{6}=\frac{36}{6} \quad x=6$

20. Find the length of AD.



$\frac{20}{x}=\frac{16}{9}$

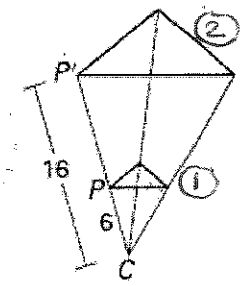
$\frac{180}{16}=\frac{16x}{16}$

$11.25=x$

$AD=20+11.25$

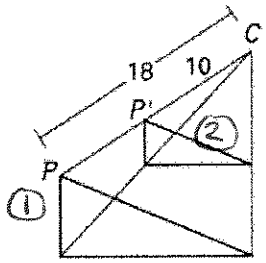
31.25

21. Identify the dilation and the scale factor of the following:

a. 

Dilation: enlargement

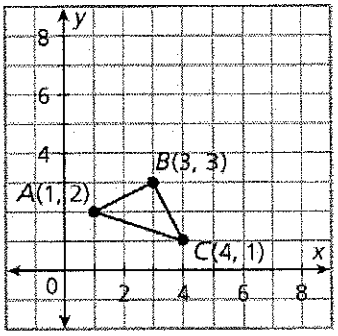
Scale Factor: $k = \frac{P'}{P} = \frac{16}{6} = \frac{8}{3}$ 2.6

b. 

Dilation: reduction

Scale Factor: $k = \frac{P'}{P} = \frac{10}{18} = \frac{5}{9}$ .5

22. Given the following has a scale factor of k = 2, what would the new coordinates be?

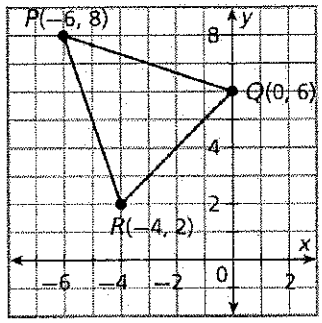


A' (2, 4)

B' (6, 6)

C' (8, 2)

23. Given the following has a scale factor of k = ½ , what would the new coordinates be?



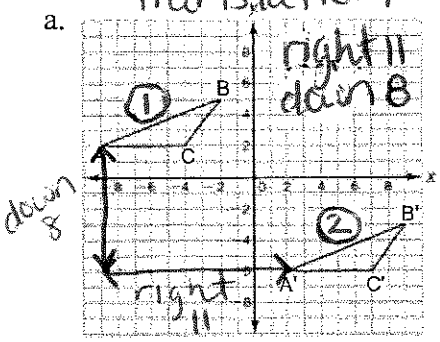
P' (−3, 4)

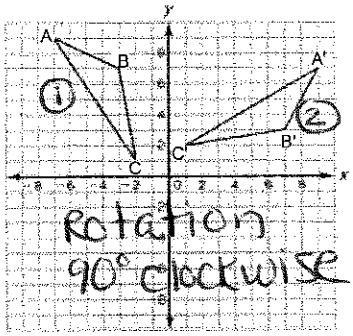
Q' (0, 3)

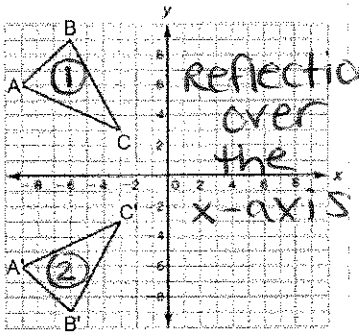
R' (−2, 1)

23. Identify the transformation that takes place. Be Specific… for example, what type of reflection, what type of transformation (left 2 up 1 for example), what type of rotation?

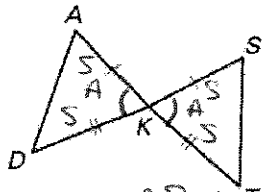
a. Translation



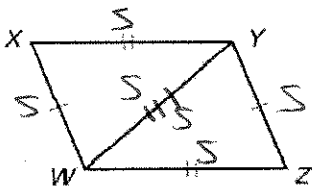
b. 

c. 

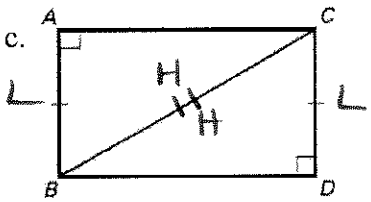
25. Are the triangles below congruent? Justify your answer:

a. 

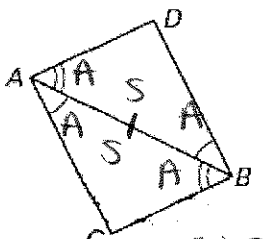
yes, SAS cong.

b. 

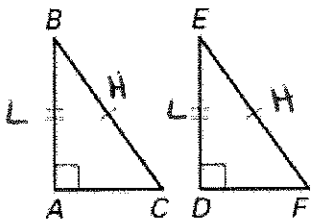
yes, SSS cong.

c. 

yes, HL cong.

d. 

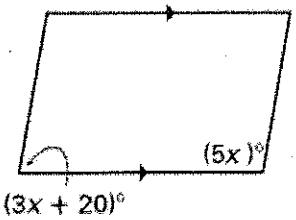
yes, ASA cong

e. 

yes, HL cong.

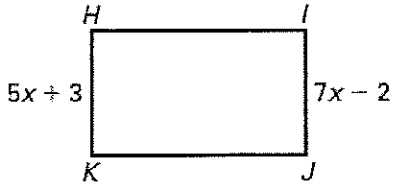
28. Use properties of quadrilaterals and parallelograms to find the missing variable(s):

a. Parallelogram



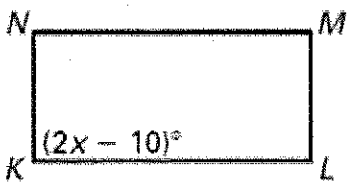
$3x+20+5x=180$
$8x+20=180$
$-20 \quad -20$
$\frac{8x}{8}=\frac{160}{8}$
$x=20$

b. Rectangle HIJK



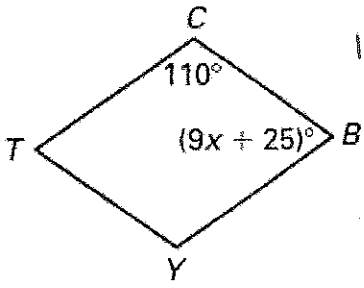
$5x+3=7x-2$
$-5x \quad -5x$
$3=2x-2$
$+2 \quad +2$
$\frac{5}{2}=\frac{2x}{2}$
$x=2.5$

c. Rectangle NMLK



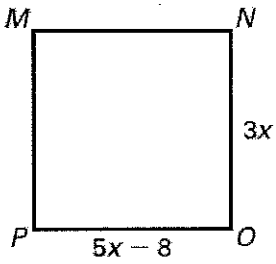
$2x-10=90$
$+10 \quad +10$
$\frac{2x}{2}=\frac{100}{2}$
$x=50$

g. Rhombus



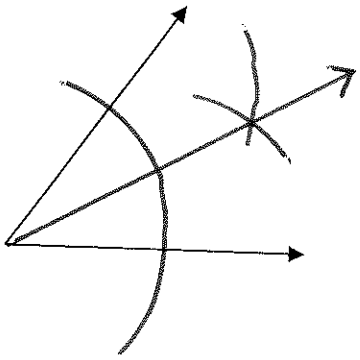
$110+9x+25=180$
$135+9x=180$
$-135 \quad -135$
$\frac{9x}{9}=\frac{45}{9}$
$x=5$

h. Square

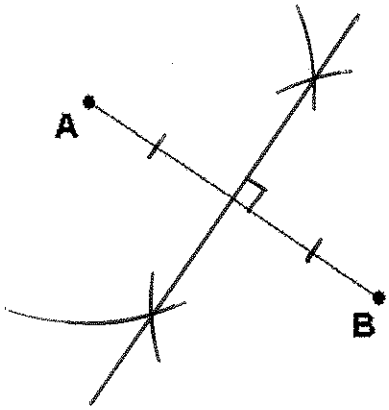


$3x+14=5x-8$
$-3x \quad -3x$
$14=2x-8$
$+8 \quad +8$
$\frac{22}{2}=\frac{2x}{2}$
$11=x$

Construct an Angle Bisector:



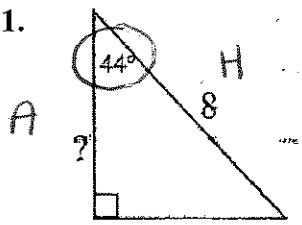
Construct a Perpendicular Bisector:



UNIT 2 REVIEW FOR ANALYTIC GEOMETRY MIDTERM

Find the missing side or angle for each of the following: $\sin\theta = \frac{opp}{hyp}$ $\cos\theta = \frac{adj}{hyp}$ $\tan\theta = \frac{opp}{adj}$

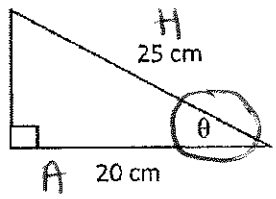
1.



$(8)\cos 44 = \frac{x}{8}(8)$

$5.755 = x$

2.

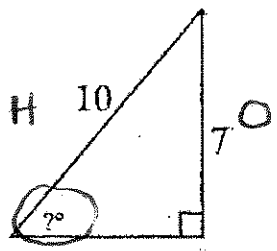


$\cos\theta = \frac{20}{25}$

$\theta = \cos^{-1}\left(\frac{20}{25}\right)$

$\theta = 36.87°$

3.

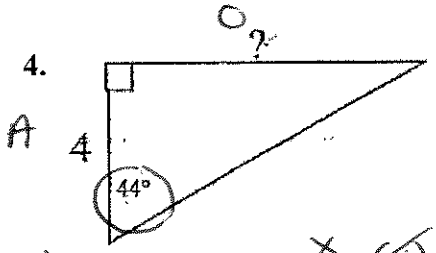


$\sin\theta = \frac{7}{10}$

$\theta = \sin^{-1}\left(\frac{7}{10}\right)$

$\theta = 44.427°$

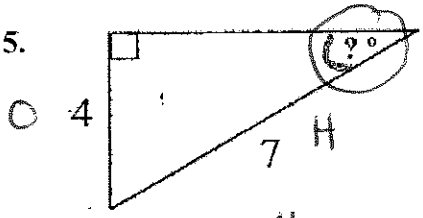
4.



$(4)\tan 44 = \frac{x}{4}(4)$

$3.863 = x$

5.

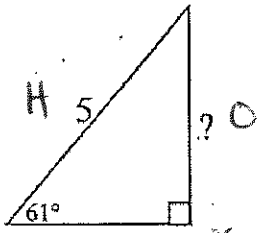


$\sin\theta = \frac{4}{7}$

$\theta = \sin^{-1}\left(\frac{4}{7}\right)$

$\theta = 34.85°$

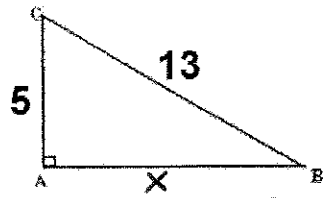
6.



$(5)\sin 61 = \frac{x}{5}(5)$

$4.373 = x$

7.



$5^2 + x^2 = 13^2$

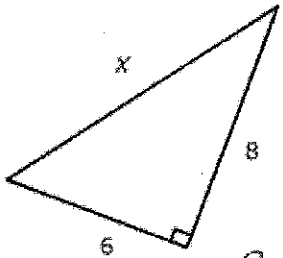
$25 + x^2 = 169$

$-25 \quad -25$

$\sqrt{x^2} = \sqrt{144}$

$x = 12$

8.

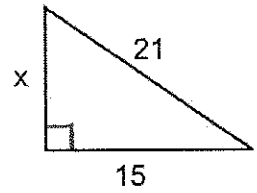


$6^2 + 8^2 = x^2$

$\sqrt{100} = \sqrt{x^2}$

$10 = x$

9.



$x^2 + 15^2 = 21^2$

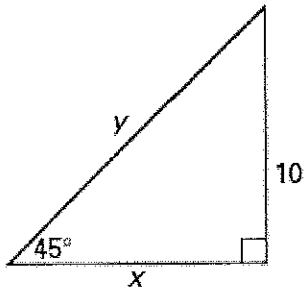
$x^2 + 225 = 441$

$-225 \quad -225$

$\sqrt{x^2} = \sqrt{216}$

$x = 6\sqrt{6}$ or 14.697

10.

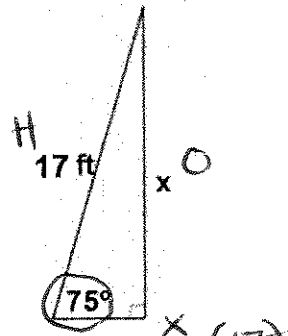


$x = 10$

$y = 10\sqrt{2}$

special Right Δ

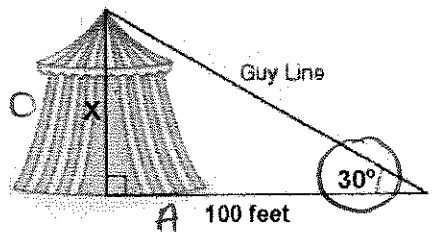
11.



$(17)\sin 75 = \frac{x}{17}(17)$

$16.421 = x$

12.

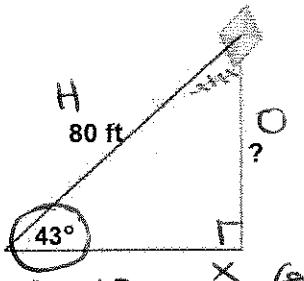


$(100)\tan 30 = \frac{x}{100}(100)$

$57.735 = x$

or $\frac{100\sqrt{3}}{3}$ ← if you use spec. Right Δ's

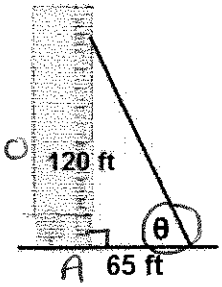
13.



$(80)\ \sin 43 = \frac{x}{80}(80)$

$54.56 = x$

14.



$\tan\theta = \frac{120}{65}$

$\theta = \tan^{-1}\left(\frac{120}{65}\right)$

$\theta = 61.557°$

15.

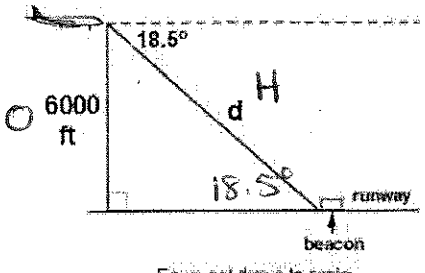


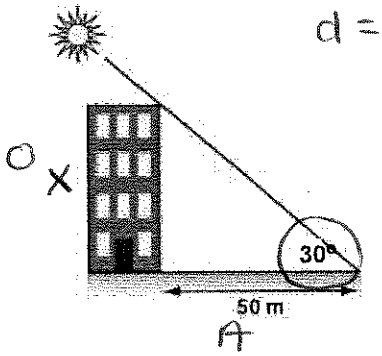
Figure not drawn to scale

$\sin 18.5 = \frac{6000}{d}$

$d = \frac{6000}{\sin 18.5}$

$d = 18{,}909.272$ ft

16. If the shadow of this building is 50 meters long when the angle of elevation to the sun is **30°** what is the approximate height, in meters, of the building?



$(50)\ \tan 30 = \frac{x}{50}(50)$

$\frac{50\sqrt{3}}{3} = x$

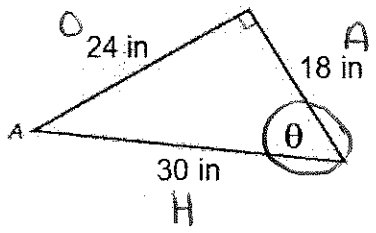
OR 28.868 m

17. Find the following trigonometric ratios (simplify):

$\text{Sin}\,\Theta = \frac{O}{H} = \frac{24}{30} = \frac{4}{5}$

$\text{Cos}\,\Theta = \frac{A}{H} = \frac{18}{30} = \frac{3}{5}$

$\text{Tan}\,\Theta = \frac{O}{A} = \frac{24}{18} = \frac{4}{3}$



18. Given Δ HIJ ~ Δ KLM and sin (∠J) = 2/9, find sin (∠M) $\frac{2}{9}$

↑ ↑ same position

19. If $\cos(x) = \sin(45°)$, what is the value of x? $45°$

$90 - 45$

20. If $\sin(x) = \cos(27°)$, what is the value of x? $63°$

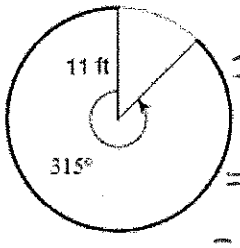
$90 - 27$

21. If $\cos(x) = \sin(45°)$, what is the value of x? $45°$

$90 - 45$

UNIT 3 REVIEW FOR ANALYTIC GEOMETRY MIDTERM

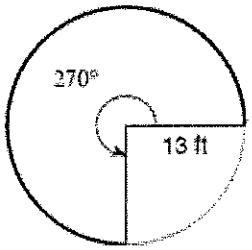
Find the length of each arc:

1. 

$\frac{2\pi(11)(315)}{360}$

$= \frac{77\pi}{4}$

$= 60.476$ ft.

2. 

$\frac{2\pi(13)(270)}{360}$

$= \frac{39\pi}{2}$

$= 61.261$ ft

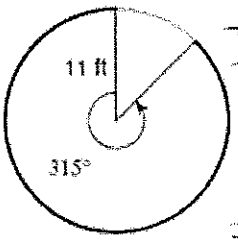
Arc Length of a Circle

Arc Length $= \frac{2\pi r\theta}{360}$

Area of a Sector of a Circle

Area of Sector $= \frac{\pi r^2\theta}{360}$

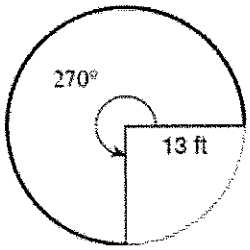
Find the area of each sector:

3. 

$\frac{\pi(11)^2(315)}{360}$

$= \frac{847\pi}{8}$

$= 332.616$ ft²

4. 

$\frac{\pi(13)^2(270)}{360}$

$= \frac{507\pi}{4}$

$= 398.197$ ft²

Volume

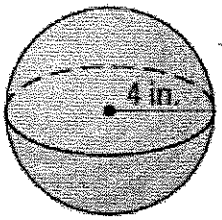
Cylinder $V = \pi r^2 h$

Pyramid $V = \frac{1}{3}Bh$

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

Sphere $V = \frac{4}{3}\pi r^3$

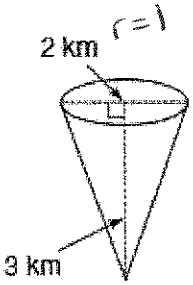
Find the Volume of the following:

5. 

$\frac{4}{3}\pi(4)^3$

$= \frac{256\pi}{3}$

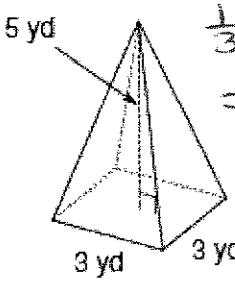
$= 268.083$ in³

6. 

$\frac{1}{3}\pi(1)^2(3)$

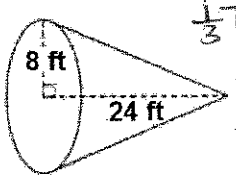
$= \pi$

$= 3.142$ km³

7. 

$\frac{1}{3}(3)(3)(5)$

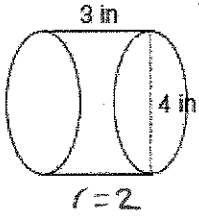
$= 15$ yd³

8. 

$\frac{1}{3}\pi(8)^2(24)$

$= 512\pi$

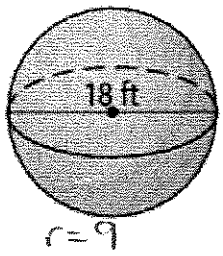
$= 1608.495$ ft³

9. 

$\pi(2)^2(3)$

$= 12\pi$

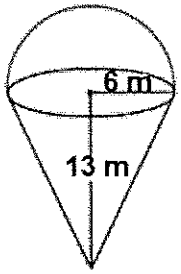
$= 37.699$ in³

10. 

$\frac{4}{3}\pi(9)^3$

$= 972\pi$

$= 3053.628$ ft³

11. 

Hemisphere

$\frac{4}{3}\pi(6)^3 \div 2$

$= 288\pi \div 2$

$= 144\pi$

$= 452.389$

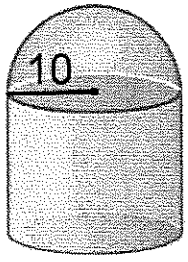
cone

$\frac{1}{3}\pi(6)^2(13)$

$= 156\pi = 490.088$

$452.389 + 490.088$

942.477 m³

12. 

Hemisphere

$\frac{4}{3}\pi(10)^3 \div 2$

$= 4188.790 \div 2$

$= 2094.395$

cylinder

$\pi(10)^2(16)$

1600π

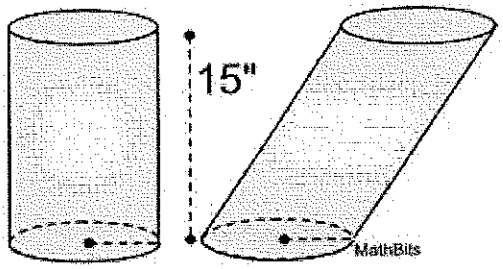
5026.548

$2094.395 + 5026.548$

7120.943 units³

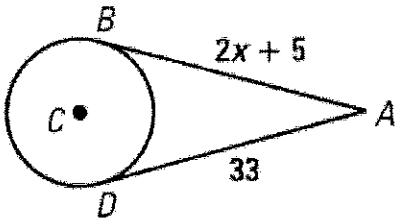
13. **Given Cylinder 1 and Cylinder 2 have the same height and the same radius what woud you know about their volume? (Would cylinder 1's volume be greater or less than the volume of cylinder 2 or would it be exactly the same?)**

The volumes would be exactly the same.



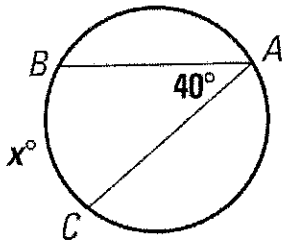
Find the missing value:

14.



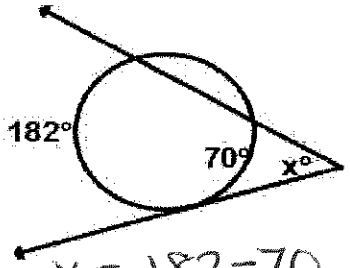
$2x+5 = 33$
$-5 \quad -5$
$\frac{2x}{2} = \frac{28}{2}$
$x = 14$

15.



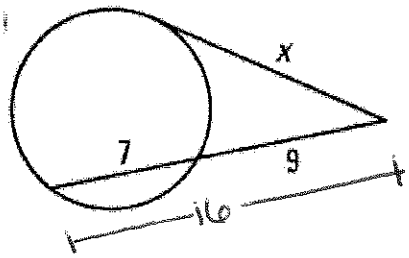
$x = 40(2)$
$x = 80°$

16.



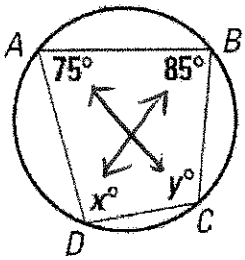
$x = \frac{182-70}{2}$
$x = 56°$

17.



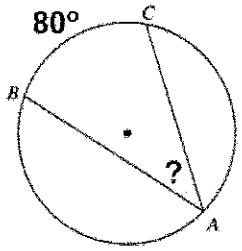
$9(16) = x(x)$
$144 = x^2$
$\sqrt{144} = \sqrt{x^2}$
$12 = x$

18.



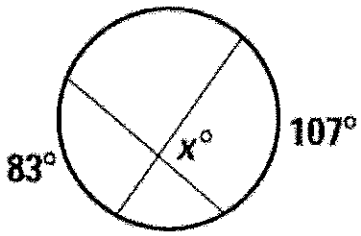
$x+85=180$ $\quad$ $y+75=180$
$-85 \quad -85$ $\quad$ $-75 \quad -75$
$x = 95$ $\quad$ $y = 105$

19.



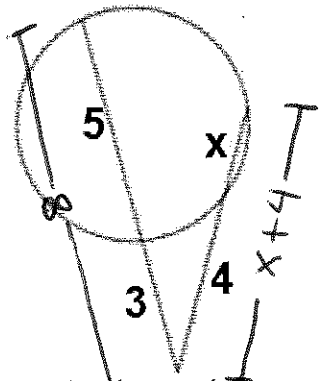
$x = \frac{80}{2}$
$x = 40°$

20.



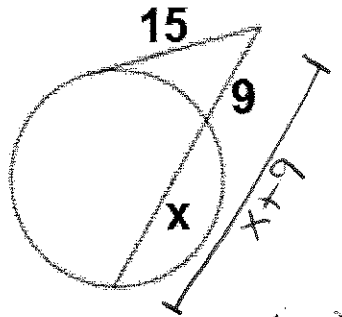
$\frac{83+107}{2} = x$
$95 = x$

21.



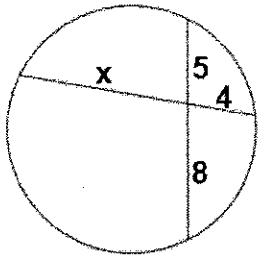
$3(8) = 4(x+4)$
$24 = 4x+16$
$-16 \quad -16$
$\frac{8}{4} = \frac{4x}{4}$
$x = 2$

22.



$9(x+9) = 15(15)$
$9x+81 = 225$
$-81 \quad -81$
$\frac{9x}{9} = \frac{144}{9}$
$x = 16$

23.

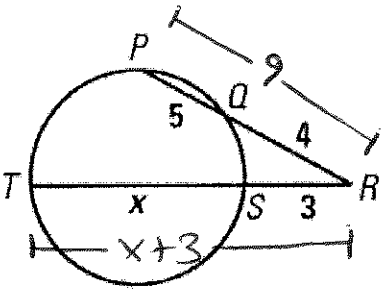


$5(8) = 4(x)$

$\frac{40}{4} = \frac{4x}{4}$

$10 = x$

24.



$4(9) = 3(x+3)$

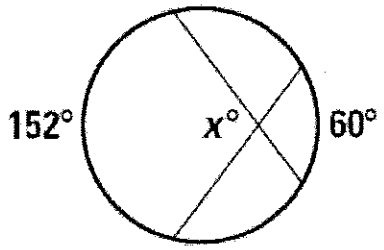
$36 = 3x + 9$

$-9 \quad -9$

$\frac{27}{3} = \frac{3x}{3}$

$9 = x$

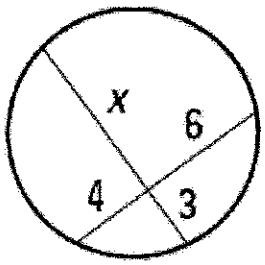
25.



$\frac{152 + 60}{2} = x$

$106 = x$

26.

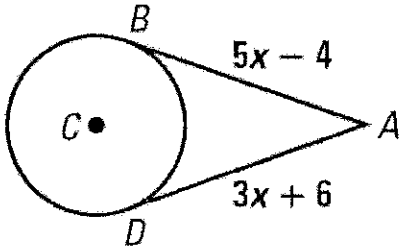


$4(6) = 3(x)$

$\frac{24}{3} = \frac{3x}{3}$

$8 = x$

27.



$5x - 4 = 3x + 6$

$-3x \quad -3x$

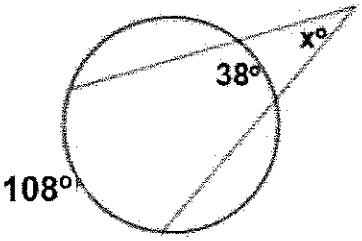
$2x - 4 = 6$

$+4 \quad +4$

$\frac{2x}{2} = \frac{10}{2}$

$x = 5$

28.



$x = \frac{108 - 38}{2}$

$x = 35$

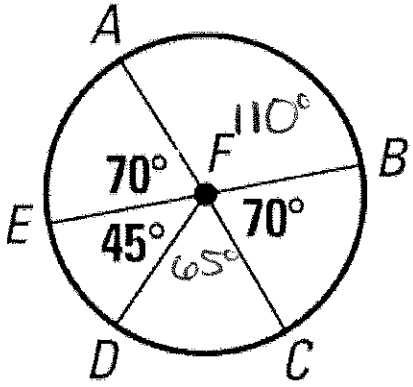
29. **Find the measure of the following:**

$\overset{\frown}{m\,AE} = 70°$

$\overset{\frown}{m\,AB} = 110°$

$\overset{\frown}{m\,ABC} = 180°$

$\overset{\frown}{m\,EC} = 110°$



UNIT 4 REVIEW FOR ANALYTIC GEOMETRY MIDTERM

1. $(7x + 4) + (3x - 6)$

$10x - 2$

2. $(3x - 3)(3x + 8)$

$9x^2 + 24x$
$-9x - 24$

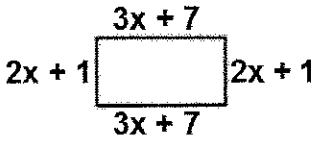
$9x^2 + 15x - 24$

3. $(8x^2 - 7x + 8) - (-3x^2 + 7x - 2)$

$8x^2 - 7x + 8 + 3x^2 - 7x + 2$

$11x^2 - 14x + 10$

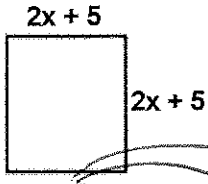
4. **Find the perimeter:**



$3x + 7$
$2x + 1$
$3x + 7$
$+ 2x + 1$

$10x + 16$ units

5. **Find the area:**

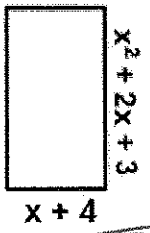


$(2x+5)(2x+5)$

$4x^2 + 10x + 10x + 25$

$4x^2 + 20x + 25$ units^2

6. **Find the area:**

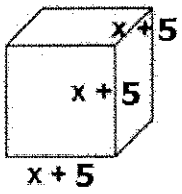


$(x+4)(x^2+2x+3)$

$x^3 + 2x^2 + 3x$
$4x^2 + 8x + 12$

$x^3 + 6x^2 + 11x + 12$ units^2

7. **Find the volume:**



$(x+5)(x+5)$

$x^2 + 5x + 5x + 25$

$x^2 + 10x + 25$

$(x+5)(x^2+10x+25)$

$x^3 + 10x^2 + 25x$
$5x^2 + 50x + 125$

$x^3 + 15x^2 + 75x + 125$ units^3

Simplify the following Radicals:

8. $\sqrt{27}$

$\sqrt{3}\sqrt{9}$
$\sqrt{3}\sqrt{3}$

$3\sqrt{3}$

9. $\sqrt{32}$

$\sqrt{2}\sqrt{16}$
$\sqrt{4}\sqrt{4}$

$4\sqrt{2}$

10. $\sqrt{24}$

$\sqrt{2}\sqrt{12}$
$\sqrt{2}\sqrt{6}$
$\sqrt{2}\sqrt{3}$

$2\sqrt{2 \cdot 3}$

$2\sqrt{6}$

11. $\frac{8}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}}$

$\frac{8\sqrt{5}}{5}$

12. $\frac{7}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$

$\frac{7\sqrt{3}}{3}$

13. $\frac{8}{3\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

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

$\frac{8\sqrt{2}}{6}$

$\frac{4\sqrt{2}}{3}$

14. $-8\sqrt{5} - 12\sqrt{5}$

$-20\sqrt{5}$

15. $2\sqrt{3} + 4\sqrt{27}$

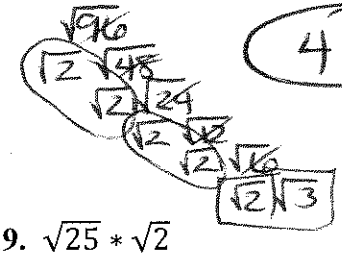
$2\sqrt{3}+4(3\sqrt{3})$

$2\sqrt{3}+12\sqrt{3}$

$14\sqrt{3}$

$3\sqrt{3}$

16. $\sqrt{12} * \sqrt{8}$



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

$4\sqrt{6}$

17. $3\sqrt{11} + 9\sqrt{11}$

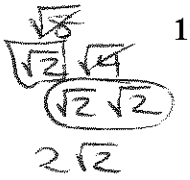
$12\sqrt{11}$

18. $2\sqrt{2} + 2\sqrt{8}$

$2\sqrt{2}+2(2\sqrt{2})$

$2\sqrt{2}+4\sqrt{2}$

$6\sqrt{2}$



$2\sqrt{2}$

19. $\sqrt{25} * \sqrt{2}$

$\sqrt{50}$

$\sqrt{2}\ \sqrt{25}$

20. What will be the end result when an irrational number is multiplied by a nonzero rational number?

Irrational

21. What will be the end result when a rational number is multiplied to another rational number?

Rational

22. What will be the end result when a rational number is added to another rational number?

Rational

Identify the following as rational or irrational:

23. $\frac{\pi}{\pi} = 1$

Rational

24. $\frac{2\sqrt{2}}{3} * \frac{4}{\sqrt{2}} = \frac{8}{3}$

Rational

25. $3 + 0.111\ldots$

Rational

26. $\sqrt{81} * \sqrt{25}$

$9 \cdot 5 = 45$

Rational

27. $\sqrt{5} + 0.\overline{5}$

Irrational

28. 25.123685841…

Irrational

29. π

Irrational

30. $-\sqrt{5} + \sqrt{5} = 0$

Rational