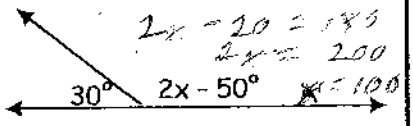
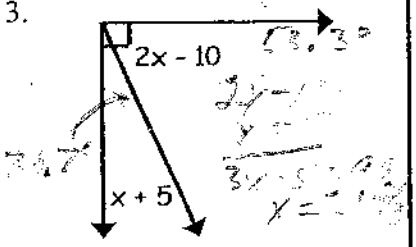
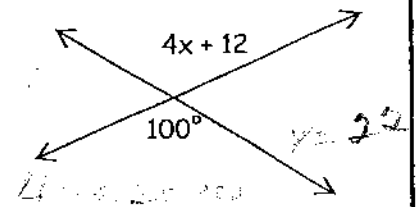
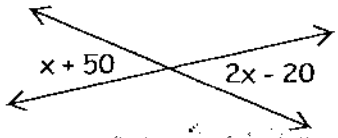
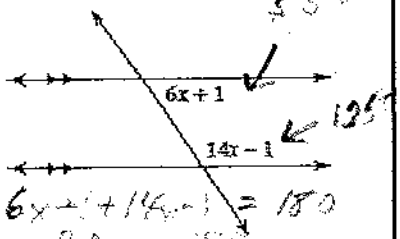
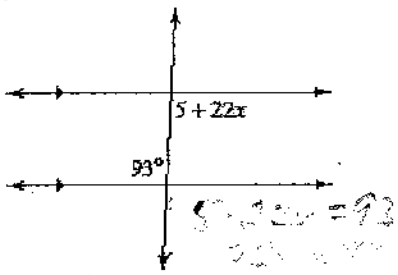
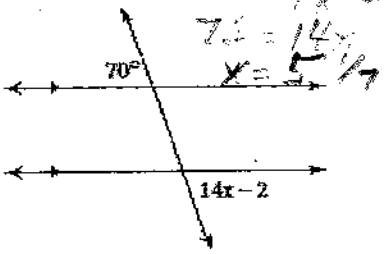
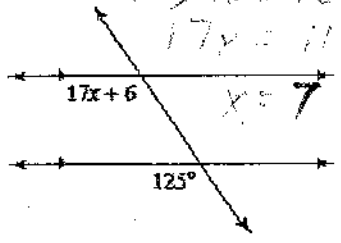
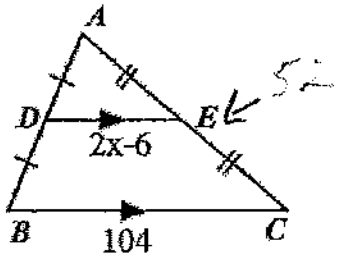
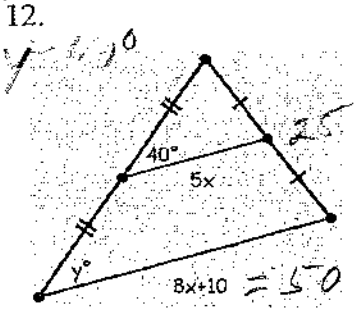
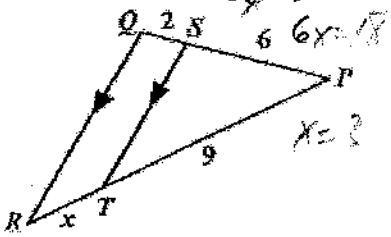
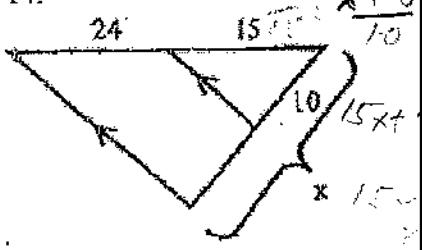
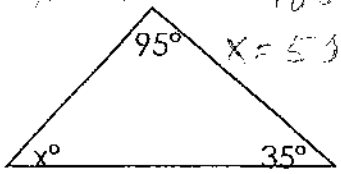
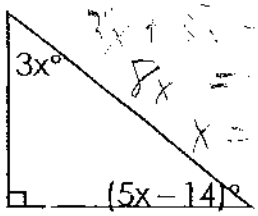
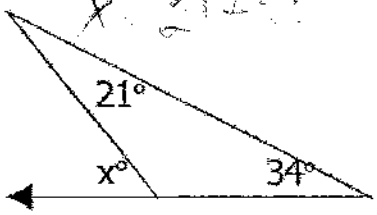
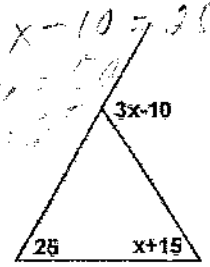
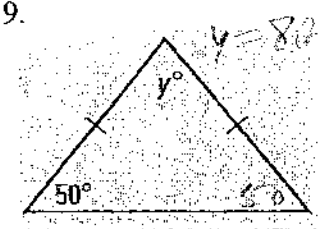
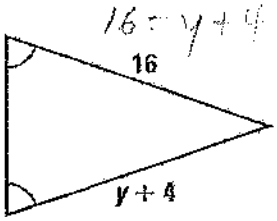
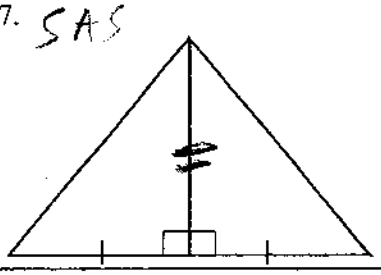
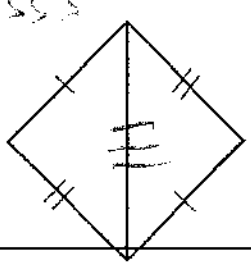
Packet 1 KEY

Analytic Geometry

UNIT 1: Use the following to review for you test. Work the Practice Problems on a separate sheet of paper.

What you need to know & be able to do	Things to remember		
A. Solve for x when the angles are supplementary.	Angles add to 180°	1. $30 + 2x - 50 = 180$, $2x - 20 = 180$, $2x = 200$, $x = 100$ 	2. One angle is 12 more than twice its supplement. Find both angles. $A + B = 180$, $3A = 168$, $A = 56°$, $B = 124°$
B. Solve for x when the angles are complementary.	Angles add to 90°	3. 	4. $3x + 10$, $2x - 5$, $5x + 5 = 90$, $x = 17$. 3x + 10° and 2x - 5° are complementary. Solve for x.
C. Recognize and solve vertical angles	Set vertical angles equal to each other	5.  $x = 22$	6.  $70 = x$
D. Name and solve problems involving angles formed by 2 parallel lines and a transversal.	Consecutive interior angles are supplementary. Alternate interior, alternate exterior, and corresponding angles are congruent.	7.  $6x + 1 + 14x - 1 = 180$, $20x = 180$, $x = 9$	8. 
		9.  $70 = 14x - 2$, $72 = 14x$, $x = 5\frac{1}{7}$	10. $17x + 6 = 125$, $17x = 119$, $x = 7$ 

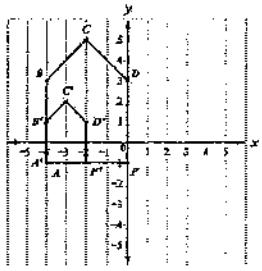
Analytic Geometry

E. Recognize and solve midsegment of a triangle problems	A midsegment connecting two sides of a triangle is parallel to the third side and is half as long.	11. 	12. 
F. Recognize and solve triangle proportionality theorem problems	If a line parallel to one side of a triangle intersects the other two sides of the triangle, then the line divides these two sides proportionally.	13. 	14. 
G.Solve for x in problems involving the sum of the interior angles of a triangle.	The interior angles of a triangle sum to 180°.	15. 	16. 
H. Solve for x in problems involving the exterior angle theorem.	The measure of an exterior angle of a triangle equals to the sum of the measures of the two remote interior angles of the triangle.	17. 	18. 
I. Recognize and solve problems involving the congruent base theorem.	If two sides of a triangle are congruent, then the angles opposite those sides are congruent.	19. 	20. 
J. Name Corresponding Parts of Triangles.		25. $\Delta ABC \cong \Delta FEG$ $\overline{CA} \cong$ _____	26. $\Delta ABC \cong \Delta FEG$ $\angle GEF \cong$ _____
K. Determine if two triangles are congruent.	Remember the 5 ways that you can do this: SSS, SAS, ASA, AAS, HL	27. 	28. 

Name: _____ Date: _____

MULTIPLE CHOICE PRACTICE

1. Figure A'B'C'D'F' is a dilation of figure ABCDF by a scale factor of ½. The dilation is centered at (–4, –1).



Which statement is true?

a) $\frac{AB}{A'B'}=\frac{B'C'}{BC}$ b) $\frac{AB}{A'B'}=\frac{BC}{B'C'}$ c) $\frac{AB}{A'B'}=\frac{BC}{D'F'}$ d) $\frac{AB}{A'B'}=\frac{DF}{B'C'}$

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2. Which transformation results in a figure that is similar to the original figure but has a greater area?
   a) a dilation of ΔQRS by a scale factor of 0.25
   b) a dilation of ΔQRS by a scale factor of 0.5
   c) a dilation of ΔQRS by a scale factor of 1
   d) a dilation of ΔQRS by a scale factor of 2

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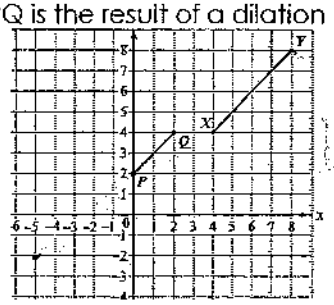
3. In the coordinate plane, segment PQ is the result of a dilation of segment XY by a scale factor of 1/2.



Which point is the center of dilation?

a) (-4, 0) b) (0,-4) c) (0, 4) d) (4, 0)

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4. In the triangles shown, ΔABC is dilated by a factor of 2/3 to form ΔXYZ. Given that $m\angle A = 50°$ and $m\angle B = 100°$, what is the $m\angle Z$?

a) 15° b) 25° c) 30° d) 50°

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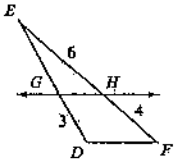
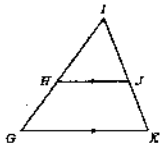
5. In the triangle shown, $\overline{GH} \parallel \overline{DF}$.



What is the length of $\overline{EG}$?

a) 2.0 b) 4.5 c) 7.5 d) 8.0

6. Use this triangle to answer the question.

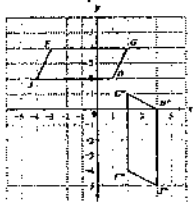


This is a proof of the statement "If a line is parallel to one side of a triangle and intersects the other two sides at distinct points, then it separates these sides into segments of proportional lengths."
Which reason justifies step 2?

a) Alternate interior angles are congruent.
b) Alternate exterior angles are congruent.
c) Corresponding angles are congruent.
d) Vertical angles are congruent.

	Step	Justification
1	$\overline{GK}$ is parallel to $\overline{HJ}$	Given
2	$\angle HGK \cong \angle IHJ$ $\angle IKG \cong \angle IJH$	?
3	$\Delta GIK \sim \Delta HIJ$	AA similarity postulate

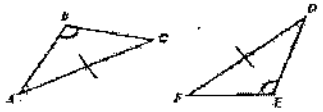
7. Parallelogram FGHJ was translated 3 units down to form parallelogram F 'G'H'J '. Parallelogram F 'G'H'J ' was then rotated 90° counterclockwise about point G' to obtain parallelogram F "G"H"J ".



Which statement is true about parallelogram FGHJ and parallelogram F "G"H"J "?

a) The figures are both similar and congruent.
b) The figures are neither similar nor congruent.
c) The figures are similar but not congruent.
d) The figures are congruent but not similar.

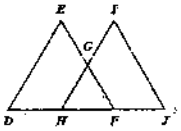
8. Consider the triangles shown.



Which can be used to prove the triangles congruent?

a) SSS b) ASA c) SAS d) AAS

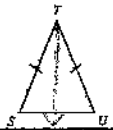
9. In this diagram, $\overline{DE} \cong \overline{JI}$ and $\angle D \cong \angle J$.



Which additional information is sufficient to prove that ΔDEF is congruent to ΔJIH?

a) $\overline{EF} \cong \overline{IH}$ b) $\overline{DH} \cong \overline{JF}$ c) $\overline{HG} \cong \overline{GI}$ d) $\overline{HF} \cong \overline{JF}$

10. In this diagram, STU is an isosceles triangle where $\overline{ST}$ is congruent to $\overline{UT}$. The paragraph proof shows that $\angle S$ is congruent to $\angle U$.

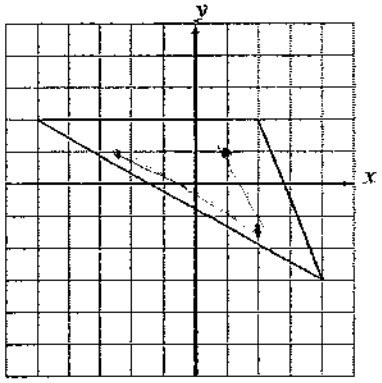
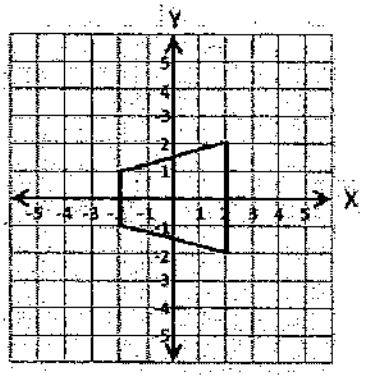
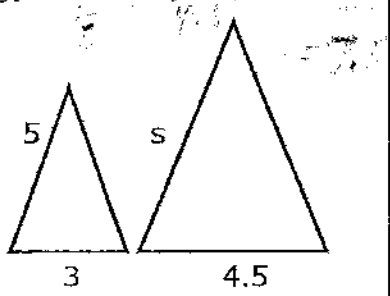
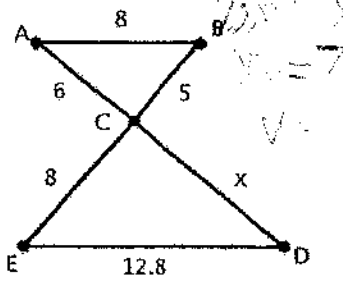
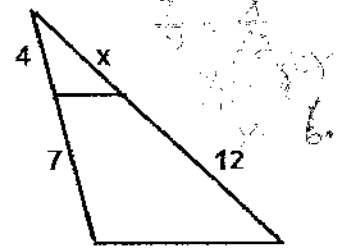
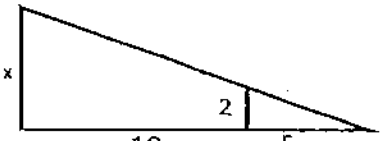
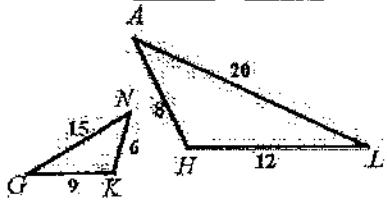
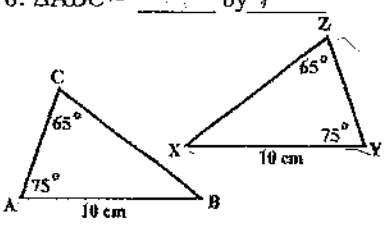


It is given that $\overline{ST}$ is congruent to $\overline{UT}$. Draw $\overline{TV}$ that bisects $\angle T$. By the definition of an angle bisector, $\angle STV$ is congruent to $\angle UTV$. By the Reflexive Property, $\overline{TV}$ is congruent to $\overline{TV}$. $\triangle STV$ is congruent to $\triangle UTV$ by SAS. $\angle S$ is congruent to $\angle U$ by ___?___.

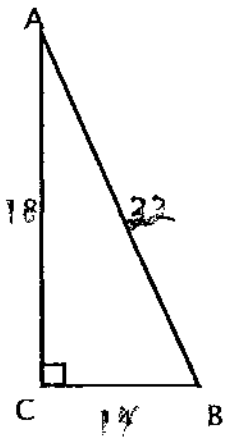
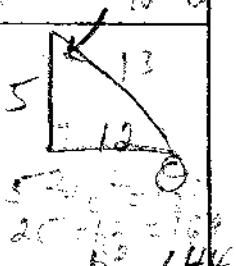
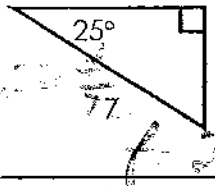
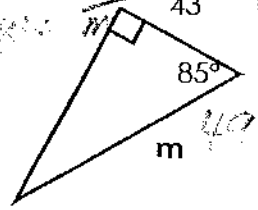
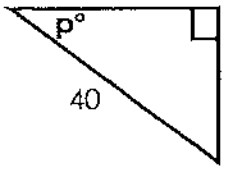
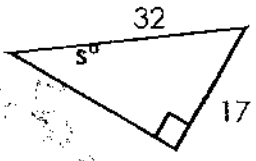
a) CPCTC b) Reflexive Property of ≅ c) Def. of Right angles d) ∠ Congruence Postulate

Analytic Geometry

UNIT 2: Use the following to review for you test. Work the Practice Problems on a separate sheet of paper.

What you need to know & be able to do	Things to remember		
A. Perform a dilation with a given scale factor	When the center of dilation is the origin, you can multiply each coordinate of the original figure, or pre-image, by the scale factor to find the coordinates of the dilated figure, or image.	1. Dilate with k = ½. 	2. Dilate with k = 2. 
B. Find the missing side for similar figures.	Set up a proportion by matching up the corresponding sides. Then, solve for x.	3. 	4. 
		5. 	6. 
C. Determine if 2 triangles are similar, and write the similarity statement.	Remember the 3 ways that you can do this: AA, SAS, SSS	7. ΔGNK ~ LMK by SSS 	8. ΔABC ~ ___ by ___ 

5.

D. Find sin, cos, and tan ratios	Just find the fraction using SOHCAHTOA		**9.** Find sin A. $\frac{7}{11}$ **10.** Find tan B. $\frac{7}{7}$ **11.** Find cos B. $\frac{7}{11}$ **12.** Find tan A. $\frac{7}{7}$
E. Know the relationship between the ratios for complementary angles.	$\sin\theta = \cos(90-\theta)$ $\cos\theta = \sin(90-\theta)$ $\tan\theta = \frac{1}{\tan(90-\theta)}$	**13.** Given Right ΔABC and $\sin\theta = 5/13$, find $\sin(90-\theta)$ *and* $\cos(90-\theta)$. $\frac{12}{13}$ 	
F. Use trig to find a missing side measure	Set up the ratio and then use your calculator. If the variable is on the top, multiply. If the variable is on the bottom, divide.	**14.** Find f. 	**15.** Find m. 
G. Use trig to find a missing angle measure	Set up the ratio and then use the 2nd button on your calculator.	**16.** Find p. 	**17.** Find s. 

Unit 2 – Right Triangle Trigonometry

STANDARD: TRIGONOMETRIC RATIOS

- **Trig Ratios** –
  $\sin\theta = \frac{O}{H}$ $\cos\theta = \frac{A}{H}$ $\tan\theta = \frac{O}{A}$

- **Inverse Trig Ratios** – Only used when finding the angle measure of a right triangle. $\sin\theta = \frac{O}{H} \longrightarrow \theta = \sin^{-1}\frac{O}{H}$

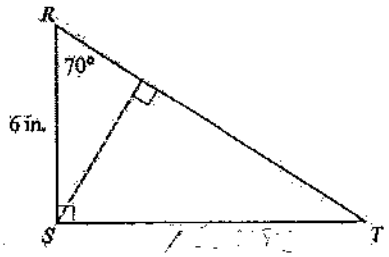
  $\cos\theta = \frac{A}{H} \longrightarrow \theta = \cos^{-1}\frac{O}{H}$

  $\tan\theta = \frac{O}{A} \longrightarrow \theta = \tan^{-1}\frac{O}{H}$

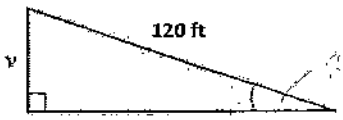
43. What does it mean for two angles to be complementary?

44. Angle J and angle K are complementary angles in a right triangle. The value of $\tan J$ is $\frac{15}{8}$. What is the value of $\sin J$?

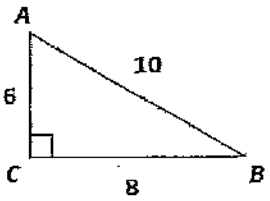
45. Triangle RST is a right triangle with right angle S, as shown. What is the area of triangle RST?



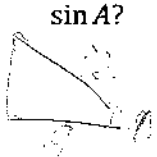
46. A road ascends a hill at an angle of 6°. For every 120 feet of road, how many feet does the road ascend?



47. Given triangle ABC, what is $\sin A$?

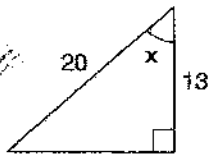


48. In a right triangle, if $\cos A = \frac{9}{12}$, what is $\sin A$?

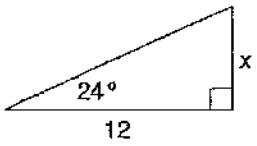


49. In right triangle ABC, if $\angle A$ and $\angle B$ are the acute angles, and $\sin B = \frac{6}{20}$, what is $\cos A$?

50. Find the measure of angle x. Round your answer to the nearest degree.



51. Solve for x.



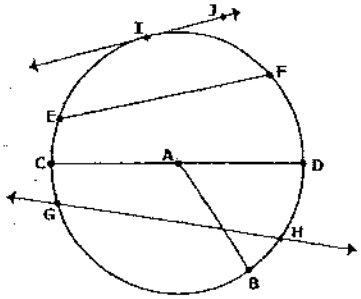
52. You are given that $\tan B = \frac{19}{11}$. What is the measure of angle B?

53. A ladder is leaning against a house so that the top of the ladder is 18 feet above the ground. The angle with the ground is 47°. How far is the base of the ladder from the house?

Unit 3 – Circles and Spheres

STANDARD: CIRCLES

- **Area** – πr^2
- **Circumference** – $2\pi r$
- **Parts of a Circle** –



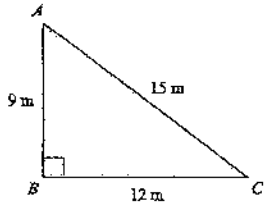
Name: _____ Date: _____

MULTIPLE CHOICE PRACTICE

1) In right triangle ABC, angle A and angle B are complementary angles. The value of cos A is 5/13. What is the value of sin B?

a) 5/13 b) 12/13 c) 13/12 d) 13/5

2) Triangle ABC is given below.



What is the value of cos A?

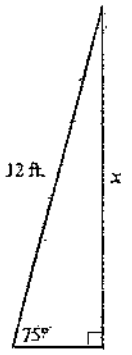
a) 3/5 b) 3/4 c) 4/5 d) 5/3

3) In right triangle HJK, $\angle J$ is a right triangle and $\tan \angle H = 1$. Which statement about triangle HJK must be true?

a) $\sin \angle H = 1/2$ b) $\sin \angle H = 1$ c) $\sin \angle H = \cos \angle H$ d) $\sin \angle H = 1 / \cos \angle H$

4) A 12 foot ladder is leaning against a building at a 75° angle with the ground.

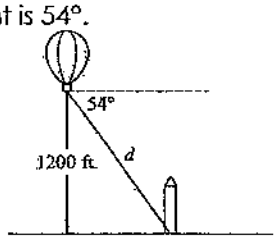
Which can be used to find how high the ladder reaches up the side of the building?



a) $\sin 75° = \frac{12}{x}$ b) $\tan 75° = \frac{12}{x}$

c) $\cos 75° = \frac{x}{12}$ d) $\sin 75° = \frac{x}{12}$

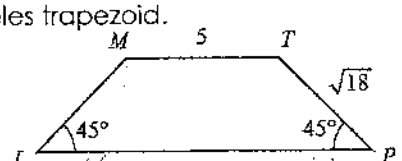
5) A hot air balloon is 1200 feet above the ground. The angle of depression from the basket of the hot-air balloon to the base of a monument is 54°.



Which equation can be used to find the distance, d, in feet, from the basket of the hotair balloon to the base of the monument?

a) $\sin 54° = \frac{d}{1200}$ b) $\sin 54° = \frac{1200}{d}$ c) $\cos 54° = \frac{d}{1200}$ d) $\cos 54° = \frac{1200}{d}$

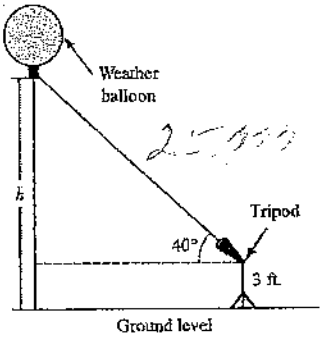
6) Quadrilateral $MATP$ is an isosceles trapezoid.



What is the length of $\overline{LP}$?

a) 10 b) 11 c) $5+2\sqrt{18}$ d) $5+6\sqrt{2}$

7) Bianca uses an angle-measuring device on a 3-foot tripod to find the height, h, of a weather balloon above ground level, as shown in this diagram.



not drawn to scale

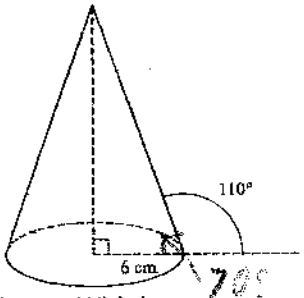
The balloon is at a 40° angle of elevation. A radio signal from the balloon tells Bianca that the distance between the tripod and the balloon is 25,000 feet.

Which expression represents the height, h, of the balloon above ground level?

a) $25,000 \bullet \sin 40° - 3$ b) $25,000 \bullet \sin 40° + 3$

c) $\dfrac{25,000}{\sin 40°} - 3$ d) $\dfrac{25,000}{\sin 40°} + 3$

8) Use this diagram of a cone to answer the question.



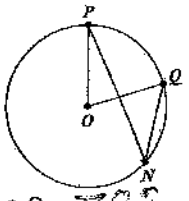
The base of the cone has a radius of 6 cm. Which expression represents the slant height, in centimeters, of the cone?

a) $6 \bullet \cos 70°$ b) $6 \bullet \cos 110°$ c) $\dfrac{6}{\cos 70°}$ d) $\dfrac{6}{\cos 110°}$

Name: _____ Date: _____

Free Response:

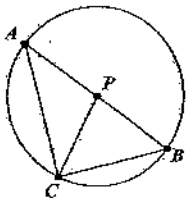
1) $\angle PNQ$ is inscribed in circle O and $m\overset{\frown}{PQ} = 70°$.



a) What is the measure of $\angle POQ$?

b) What is the measure of $\angle PNQ$?

2) In circle P below, $\overline{AB}$ is a diameter.



If $m\angle APC = 100°$, find the following:

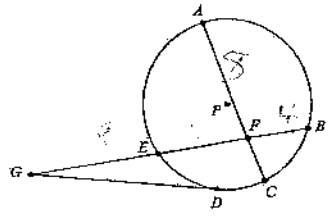
a) $m\angle BPC$

b) $m\angle BAC$

c) $m\overset{\frown}{BC}$

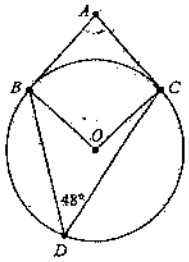
d) $m\overset{\frown}{AC}$

3) In circle P below, $\overline{DG}$ is a tangent. AF = 8, EF = 6, BF = 4, and EG = 8.

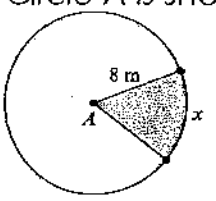


Find CF and DG.

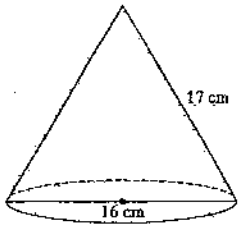
4) In this circle, $\overline{AB}$ is tangent to the circle at point B, $\overline{AC}$ is tangent to the circle at point C, and point D lies on the circle. What is $m\angle BAC$?



5) Circle A is shown. If x = 50°, what is the area of the sector?



6) What is the volume of the cone shown below?

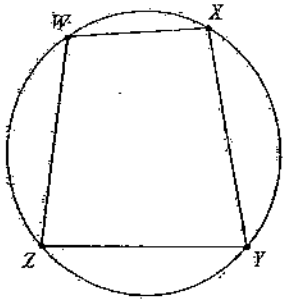


7) A sphere has a radius of 3 feet. What is the volume?

8) A cylinder has a radius of 10 cm and a height of 9 cm. A cone has a radius of 10 cm. and a height of 9 cm. Show that the volume of the cylinder is three times the volume of the cone.

Multiple Choice:

9) Quadrilateral WXYZ is inscribed in this circle.



Which statement must be true?

a) $\angle W$ and $\angle Y$ are complementary.

b) $\angle W$ and $\angle Y$ are supplementary.

c) $\angle Z$ and $\angle Y$ are complementary.

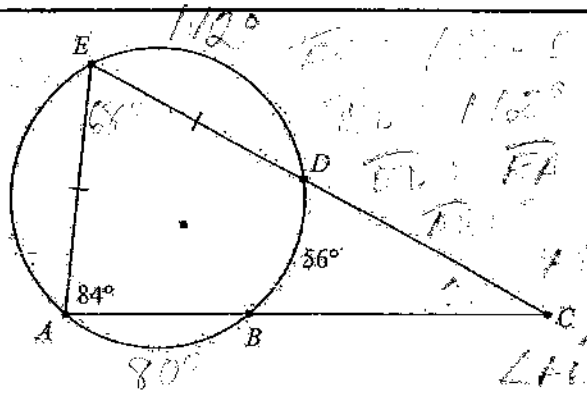
d) $\angle Z$ and $\angle Y$ are supplementary.

10) Points A, B, D and E lie on the circle.

Point C is outside the circle.

$\overline{AE} \cong \overline{DE}$, $m\overset{\frown}{BD} = 56°$ & $m\angle EAC = 84°$

What is the measure of $\angle ACE$?



a) 28° b) 42°

c) 56° d) 84°

11) A circular pizza with a diameter of 15 inches is cut into 8 equal slices. What is the area of one slice?

a) 5.9 sq. in.

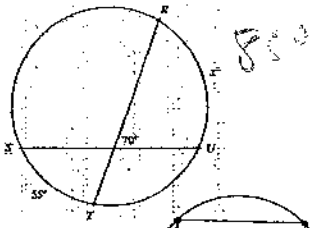
b) 22.1 sq. in.

c) 88.4 sq. in.

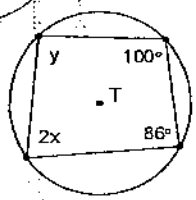
d) 120 sq. in.

- **Properties of Tangent Lines –**
  - Tangent and a radius form a right angle
  - You can use Pythagorean Theorem to find the side lengths
  - Two tangents from a common external point are congruent
- **Central Angles –** $mAngle = mArc$
- **Inscribed Angles –** $mAngle = \frac{mArc}{2}$
- **Angles Outside the Circle –** $angle\ x = \frac{far\ arc - near\ arc}{2}$
- **Intersecting Chords –** $angle\ x = \frac{arc\ A + arc\ B}{2}$

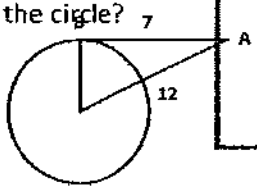
54. What is the value of x in this diagram?



55. Given $\odot T$, with the inscribed quadrilateral, find the value of each variable.



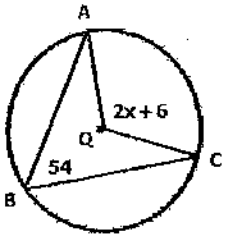
56. $\overline{AB}$ is tangent to $\odot C$ at point B. $\overline{AC}$ measures 12 inches and $\overline{AB}$ measures 7 inches. What is the radius of the cigcle?



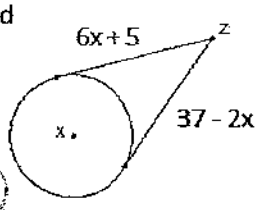
STANDARD: SPHERES

- **Surface Area** $= 4\pi r^2$
- **Volume** $= \frac{4}{3}\pi r^3$

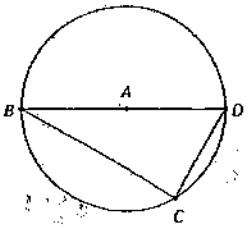
57. Given $\odot Q$, the $m\angle ABC = 54°$ and the $m\angle AQC = (2x + 6)°$ find the value of x.



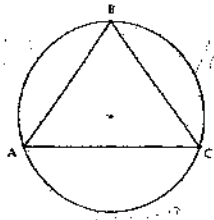
58. If two tangents of $\odot X$ meet at the external point Z, find their congruent length.



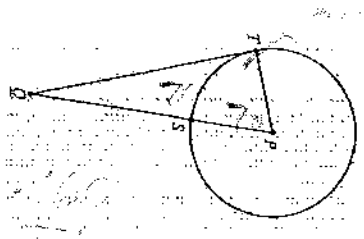
59. The measure of $\overset{\frown}{CD}$ is 64°. What is the measure of $\angle BDC$?



60. Isosceles triangle ABC is inscribed in this circle. $\overline{AB} \cong \overline{BC}$ and $m\overset{\frown}{AB} = 108°$. What is the measure of $\angle ABC$?



61. In this diagram, segment $\overline{QT}$ is tangent to circle P at point T. The measure of minor arc $\overset{\frown}{ST}$ is 70°. What is $m\angle TQP$?



62. A sphere has a radius of 8 cm. What is the surface area? Answer in both decimal and exact π-form.

63. When comparing two different sized bouncy balls, by how much more is the volume of the larger ball if its radius is 3 times larger than the smaller ball?

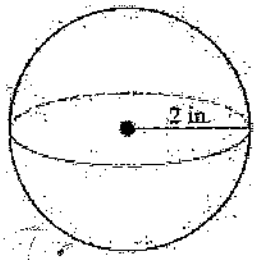
$3^3 = 27$ times

Perimeter / Circumference Linear – multiply by factor

Area Squared – multiply by (factor)^2

Volume Cubed – multiply by (factor)^3

64. Find the volume of the following figures.

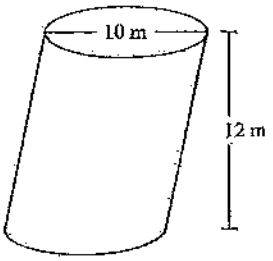


$V = \frac{4}{3}\pi r^3$

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

$V = \frac{32}{3}\pi$

$V = 33.5 \text{ in}^3$



$V = \pi r^2 h$

$V = \pi 5^2 12$

$V = 300\pi$

942 m^3

Analytic Geometry

Unit 4 Key Notes:

- ***Combine like terms when adding and subtracting polynomials***
- ***Use the distributive property when multiplying polynomials***
- ***Perimeter: Add up all the sides***
- ***Area: length*width***
- ***Volume: Bh (remember B=area of the base)***

- ***Imaginary Numbers:*** $i \times i = -1$,
- then $-1 \times i = -i$,
- then $-i \times i = 1$,
- then $1 \times i = i$ (back to i again!)

$i = \sqrt{-1}$ $\quad i^2 = -1$ $\quad i^3 = -\sqrt{-1}$ $\quad i^4 = 1$ $\quad i^5 = \sqrt{-1}$

- The complex conjugate of $a + bi$ is $a - bi$, and similarly the complex conjugate of $a - bi$ is $a + bi$. This consists of changing the sign of the imaginary part of a complex number. The real part is left unchanged.
- **Irrational Numbers:**
- Can't be expressed as the quotient of two integers (i.e. a fraction) such that the denominator is not zero.
- Examples: $\sqrt{7}, \sqrt{5}, \pi$

Rational Numbers:
Can be expressed as the quotient of two integers (i.e. a fraction) with a denominator that is not zero. Many people are surprised to know that a repeating decimal is a rational number.

Examples: -5, 0, 7, 3/2, $0.\overline{26}$

- $\sqrt{9}$ is rational - you can simplify the square root to 3 which is the quotient of the integers 3 and 1.

Laws of Exponents

I.	Multiplication	$b^n \cdot b^m = b^{n+m}$	add exponents
II.	Power of a power	$(b^n)^m = b^{nm}$	multiply exponents
III.	Power of a product	$(bc)^n = b^n c^n$	
IV.	Power of a fraction	$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$	
V.	Division	$\frac{b^n}{b^m} = b^{n-m}$ or, alternatively, $= \frac{1}{b^{m-n}}$	subtract exponents

Unit 4 Test Review

Add or Subtract:

1. $(5x^2 - 8x - 6) + (7x^2 - 9x - 3)$

$12x^2 - 17x - 9$

2. $(3x^2 + 5x - 9) - (6x^2 + 5x - 11)$

$-3x^2 + 2$

Multiply:

3. $7x^2(9xy^3 - 8z^4y + 4y^3)$

$63x^3y^3 - 56x^3z^4y + 28x^2y^3$

4. $(x-4)^2$

$(x-4)(x-4)$

$x^2 - 8x + 16$

5. $(x-6)(x+7)$

$x^2 + x - 42$

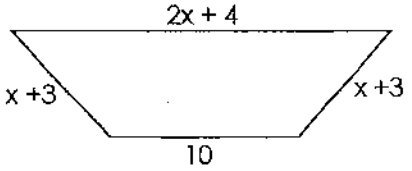
6. $(x-2)(x^2-4x+6)$

$x^3 - 4x^2 + 6x$

$-2x^2 + 8x - 12$

$x^3 - 6x^2 + 14x - 12$

7. Give the perimeter of the deck shown below.



$2x + 4$

$x + 3$

$x + 3$

$+ 10$

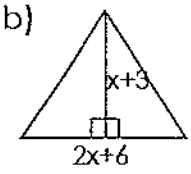
$4x + 20$

14

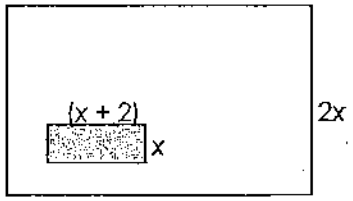
8. Find the area of the figures

a)

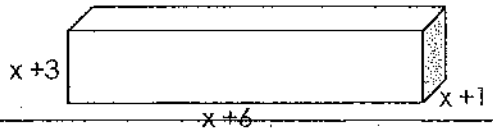
b)



9. Find the area of the white space.



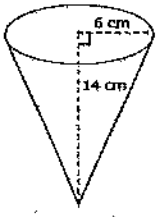
10. Find the volume of the rectangular prism.



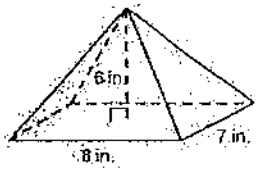
Review:

11. Find the volume of each figure below.

a)



b)



c)