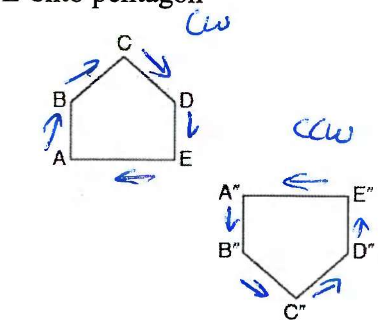
Name Schlansky
Mr. Schlansky

Date ____________
Geometry

Geometry Schlansky's Guide to 85

1. Identify which sequence of transformations could map pentagon $ABCDE$ onto pentagon $A''B''C''D''E''$, as shown below.

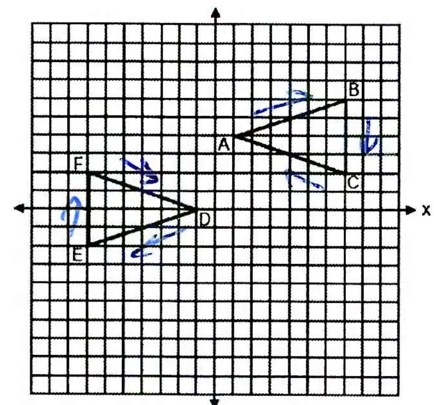
Orientation different
must be a single
line reflection



~~1) dilation followed by a rotation~~
~~2) translation followed by a rotation~~
3) line reflection followed by a translation
~~4) line reflection followed by a line reflection~~
2 line reflections

Identifying Sequence of Transformations (Multiple Choice)
Check for orientation!!! (The direction of the letters)
Same Orientation: Can't be a single line reflection
Different Orientation: Must be a single line reflection
-Cross out the appropriate choices.
-If two (or more remain), pick one of the choices and perform the transformations and see which works.

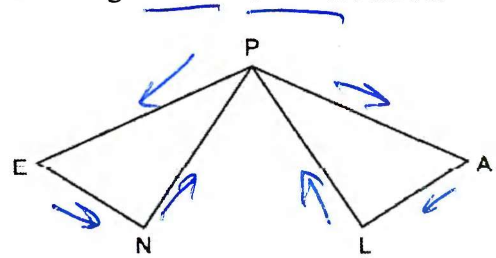
2. Triangles ABC and DEF are graphed on the set of axes below. Which sequence of rigid motions maps ΔABC onto ΔDEF?



~~1) A reflection over $y=-x+2$~~
2) A point reflection through (0,2)
~~3) A translation 2 units left followed by a reflection over the x-axis~~
~~4) A translation 4 units down folowed by a reflection over the y-axis~~
*a point reflection is not a line reflection

Same orientation
Can't be a single
line reflection

3. In the diagram below, congruent triangles PEN and PAL are drawn.



Orientation different
must be a single line reflection

Which rigid motion maps $\triangle PEN$ onto $\triangle PAL$?

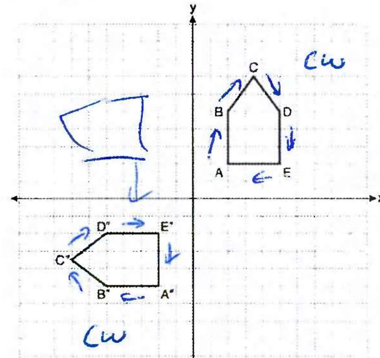
~~1) a point reflection of $\triangle PEN$ through P~~
2) a reflection of $\triangle PEN$ over the angle bisector of $\angle EPA$
~~3) a rotation of $\triangle PEN$ about point P, mapping $\overline{PE}$ onto $\overline{PA}$~~
~~4) a translation of $\triangle PEN$ along $\overline{EA}$, mapping point E onto A~~

Identifying Sequence of Transformations (Multiple Choice)
Check for orientation!!! (The direction of the letters)
Same Orientation: Can't be a single line reflection
Different Orientation: Must be a single line reflection
-Cross out the appropriate choices.
-If two (or more remain), pick one of the choices and perform the transformations and see which works.

4. On the set of axes below, pentagon $ABCDE$ is congruent to $A''B''C''D''E''$. Which describes a sequence of rigid motions that maps $ABCDE$ onto $A''B''C''D''E''$?

to each of these

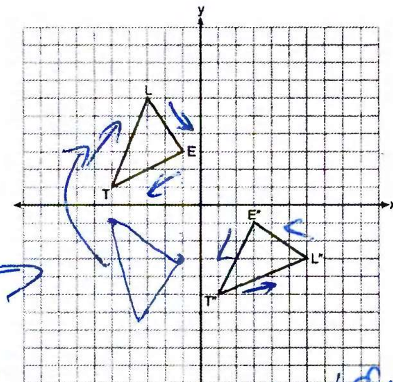
1) a rotation of 90° counterclockwise about the origin followed by a reflection over the x-axis
2) a rotation of 90° counterclockwise about the origin followed by a translation down 7 units
3) a reflection over the y-axis followed by a reflection over the x-axis
4) a reflection over the x-axis followed by a rotation of 90° counterclockwise about the origin



orientation same
can't ~~must~~ be a single line reflection.

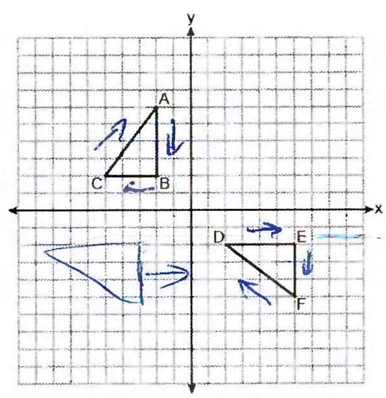
5. On the set of axes below, $\triangle LET$ and $\triangle L''E''T''$ are graphed in the coordinate plane where $\triangle LET \cong \triangle L''E''T''$.
Which sequence of rigid motions maps $\triangle LET$ onto $\triangle L''E''T''$?

1) a reflection over the y-axis followed by a reflection over the x-axis
2) a rotation of 180° about the origin
3) a rotation of 90° counterclockwise about the origin followed by a reflection over the y-axis
4) a reflection over the x-axis followed by a rotation of 90° clockwise about the origin this would end up in the same quadrant it started in.



orientation different
must be a single line reflection

6. On the set of axes below, congruent triangles ABC and DEF are drawn.

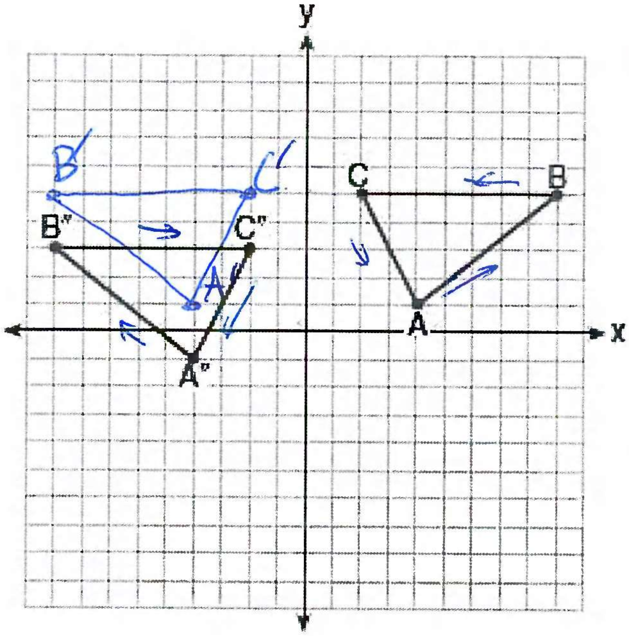


Same orientation
can't be a single line reflection.

Which sequence of transformations maps $\triangle ABC$ onto $\triangle DEF$?

1) A counterclockwise rotation of 90 degrees about the origin, followed by a translation 8 units to the right.
2) A counterclockwise rotation of 90 degrees about the origin, followed by a reflection over the y-axis.
3) A point reflection through the origin, followed by a translation 4 units down.
4) A clockwise rotation of 90 degrees about the origin, followed by a reflection over the x-axis.

7. The graph below shows $\triangle ABC$ and its image, $\triangle A''B''C''$.
Describe a sequence of rigid motions which would map $\triangle ABC$ onto $\triangle A''B''C''$.

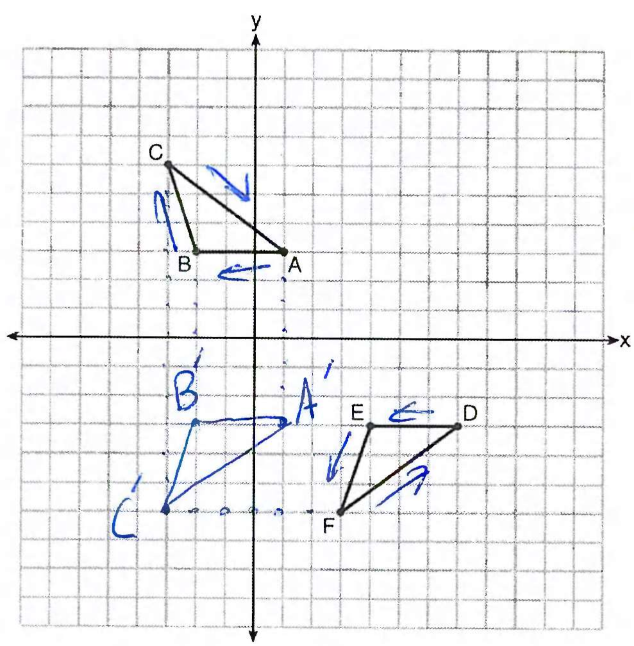


Identifying Transformations (Open Response)
CHECK FOR ORIENTATION!!!!
Same orientation (rotation first, then translation)
-Rotate any point the appropriate degree measure and direction.
-Translate the rest of the way by counting from that point to its image.
Opposite orientation (reflection first, then translation)
-Reflect over the appropriate axis (use y=x if it needs to be reflected diagonally)
-Translate the rest of the way by counting from any new point to its image.

orientation different
must be a single line reflection

Reflection over the y axis followed by a translation 2 units down.

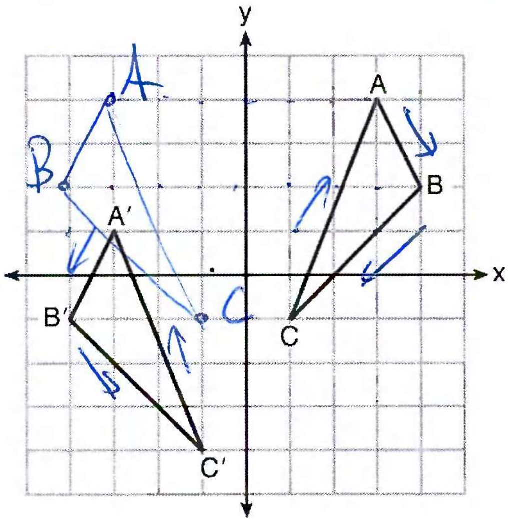
8. Describe a sequence of transformations that will map $\triangle ABC$ onto $\triangle DEF$ as shown below.



orientation different
Single line reflection

Reflect $\triangle$ ABC over the x-axis followed by a translation 6 units to the right.

9. As graphed on the set of axes below, $\triangle A'B'C'$ is the image of $\triangle ABC$ after a sequence of transformations.

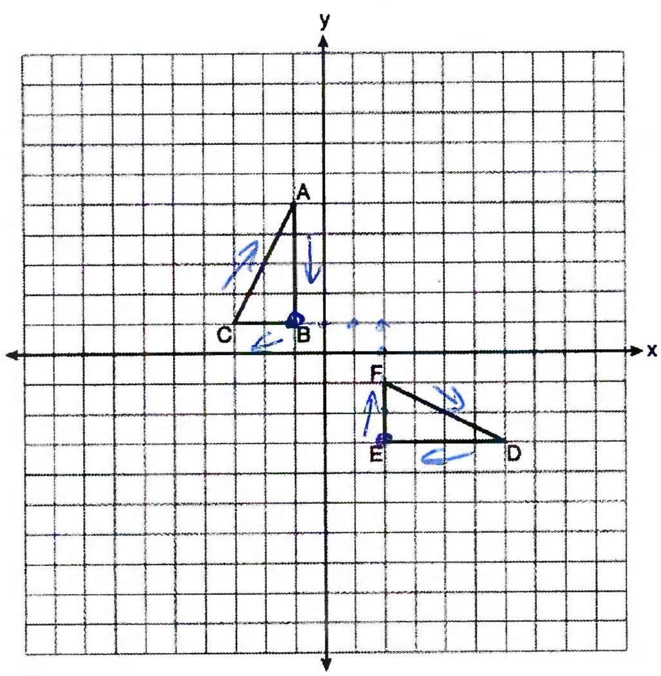


orientation different
single line reflection

Reflection over the y-axis followed by a translation down 3 units.

Identifying Transformations (Open Response)
CHECK FOR ORIENTATION!!!!
Same orientation (rotation first, then translation)
-Rotate any point the appropriate degree measure and direction.
-Translate the rest of the way by counting from that point to its image.
Opposite orientation (reflection first, then translation)
-Reflect over the appropriate axis (use y=x if it needs to be reflected diagonally)
-Translate the rest of the way by counting from any new point to its image.

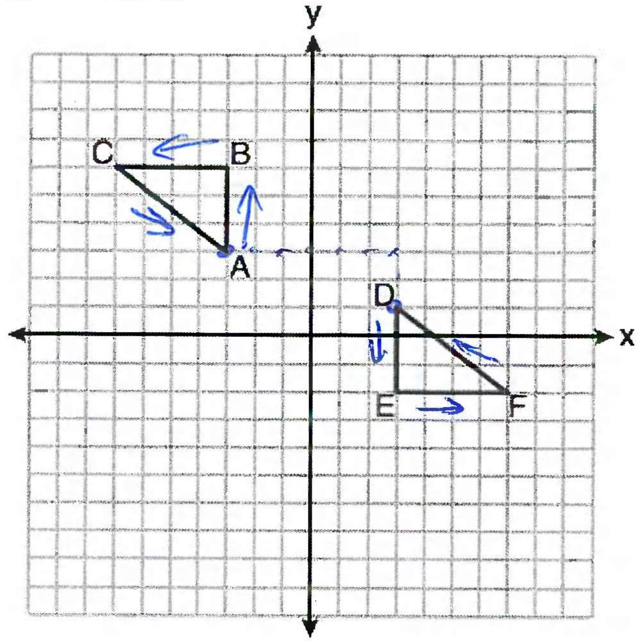
10. On the set of axes below, $\triangle ABC$ and $\triangle DEF$ are graphed. Describe a sequence of rigid motions that would map $\triangle ABC$ onto $\triangle DEF$.



Same orientation
rotation

Rotation of 90° clockwise centered at B followed by a translation 3 units right and 4 units down.

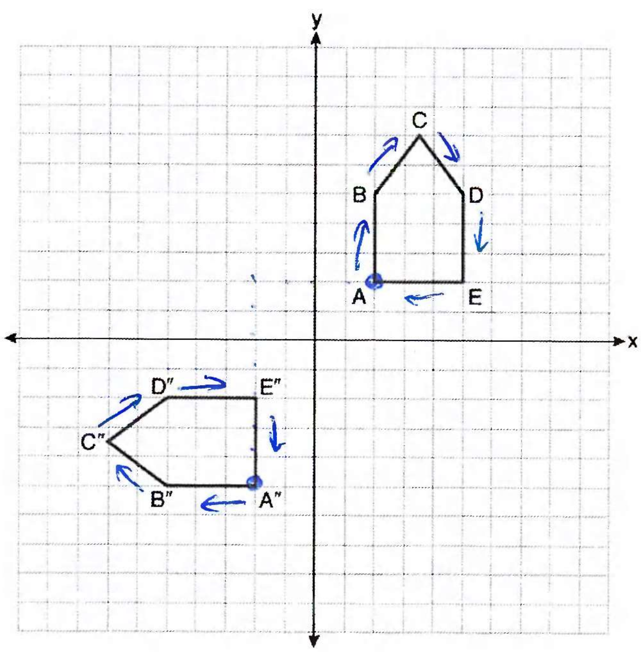
11. On the set of axes below, $\triangle ABC \cong \triangle DEF$. Describe a sequence of rigid motions that maps $\triangle ABC$ onto $\triangle DEF$.



Same orientation
rotation

Rotation of 180° clockwise centered at A followed by a translation 6 right and 2 down.

12. On the set of axes below, pentagon $ABCDE$ is congruent to $A''B''C''D''E''$. Describe a sequence of rigid motions that maps pentagon $ABCDE$ onto $A''B''C''D''E''$.



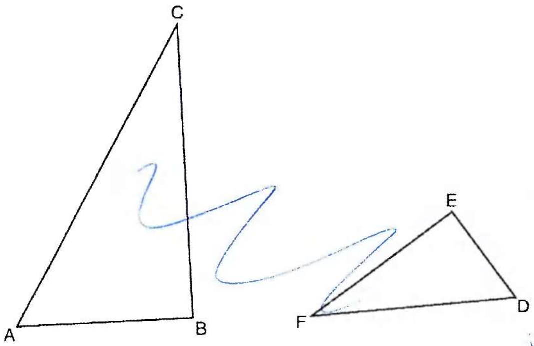
Same orientation
rotation

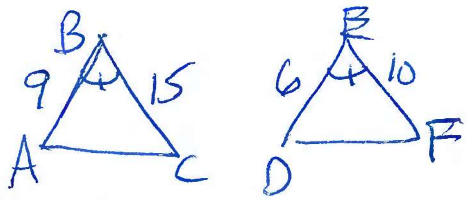
Rotation of 90° counter-clockwise centered at A followed by a translation left 4 and down 7.

To show triangles are similar:
The ANGLES of similar triangles are congruent
The SIDES of similar triangles are in proportion
1) AA (2 pairs of corresponding angles are congruent)
2) SAS (2 pairs of corresponding sides are in proportion and the corresponding angles between them are congruent)
3) SSS (3 pairs of corresponding sides are in proportion)
*See if the corresponding sides are in proportion by putting the corresponding sides on top of each other!
*Candy Corn problems can be SAS because of the reflexive angle.

13. Triangles ABC and DEF are drawn below.

If $AB = 9$, $BC = 15$, $DE = 6$, $EF = 10$, and $\angle B \cong \angle E$, are the triangles similar? Explain your answer.





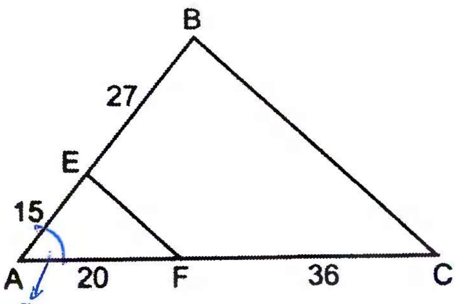
$\frac{9}{6} = \frac{15}{10}$

$\frac{3}{2} = \frac{3}{2}$ ✓

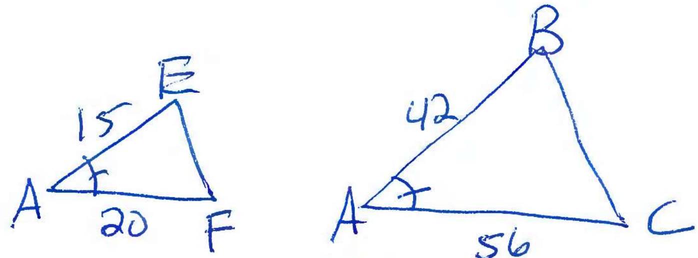
Yes, because SAS

Yes, because two pairs of corresponding sides are in proportion and the angle between them is congruent.

14. In the diagram below, $AE = 15$, $EB = 27$, $AF = 20$, and $FC = 36$. Is $\Delta ABC \sim \Delta AEF$. Explain your answer.



reflexive



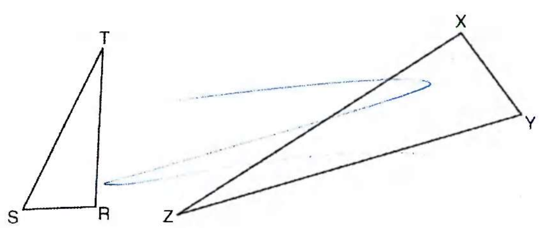
$\frac{15}{42} = \frac{20}{56}$

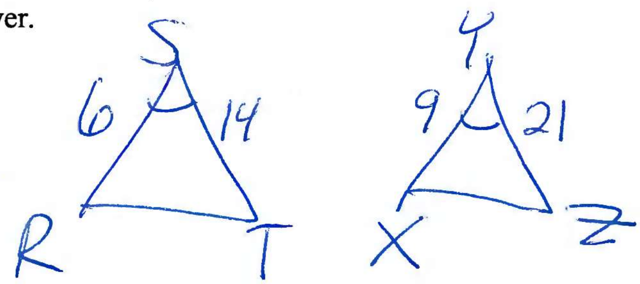
$\frac{5}{14} = \frac{5}{14}$

Yes, because SAS.

Yes, because two pairs of corresponding sides are in proportion and the angle between them is congruent.

15. Triangles RST and XYZ are drawn below. If $RS = 6$, $ST = 14$, $XY = 9$, $YZ = 21$, and $\angle S \cong \angle Y$, is $\triangle RST$ similar to $\triangle XYZ$? Justify your answer.





$\frac{6}{9} = \frac{14}{21}$

$\frac{2}{3} = \frac{2}{3}$

Yes, because SAS

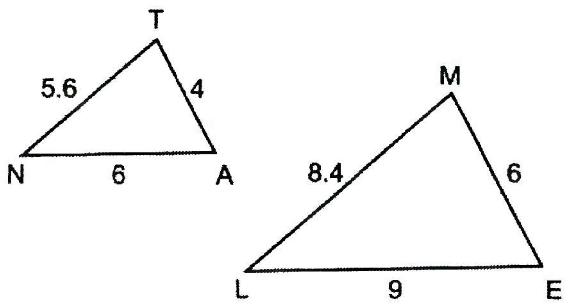
Yes, because two pairs of corresponding sides are in proportion and the angle between them is congruent.

16. In triangles *ANT* and *ELM* below, $AN = 6$, $NT = 5.6$, $TA = 4$, $EL = 9$, $LM = 8.4$, and $ME = 6$. Explain why $\triangle ANT \sim \triangle ELM$.

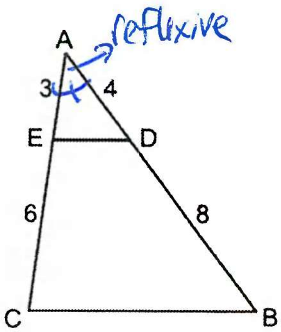
$\frac{5.6}{8.4} = \frac{4}{6} = \frac{6}{9}$ Yes, because SSS.

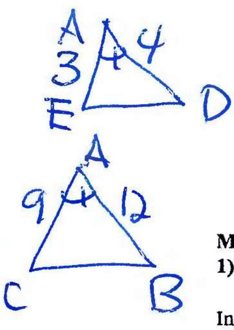
$\frac{2}{3} = \frac{2}{3} = \frac{2}{3}$ ✓

Yes, because three pairs of corresponding sides are in proportion



17. In $\triangle ABC$ below, $\overline{DE}$ is drawn such that $AD = 4$, $DB = 8$, $AE = 3$, and $EC = 6$. Explain why $\triangle ADE \sim \triangle ABC$.





$\frac{3}{9} = \frac{4}{12}$

$\frac{1}{3} = \frac{1}{3}$

Yes, because SAS.

Yes, because two pairs of corresponding sides are in proportion and the angle between them is congruent.

Modeling Volume

1) Check units. Convert to what it wants later in the problem if necessary. To convert units:

Inches to feet: divide by 12

Feet to inches: multiply by 12

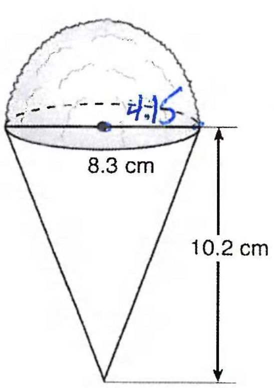
2) FIND VOLUME (Likely to be compound volume (add) or hollow volume (subtract)

3) Begin dimensional analysis. Start with volume!

18. A snow cone consists of a paper cone completely filled with shaved ice and topped with a hemisphere of shaved ice, as shown in the diagram below. The inside diameter of both the cone and the hemisphere is 8.3 centimeters. The height of the cone is 10.2 centimeters. The desired density of the shaved ice is 0.697 g/cm^3, and the cost, per kilogram, of ice is \$3.83. Determine and state the cost of the ice needed to make 50 snow cones.

1000g

- Units match ✓
- find volume
- dimensional analysis



hemisphere

$V = \frac{1}{2}(\frac{4}{3}\pi r^3)$

$V = \frac{1}{2}(\frac{4}{3}\pi(4.15)^3)$

$V = 149...$

Cone

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

$V = \frac{1}{3}\pi(4.15)^2(10.2)$

$V = 183...$

$149.. + 183... = 333... \text{ cm}^3$

$333. \text{ cm}^3 \cdot \frac{.697 \text{ g}}{1 \text{ cm}^3} \cdot \frac{3.83 \text{ \$}}{1000 \text{ g}} \cdot 50$

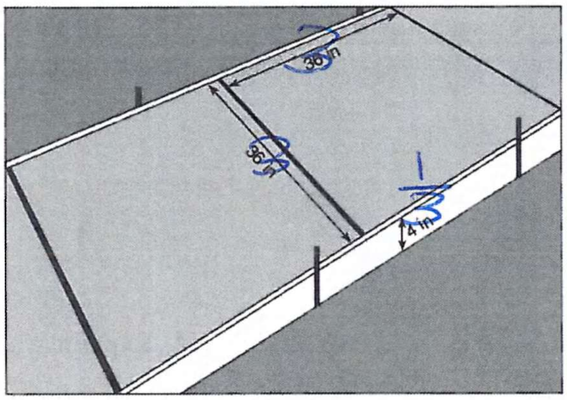
\$44.53

19. Ian needs to replace two concrete sections in his sidewalk, as modeled below. Each section is 36 inches by 36 inches and 4 inches deep. He can mix his own concrete for \$3.25 per cubic foot. How much money will it cost Ian to replace the two concrete sections?

units don't match

$\frac{36}{12}=3$

$\frac{4}{12}=\frac{1}{3}$



Rectangular Prism

$V=lwh$

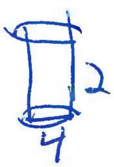
$V=3(3)(\frac{1}{3})$

$V=3\ ft^3$

$3\ \cancel{ft^3} \cdot \frac{3.25\ \$}{1\ \cancel{ft^3}} \cdot 2 = \$19.50$

units match

20. Cylindrical bricks are needed to fill a hole in a homeowner's backyard. Each brick is to have a diameter of 4 cm and a height of 2 cm. The weight of the concrete that the brick is going to be made from is 2.1 ounces per cubic centimeter. If the concrete costs \$.14 per ounce, how much would it cost to purchase four bricks? Round your answer to the *nearest cent*.



Cylinder

$V=\pi r^2 h$

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

$V=25...cm^3$

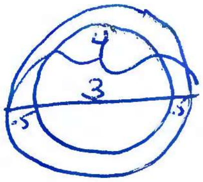
$25..\ \cancel{cm^3} \cdot \frac{2.1\ \cancel{oz}}{1\ \cancel{cm^3}} \cdot \frac{.14\ \$}{1\ \cancel{oz}} \cdot 4 = \$29.56$

Subtract

21. A bakery sells hollow chocolate spheres. The larger diameter of each sphere is 4 cm. The thickness of the chocolate of each sphere is 0.5 cm. Determine and state, to the *nearest tenth of a cubic centimeter*, the amount of chocolate in each hollow sphere. The bakery packages 8 of them into a box. If the density of the chocolate is 1.308 g/cm^3, determine and state, to the *nearest gram*, the total mass of the chocolate in the box.

units match

$33.. - 14.. = 19.4\ cm^3$



Outer sphere

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

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

$V=33..$

Inner Sphere

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

$V=\frac{4}{3}\pi(1.5)^3$

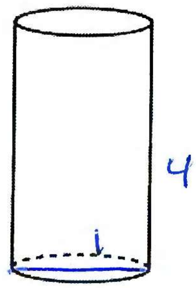
$V=14..$

$19.4\ \cancel{cm^3} \cdot \frac{1.308\ g}{1\ \cancel{cm^3}} \cdot 8 = 203$ grams

$\frac{12}{12} = 1\text{ ft}$

22. A concrete footing is a cylinder that is placed in the ground to support a building structure. The cylinder is 4 feet tall and 12 inches in diameter. A contractor is installing 10 footings. If a bag of concrete mix makes $\frac{2}{3}$ of a cubic foot of concrete, determine and state the minimum number of bags of concrete mix needed to make all 10 footings.

units don't match



$V = \pi r^2 h$

$V = \pi(.5)^2(4)$

$V = 3\ldots\ ft^3$

$3\ldots ft^3 \cdot \frac{1 \text{ bag}}{\frac{2}{3} ft^3} \cdot 10 = 47.12\ldots$

48 bags

*47 isn't enough.

Line Dilations

-If the center or scale factor is not given, all we know is that they are parallel (same slope). Find the choice that has the same slope.

$m = \frac{2}{3}$

23. The line $y = \frac{2}{3}x + 3$ is dilated centered at the origin. Which linear equation could be its image?

Same slope

1) $2x + 3y = 7$
2) $2x - 3y = 7$
3) $3x - 2y = 7$
4) $3x + 2y = 7$

$2x - 3y = 7$

$-2x \quad -2x$

$\frac{-3y}{-3} = \frac{-2x + 7}{-3}$

$y = \frac{2}{3}x - \frac{7}{3}$

$m = \frac{2}{3}$

Parallel Keep the slope

24. The line $3y = -2x + 8$ is transformed by a dilation centered at the origin. Which linear equation could be its image?

1) $2x + 3y = 5$
2) $2x - 3y = 5$
3) $3x + 2y = 5$
4) $3x - 2y = 5$

$2x + 3y = 5$

$-2x \quad -2x$

$\frac{3y}{3} = \frac{-2x + 5}{3}$

$y = -\frac{2}{3}x + \frac{5}{3}$

$\frac{3y}{3} = \frac{-2x + 8}{3}$

$y = -\frac{2}{3}x + \frac{8}{3}$

$m = -\frac{2}{3}$

Parallel Keep the slope

25. The line represented by the equation $4y = 3x + 7$ is transformed by a dilation centered at the origin. Which linear equation could represent its image?

1) $3x - 4y = 9$
2) $3x + 4y = 9$
3) $4x - 3y = 9$
4) $4x + 3y = 9$

$\frac{4y}{4} = \frac{3x + 7}{4}$

$y = \frac{3}{4}x + \frac{7}{4}$

$m = \frac{3}{4}$

$\cancel{3x} - 4y = 9$

$-\cancel{3x} \quad -3x$

$\frac{-4y}{-4} = \frac{-3x + 9}{-4}$

$y = \frac{3}{4}x - \frac{9}{4}$

Equation of a line through a point

1) Find m using parallel (same slope) or perpendicular (negative reciprocal slopes)
2) Substitute into $y - y_1 = m(x - x_1)$. Don't forget to negate x_1 and y_1.
3) If it's multiple choice, you may have to distribute and isolate y.

*You must get y by itself to get the slope

26. What is the equation of a line that passes through the point $(-3,-11)$ and is parallel to the line whose equation is $y=2x-4$?

Same slope

m=2

1) $y = 2x+5$
2) $y = 2x-5$
3) $y = \frac{1}{2}x + \frac{25}{2}$
4) $y = -\frac{1}{2}x - \frac{25}{2}$

$m\parallel = 2$
$x_1 = -3$
$y_1 = -11$

$y - y_1 = m(x - x_1)$
$y + 11 = 2(x+3)$
$y + 11 = 2x + 6$
$-11 \quad -11$
$y = 2x - 5$

Negative reciprocal slopes

27. What is an equation of the line that passes through the point $(-2, 5)$ and is perpendicular to the line whose equation is $y = \frac{1}{2}x + 5$?

$m = \frac{1}{2}$

1) $y-5 = \frac{1}{2}(x+2)$
2) $y-5 = -2(x+2)$
3) $y+5 = \frac{1}{2}(x-2)$
4) $y+5 = -2(x-2)$

$m\perp = -2$
$x_1 = -2$
$y_1 = 5$

$y - y_1 = m(x - x_1)$
$y - 5 = -2(x+2)$

negative reciprocal slopes

28. What is an equation of the line that contains the point $(3,-1)$ and is perpendicular to the line whose equation is $y = -3x + 2$?

1) $y = -3x + 8$
2) $y = -3x$
3) $y = \frac{1}{3}x$
4) $y = \frac{1}{3}x - 2$

$m\perp = \frac{1}{3}$
$x_1 = 3$
$y_1 = -1$

$y - y_1 = m(x - x_1)$
$y + 1 = \frac{1}{3}(x-3)$
$y + 1 = \frac{1}{3}x - 1$
$-1 \quad -1$
$y = \frac{1}{3}x - 2$

negative reciprocal slopes

29. What is an equation of the line that is perpendicular to the line whose equation is $y = \frac{3}{5}x - 2$ and that passes through the point $(3,-6)$?

$x_1 \; y_1$

1) $y = \frac{5}{3}x - 11$
2) $y = -\frac{5}{3}x + 11$
3) $y = -\frac{5}{3}x - 1$
4) $y = \frac{5}{3}x + 1$

$m\perp = -\frac{5}{3}$
$x_1 = 3$
$y_1 = -6$

$y - y_1 = m(x - x_1)$
$y + 6 = -\frac{5}{3}(x-3)$
$y + 6 = -\frac{5}{3}x + 5$
$-6 \quad -6$
$y = -\frac{5}{3}x - 1$

$m\parallel = -\frac{3}{2}$ $\quad y - y_1 = m(x - x_1)$

$x_1 = 2$ $\quad y + 1 = -\frac{3}{2}(x - 2)$

$y_1 = -1$

Same slope

30. An equation of the line that passes through $(2,-1)$ and is parallel to the line $2y + 3x = 8$ is

$-3x \quad -3x$

$\frac{2y}{2} = \frac{-3x + 8}{2}$

$y = -\frac{3}{2}x + 4$

1) $y+1=-\frac{3}{2}(x-2)$
2) $y+1=\frac{2}{3}(x-2)$
3) $y-1=-\frac{3}{2}(x+2)$
4) $y-1=\frac{2}{3}(x+2)$

31. A right circular cylinder has a volume of 1,000 cubic inches and a height of 8 inches. What is the diameter of the cylinder to the *nearest tenth of an inch*?

1) 6.3
2) 12.6
3) 19.8
4) 39.8

$V = \pi r^2 h$

$1000 = \pi r^2 (8)$

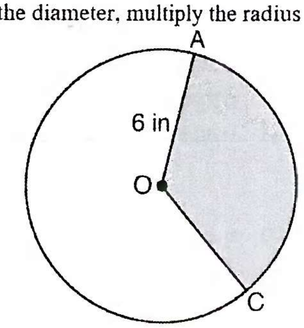
math up!

$r = 6.3$

$d = 2(6.3) = 12.6$

Geometry with Algebra
Substitute into appropriate formula
Solve the equation
OR
USE EQUATION SOLVER (Math, Up)
E1: Left Hand Side, E2: Right Hand Side
Graph, 10, Graph
*If asked for the diameter, multiply the radius by 2!

32. In the diagram below of circle O, the area of the shaded sector AOC is 12π in^2 and the length of $\overline{OA}$ is 6 inches. Determine and state $m\angle AOC$.



1) 60
2) 120
3) 45
4) 145

$A = \frac{\theta \pi r^2}{360}$ $\quad 12\pi = \frac{x\pi(6)^2}{360}$ $\quad x = 120$

Math, up!

33. The volume of a sphere is approximately 44.6022 cubic centimeters. What is the radius of the sphere, to the *nearest tenth of a centimeter*?

1) 2.2
2) 3.3
3) 4.4
4) 4.7

$V = \frac{4}{3}\pi r^3$ $\quad r = 2.2$

$44.6022 = \frac{4}{3}\pi r^3$

math, up!

34. What is the measure of a central angle whose arc length is 6 meters and whose radius measures 8 meters?

1) 43.0
2) 21.5
3) 47.2
4) 37.5

$L = \frac{\theta \pi d}{360}$ $\quad$ Math, up!

$6 = \frac{x\pi(16)}{360}$ $\quad x = 43$

35. The volume of a cylinder is 12,566.4 cm^3. The height of the cylinder is 8 cm. Find the diameter of the cylinder to the *nearest tenth of a centimeter*.

1) 12.3
2) 22.4
3) 44.7
4) 501.8

$V = \pi r^2 h$

$12566.4 = \pi r^2 8$

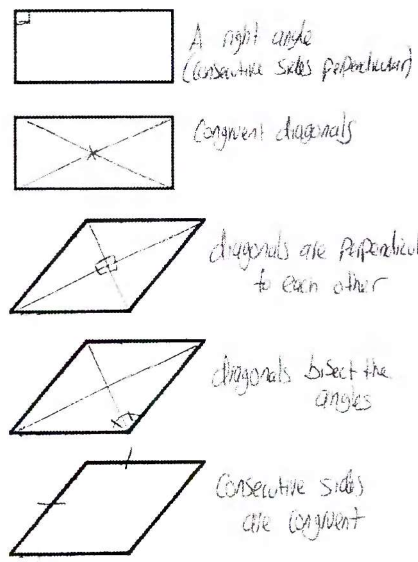
math, up!

$r = 22.36..$

$d = 2(22.36..) = 44.7$

need rhombus prove

36. A parallelogram must be a rhombus when its
1) Diagonals are congruent.
2) Opposite sides are parallel.
3) Diagonals are perpendicular.
4) Opposite angles are congruent.



rectangle ✗ rhombus ✓
needs rectangle prove

37. A rhombus must be a square when its
1) consecutive sides are congruent
2) diagonals are congruent
3) opposite angles are congruent
4) diagonals are perpendicular to each other

need rectangle prove

38. A parallelogram must be a rectangle when its
1) diagonals are perpendicular
2) diagonals are congruent
3) opposite sides are parallel
4) opposite sides are congruent

rectangle ✓ rhombus ✗
Need rhombus prove

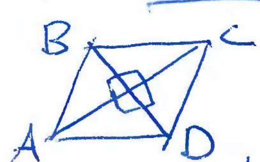
39. A rectangle must be a square when its
1) angles are right angles
2) diagonals are congruent
3) diagonals are perpendicular to each other
4) opposite sides are parallel

need rhombus prove

40. If $ABCD$ is a parallelogram, which statement would prove that $ABCD$ is a rhombus?

1) $\angle ABC \cong \angle CDA$
2) $\overline{AC} \cong \overline{BD}$
3) $\overline{AC} \perp \overline{BD}$
4) $\overline{AB} \perp \overline{CD}$

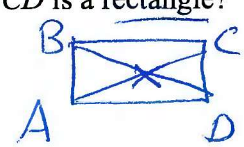
perpendicular diagonals



need rectangle prove

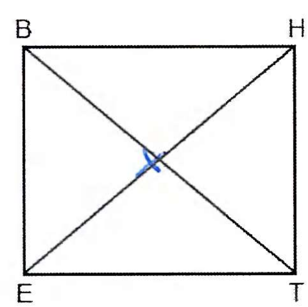
41. If $ABCD$ is a parallelogram, which statement would prove that $ABCD$ is a rectangle?

1) $\angle ABC \cong \angle CDA$
2) $\overline{AC} \cong \overline{BD}$ congruent diagonals
3) $\overline{AC} \perp \overline{BD}$
4) $\overline{AB} \perp \overline{CD}$



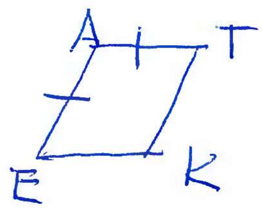
42. Parallelogram $BETH$, with diagonals $\overline{BT}$ and $\overline{HE}$, is drawn below. What additional information is sufficient to prove that $BETH$ is a rectangle? need rectangle prove

1) $\overline{BT} \perp \overline{HE}$
2) $\overline{BE} \parallel \overline{HT}$
3) $\overline{BT} \cong \overline{HE}$ congruent diagonals
4) $\overline{BE} \cong \overline{ET}$



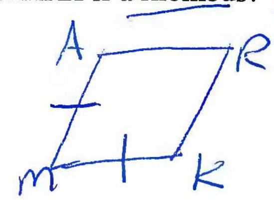
43. Parallelogram $EATK$ has diagonals $\overline{ET}$ and $\overline{AK}$. Which information is always sufficient to prove $EATK$ is a rhombus? need rhombus prove

1) $\overline{EA} \perp \overline{AT}$
2) $\overline{EA} \cong \overline{AT}$ consecutive sides congruent
3) $\overline{ET} \cong \overline{AK}$
4) $\overline{ET} \cong \overline{AT}$



44. Which congruence statement is sufficient to prove parallelogram $MARK$ is a rhombus? need rhombus prove

1) $\overline{MA} \cong \overline{MK}$ consecutive sides congruent
2) $\overline{MA} \cong \overline{KR}$
3) $\angle K \cong \angle A$
4) $\angle R \cong \angle A$



Triangles/Parallel Lines Cut By a Transversal/Angles of Parallelograms

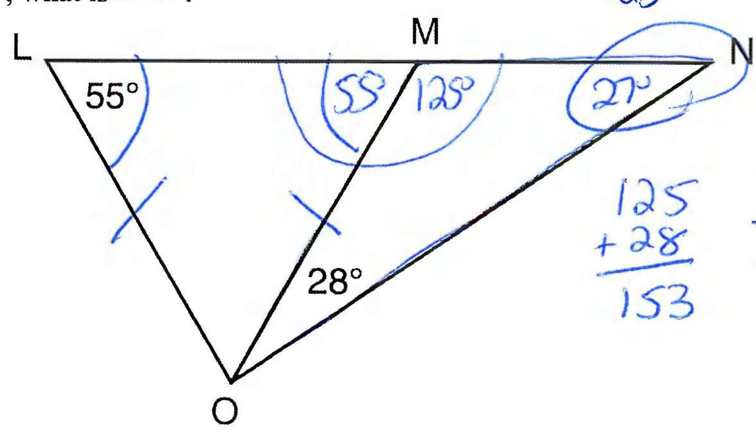
1) The three angles of a triangle add to equal 180°. **Look for triangles.**
   *The four angles of a quadrilateral add to 360°.
2) Linear pairs add to 180°. **Look for linear pairs.**
3) Vertical angles are congruent. Look for an X (intersecting lines).
4) **Given congruent sides:** Isosceles triangle has congruent angles opposite congruent sides.
5) **Given equilateral triangle:** Equilateral triangle has angles 60, 60, 60.
6) **Given angle bisector:** An angle bisector cuts an angle into two congruent halves.
7) **Given parallel:** Extend parallel lines and transversal. Follow the transversal and fill in all 8 angles. If angles are the same (both acute or both obtuse), the angles are congruent. If the angles are different (one acute and one obtuse), the angles are supplementary (add to 180).
8) **Given parallelogram:** Opposite angles are congruent and consecutive angles are supplementary (add to 180)

45. In the diagram below, $\triangle LMO$ is isosceles with $LO = MO$.

$180 - 55 = 125$

If $m\angle L = 55$ and $m\angle NOM = 28$, what is $m\angle N$?

1) 27
2) 28
3) 42
4) 70

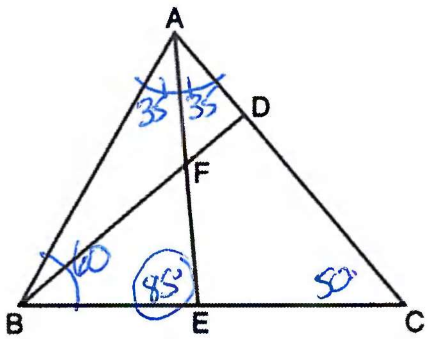


$125 + 28 = 153$

$180 - 153 = 27$

46. In the diagram of $\triangle ABC$ below, $\overline{AE}$ bisects angle BAC, and altitude $\overline{BD}$ is drawn. If $m\angle C = 50°$ and $m\angle ABC = 60°$, what is $m\angle FEB$?

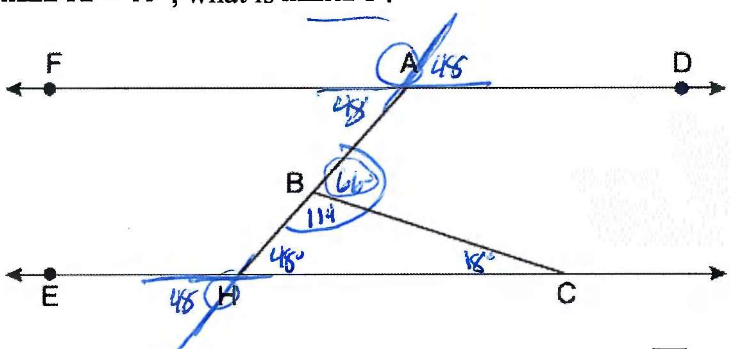
$\angle FEB = 85°$



$\triangle ABC$: $60 + 50 = 110$; $180 - 110 = 70$

$\triangle AEB$: $60 + 35 = 95$; $180 - 95 = 85$

47. In the diagram below, $\overline{FAD} \parallel \overline{EHC}$, and $\overline{ABH}$ and $\overline{BC}$ are drawn. If $m\angle FAB = 48°$ and $m\angle ECB = 18°$, what is $m\angle ABC$?



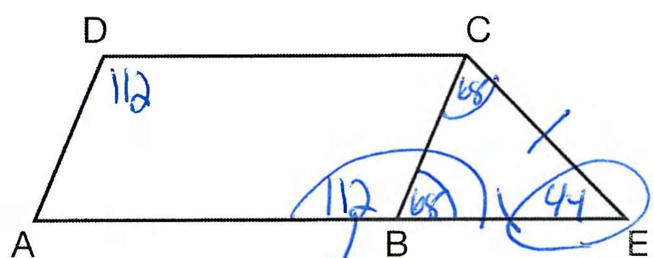
$48 + 18 = 66$; $180 - 66 = 114$; $180 - 114 = 66$

$\angle ABC = 66°$

48. In the diagram below, $ABCD$ is a parallelogram, $\overline{AB}$ is extended through B to E, and $\overline{CE}$ is drawn.

If $\overline{CE} \cong \overline{BE}$ and $m\angle D = 112°$, what is $m\angle E$?

1) 44°
2) 56°
3) 68°
4) 112°

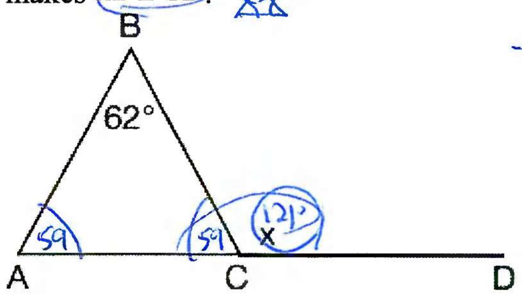


opposite angles of a parallelogram are congruent

$180 - 112 = 68$

$68 + 68 = 136$; $180 - 136 = 44$

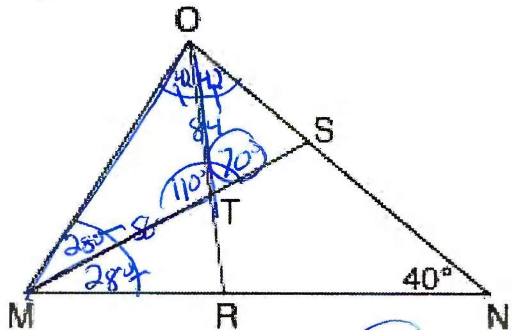
49. Given $\triangle ABC$ with $m\angle B = 62°$ and side $\overline{AC}$ extended to D, as shown below. Which value of x makes $\overline{AB} \cong \overline{CB}$?



$\begin{array}{r} 180 \\ -62 \\ \hline 118 \end{array}$ $\quad \frac{118}{2} = 59$

$\begin{array}{r} 180 \\ -59 \\ \hline 121 \end{array}$

50. In the diagram below of triangle MNO, $\angle M$ and $\angle O$ are bisected by $\overline{MS}$ and $\overline{OR}$, respectively. Segments MS and OR intersect at T, and $m\angle N = 40°$. If $m\angle TMR = 28°$, what is the measure of angle OTS?

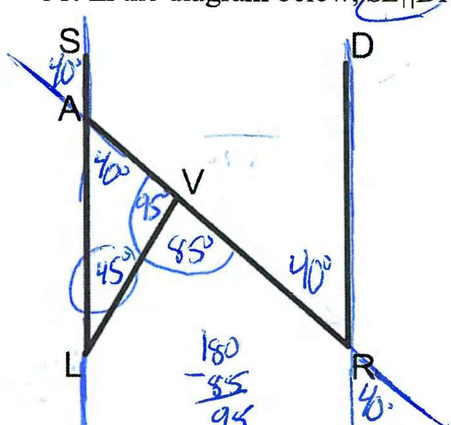


$\triangle MON$: $\begin{array}{r} 56 \\ +40 \\ \hline 96 \end{array}$ $\begin{array}{r} 180 \\ -96 \\ \hline 84 \end{array}$

$\triangle MOT$: $\begin{array}{r} 28 \\ +42 \\ \hline 70 \end{array}$ $\begin{array}{r} 180 \\ -70 \\ \hline 110 \end{array}$

$\begin{array}{r} 180 \\ -110 \\ \hline 70 \end{array}$

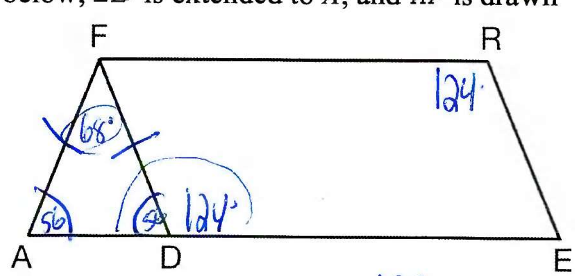
51. In the diagram below, $SL || DR$, $m\angle DRA = 40$, and $m\angle LVR = 85$. Find $m\angle ALV$.



$\begin{array}{r} 180 \\ -85 \\ \hline 95 \end{array}$

$\begin{array}{r} 40 \\ +95 \\ \hline 135 \end{array}$ $\begin{array}{r} 180 \\ -135 \\ \hline 45 \end{array}$ $\quad \angle ALV = 45$

52. In the diagram of parallelogram $FRED$ shown below, $\overline{ED}$ is extended to A, and $\overline{AF}$ is drawn such that $\overline{AF} \cong \overline{DF}$.



If $m\angle R = 124°$, what is $m\angle AFD$?

1) 124°
2) 112°
3) 68°
4) 56°

$\begin{array}{r} 56 \\ +56 \\ \hline 112 \end{array}$ $\begin{array}{r} 180 \\ -112 \\ \hline 68 \end{array}$

$\begin{array}{r} 180 \\ -124 \\ \hline 56 \end{array}$

DD4V CCA

Reference Sheet for Geometry (NGLS)

Density $d = \frac{mass}{volume}$

Population Density: $pd = \frac{Population}{area}$

$y - y_1 = m(x - x_1)$

$A = \frac{\theta \pi r^2}{360}$ $L = \frac{\theta \pi d}{360}$

Area of a Circle   Arc Length

Volume	~~Cylinder~~	~~$V = Bh$ where B is the area of the base~~
	~~General Prism~~	~~$V = Bh$ where B is the area of the base~~
	Sphere	$V = \frac{4}{3}\pi r^3$
	~~Cone~~	~~$V = \frac{1}{3}Bh$ where B is the area of the base~~
	~~Pyramid~~	~~$V = \frac{1}{3}Bh$ where B is the area of the base~~

Rectangular Prism $V = lwh$

Triangular Prism $V = \frac{1}{2} lwh$

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

Cylinder $V = \pi r^2 h$

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

$2(EA) = major - minor$
$2(VA) = arc + arc$ arcs and angles

part · part = part · part
whole · exterior = whole · exterior segments

Triangle Area

$A = \frac{1}{2} ab \sin C$