GEOMETRY

Midterm Review Questions
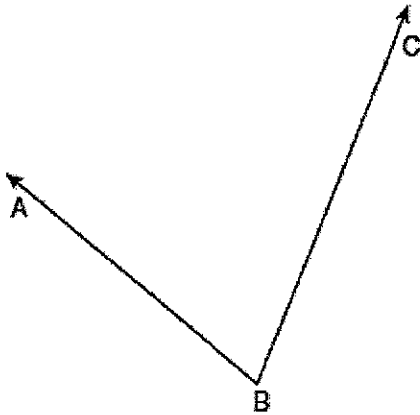
Midterm Exam:
Thursday, January 25, 2018
## 8:00-9:30 AM
Room _____

Be sure to have:
Black/Blue pens
Pencils
Graphing Calculator
Compass
Straight Edge

1. Using a compass and straightedge, construct the angle bisector of $\angle ABC$ shown below. [Leave all construction marks.]
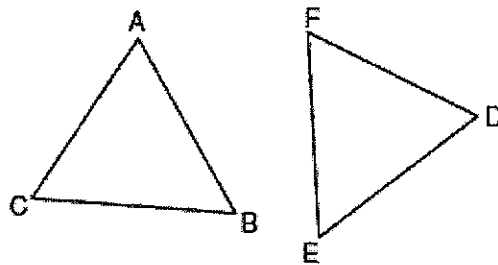

2. In $\triangle ABC$, $m\angle A = 3x + 1$, $m\angle B = 4x - 17$, and $m\angle C = 5x - 20$. Which type of triangle is $\triangle ABC$?
    1) right
    2) scalene
    3) isosceles
    4) equilateral

3. Determine the scale factor of the given dilation from point O?
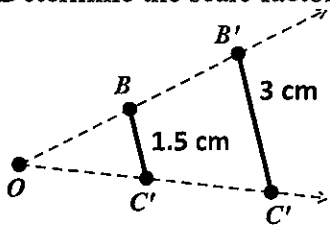
4. In the diagram of $\triangle ABC$ and $\triangle DEF$ below, $\overline{AB} \cong \overline{DE}$, $\angle A \cong \angle D$, and $\angle B \cong \angle E$.

Which method can be used to prove $\triangle ABC \cong \triangle DEF$?
    1) SSS
    2) SAS
    3) ASA
    4) HL

5. If the image of A after a dilation of -2 is $A'(-8,6)$, what are the coordinates of A? Dilation centered at origin

    1) $(4,-3)$
    2) $(-4,3)$
    3) $(16,-12)$
    4) $(-16,12)$

6. Find the coordinates of the image of $(2,4)$ under the transformation $r_{x=5} \circ T_{<3,-5>}$.

7. A quadrilateral whose diagonals bisect each other and are perpendicular is a

    1) rhombus
    2) rectangle
    3) trapezoid
    4) parallelogram

8. The vertices of $\triangle RST$ are $R(-6,5)$, $S(-7,-2)$, and $T(1,4)$. The image of $\triangle RST$ after the composition $T_{-2,3} \circ r_{y=x}$ is $\triangle R''S''T''$. State the coordinates of $\triangle R''S''T''$. [The use of the set of axes below is optional.]
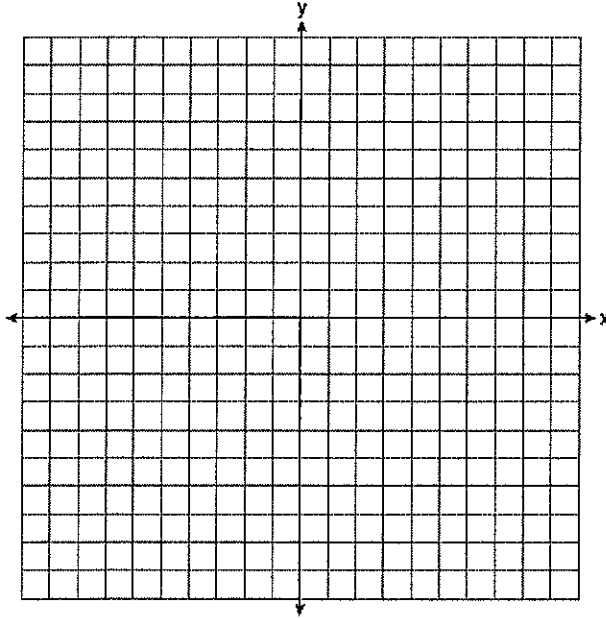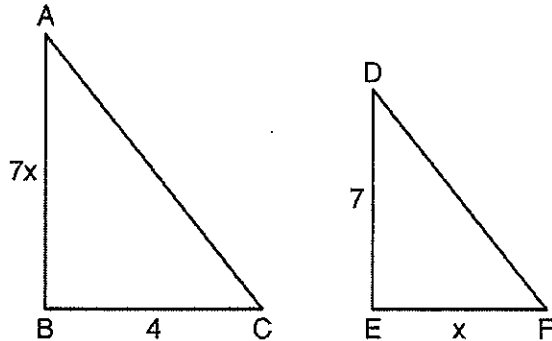

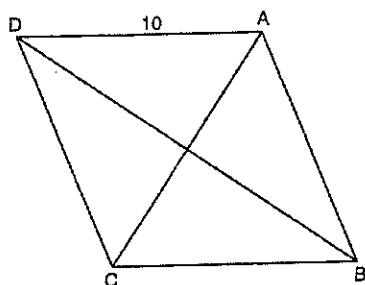9. What is the resulting translation when a figure is reflected $r_{x=4} \circ r_{x=7}$? SKIP.

10. As shown in the diagram below, $\triangle ABC \sim \triangle DEF$, $AB = 7x$, $BC = 4$, $DE = 7$, and $EF = x$.
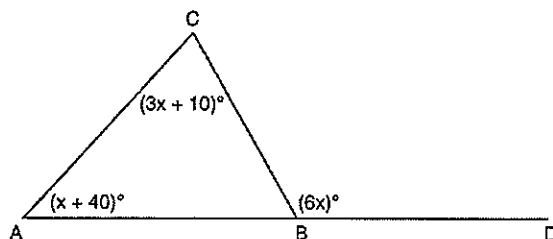   What is the length of $\overline{AB}$?
    1) 28
    2) 2
    3) 14
    4) 4

2

11. In rhombus $ABCD$, with diagonals $\overline{AC}$ and $\overline{DB}$, $AD = 10$.

If the length of diagonal $\overline{AC}$ is 12, what is the length of $\overline{DB}$?
   1) 8
   2) 16
   3) $\sqrt{44}$
   4) $\sqrt{136}$

12. In the diagram of $\triangle ABC$ below, $\overline{AB}$ is extended to point D.
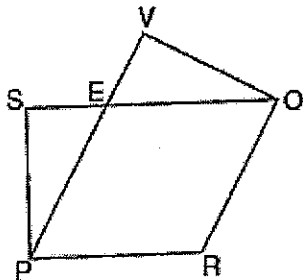

If $m\angle CAB = x + 40$, $m\angle ACB = 3x + 10$, $m\angle CBD = 6x$, what is $m\angle CAB$?

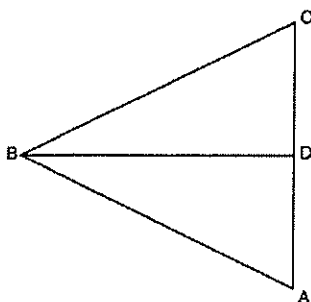13. **_True or False_**:   A translation may have invariant points.

14. Given: $PROE$ is a rhombus, $\overline{SEO}$, $\overline{PEV}$, $\angle SPR \cong \angle VOR$
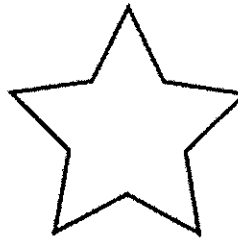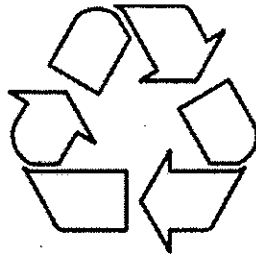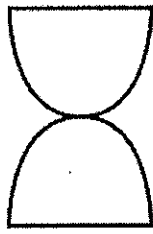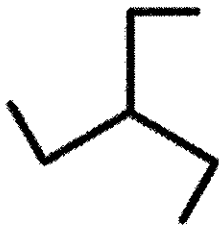   Prove: $\overline{SE} \cong \overline{EV}$

15. Given: $\triangle ABC$, $\overline{BD}$ bisects $\angle ABC$, $\overline{BD} \perp \overline{AC}$
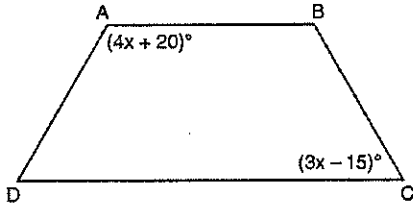   Prove: $\overline{AB} \cong \overline{CB}$

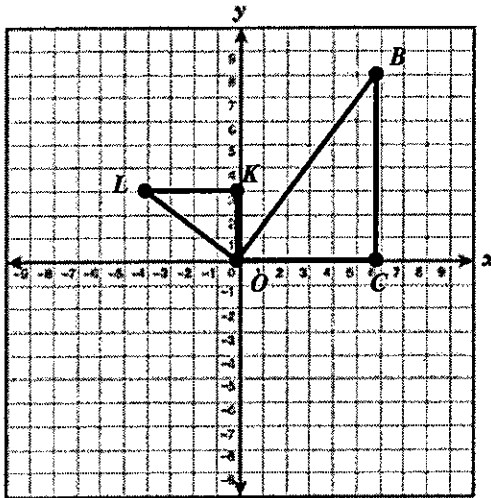16. State which type of symmetry each figure has (rotational, reflectional)

Rotational Symmetry

17. In the diagram of trapezoid $ABCD$ below, $\overline{AB} \parallel \overline{DC}$, $\overline{AD} \cong \overline{BC}$, $m\angle A = 4x + 20$, and $m\angle C = 3x - 15$.
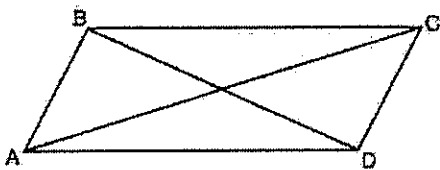
A _____ B
(4x + 20)°

(3x − 15)°
D _____ C

What is $m\angle D$?

18. Determine the two transformations that map Δ LKO onto Δ BCO.

19. Quadrilateral $ABCD$ with diagonals $\overline{AC}$ and $\overline{BD}$ is shown in the diagram below.

Which information is *not* enough to prove $ABCD$ is a parallelogram?
1) $\overline{AB} \cong \overline{CD}$ and $\overline{AB} \parallel \overline{DC}$
2) $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \cong \overline{DA}$
3) $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \parallel \overline{AD}$
4) $\overline{AB} \parallel \overline{DC}$ and $\overline{BC} \parallel \overline{AD}$

20. Which set of statements would describe a parallelogram that can always be classified as a rhombus?
   I. Diagonals are perpendicular bisectors of each other.
   II. Diagonals bisect the angles from which they are drawn.
   III. Diagonals form four congruent isosceles right triangles.
1) I and II
2) I and III
3) II and III
4) I, II, and III

4

Name: _____

Geometry Midterm Review #2 Odds

1) After a composition of transformations, the coordinates $A(4,2)$, $B(4,6)$, and $C(2,6)$ become $A''(-2,-1)$, $B''(-2,-3)$, and $C''(-1,-3)$, as shown on the set of axes below.
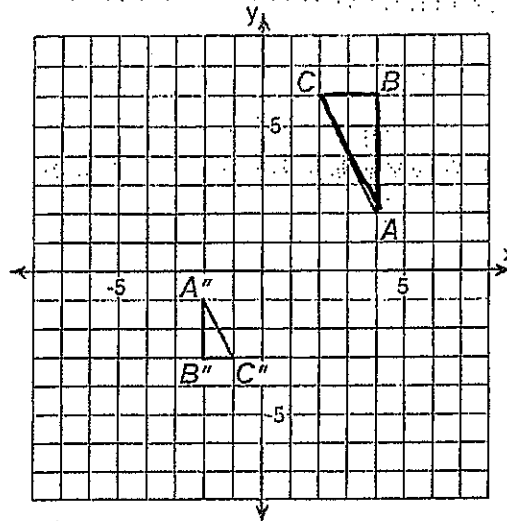
What composition of transformations was used? (Dilations + Rotations centred at origin.)

A) $R_{180°} \circ D_2$ B) $D_{\frac{1}{2}} \circ R_{180°}$ C) $D_{\frac{1}{2}} \circ R_{90°}$ D) $R_{90°} \circ D_2$

2) In isosceles triangle ABC, $AB = BC$. Which statement will *always* be true?

A) $m\angle A = m\angle C$ B) $m\angle C < m\angle B$ C) $m\angle A > m\angle B$ D) $m\angle B = m\angle A$

3) In the diagram below of $\triangle AGE$ and $\triangle OLD$, $\angle GAE \cong \angle LOD$, and $\overline{AE} \cong \overline{OD}$.
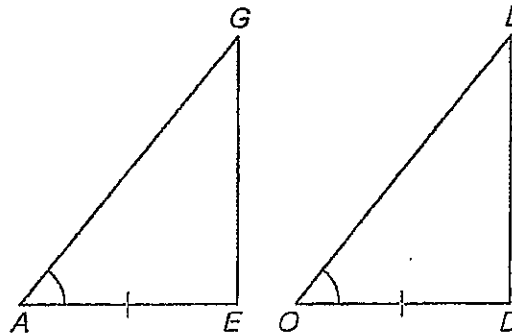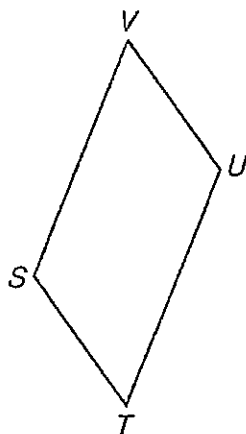

To prove that $\triangle AGE$ and $\triangle OLD$ are congruent by SAS, what other information is needed?

A) $\angle AGE \cong \angle OLD$ B) $\overline{AG} \cong \overline{OL}$ C) $\angle AEG \cong \angle ODL$ D) $\overline{GE} \cong \overline{LD}$

5

4) Based on the diagram below, which of the following statements is true?
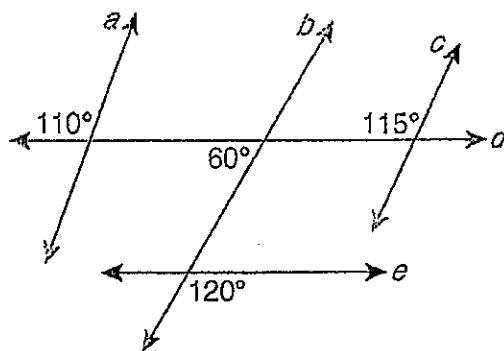
A) $b \parallel c$ B) $a \parallel c$ C) $a \parallel b$ D) $d \parallel e$

5) In the diagram below of parallelogram $STUV$, $SV = x + 3$, $VU = 2x - 1$, and $TU = 4x - 3$.

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

A) 4   B) 7   C) 2   D) 5

6) If $\triangle ABC \sim \triangle ZXY$, $m\angle A = 50°$, and $m\angle C = 30°$, what is $m\angle X$?

A) 30°   B) 80°   C) 100°   D) 50°

7) In the diagram below, the length of the legs $\overline{AC}$ and $\overline{BC}$ of right triangle ABC are 6 cm and 8 cm, respectively. Altitude $\overline{CD}$ is drawn to the hypotenuse of $\triangle ABC$.
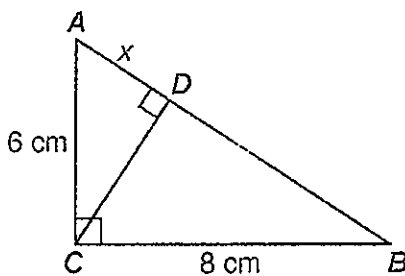
What is the length of $\overline{AD}$ to the nearest tenth of a centimeter?

A) 4.0   B) 3.6   C) 6.4   D) 6.0

6

8) In the diagram below of parallelogram *ABCD* with diagonals $\overline{AC}$ and $\overline{BD}$, m∠1 = 45° and m∠*DCB* = 120°.
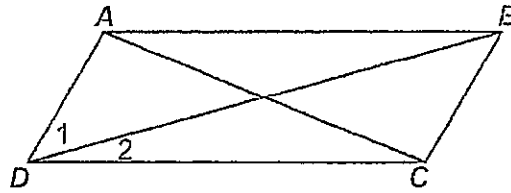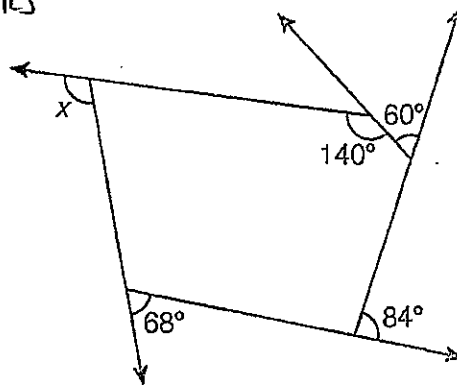
What is the measure of ∠2?

A) 60°   B) 30°   C) 45°   D) 15°

9) The pentagon in the diagram below is formed by five rays.

Sum of interior angles
of a polygon
found using
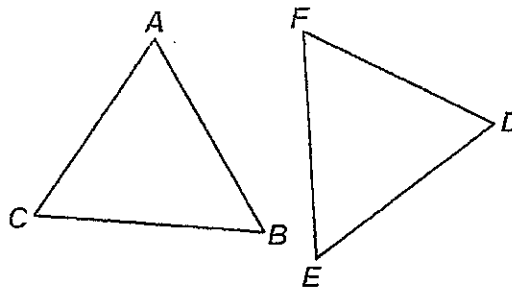formula
180 (#of sides −2)

What is the degree measure of angle *x*?

A) 108°   B) 96°   C) 112°   D) 72°

10) What is the image of point *A*(4,2) after the composition of transformations defined by $R_{90°} \circ r_{y=x}$? (Rotation centered at origin)

A) (-4,2)   B) (-4,-2)   C) (4,-2)   D) (2,-4)
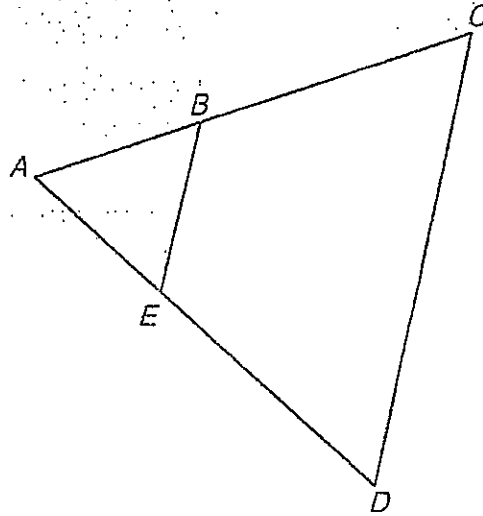
11) In the diagram of △*ABC* and △*DEF* below, $\overline{AB} \cong \overline{DE}$, ∠*A* ≅ ∠*D*, and ∠*B* ≅ ∠*E*.

Which method can be used to prove △*ABC* ≅ △*DEF*?

A) HL   B) SSS   C) ASA   D) SAS

7

12) In the diagram below of $\triangle ACD$, E is a point on $\overline{AD}$ and B is a point on $\overline{AC}$, such that $\overline{EB} \parallel \overline{DC}$. If $AE = 3$, $ED = 6$, and $DC = 15$, find the length of $\overline{EB}$. [*Show all work.*]

13) In the diagram below, quadrilateral $STAR$ is a rhombus with diagonals $\overline{SA}$ and $\overline{TR}$ intersecting at E. $ST = 3x + 30$, $SR = 8x - 5$, $SE = 3z$, $TE = 5z + 5$, $AE = 4z - 8$, $m\angle RTA = (5y - 2)°$, and $m\angle TAS = (9y + 8)°$. Find SR, RT, and $m\angle TAS$. [*Show all work.*]
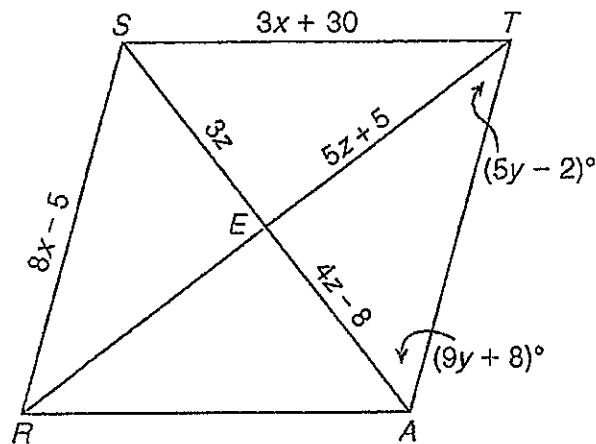
8

14)

a) $r_n(D) = $ _____

b) $r_m(E) = $ _____

c) $r_m(G) = $ _____

d) $r_s($ _____ $) = H$
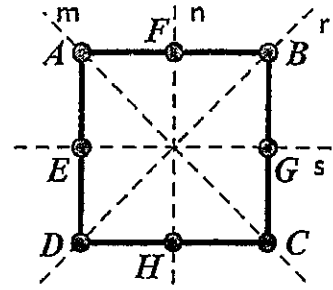
minimum

15) What is the angle of rotational symmetry for a regular decagon?

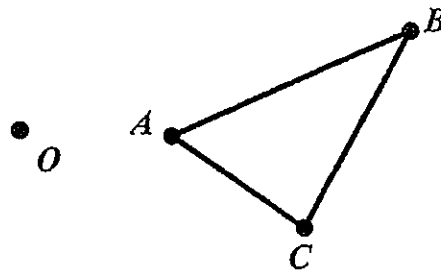   a) 18°   b) 36°   c) 45°   d) 72°

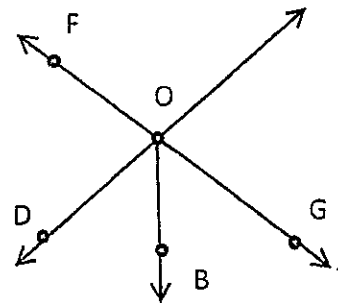16) Perform the following construction

$D_{0,-1}(\triangle ABC)$

17) If $\overline{OB}$ bisects $<DOG$, and $<DOB = 44°$, then the $m < FOD = $

     1) 88   2) 92   3) 44   4) 180

9

1. Using a compass and straightedge, construct an equilateral triangle with $\overline{AB}$ as a side. Using this triangle, construct a 30° angle with its vertex at A. [Leave all construction marks.]

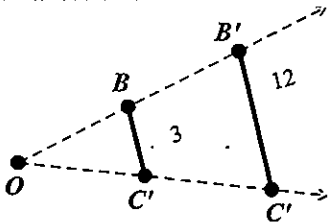A ————————————————— B

2. This shape has:

   1) Only Rotational Symmetry   2) Only Reflectional Symmetry
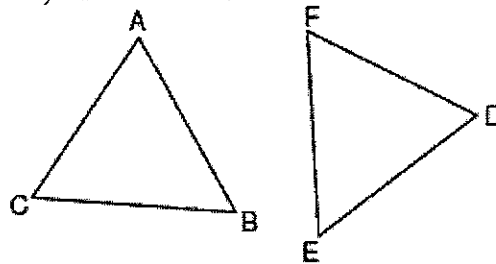   3) Both Rotational & Reflectional Symmetries   4) Neither symmetry

3. Determine the scale factor of the given dilation from point O?

   B'

   B

   12

   3

   O

   C'

   C'

4. In the diagram of $\triangle ABC$ and $\triangle DEF$ below, $\overline{BC} \cong \overline{EF}$, $\angle A \cong \angle D$, and $\angle B \cong \angle E$.
   Which method can be used to prove $\triangle ABC \cong \triangle DEF$?
   1) AAS
   2) SAS
   3) ASA
   4) HL

5. If the image of A after a dilation of $\frac{1}{2}$ is $A'(-2,3)$, what are the coordinates of A? (centered at origin)
   1) (-1,1.5)
   2) (-4,6)
   3) (4,-6)
   4) (1,-1.5)

10

6. A double reflection over y = -3 followed by y = -1, translates all points:
   1) up 4 units
   2) down 4 units   *skip*
   3) up 8 units
   4) down 8 units

7. Which figure does *not* always have congruent diagonals?

   1) square
   2) rhombus
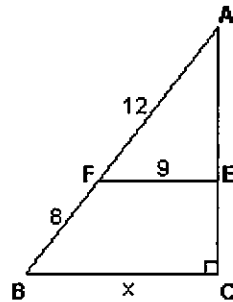   3) rectangle
   4) isosceles trapezoid

8. The coordinates of $\triangle JRB$ are $J(1,-2)$, $R(-3,6)$, and $B(4,5)$. State the coordinates of the vertices of its image after the transformation $T_{2,-1} \circ r_{y\text{-axis}}$?

9. What is the image of point $(1,1)$ under $r_{x\text{-axis}} \circ R_{0,90°}$?

   1) $(1,1)$
   2) $(1,-1)$
   3) $(-1,1)$
   4) $(-1,-1)$

10. In the diagram of $\triangle ABC$: $\overline{AFB}$, $\overline{AEC}$, $\overline{AC} \perp \overline{CB}$, $\overline{AE} \perp \overline{EF}$, $BF = 8$, $FA = 12$, $FE = 9$, and $BC = x$. What is the value of x?

   1) 3
   2) 5.4
   3) 6
   4) 15

11. In rhombus $ABCD$, with diagonals AC and $D\overline{B}$, If the length of diagonal $\overline{AC}$ is 10 and the length of diagonal $\overline{DB}$ is 24, what is the perimeter of ABCD?

   1) 26
   2) 104
   3) 13
   4) 52

11

12. In $\triangle ABC$, $m\angle A = 3x + 1$, $m\angle B = 4x - 17$, and $m\angle C = 5x - 20$. Which type of triangle is $\triangle ABC$?
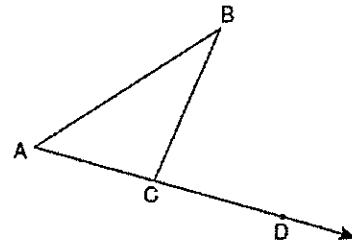
1) right
2) scalene
3) isosceles
4) equilateral

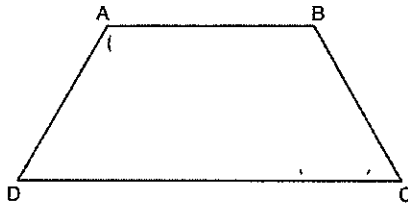13. *True or False*: A rotation may have invariant points.

14. In the diagram below, $\triangle ABC$ is shown with $\overline{AC}$ extended through point D.

If $m\angle BCD = 6x + 2$, $m\angle BAC = 3x + 15$, and $m\angle ABC = 2x - 1$, what is the value of x?
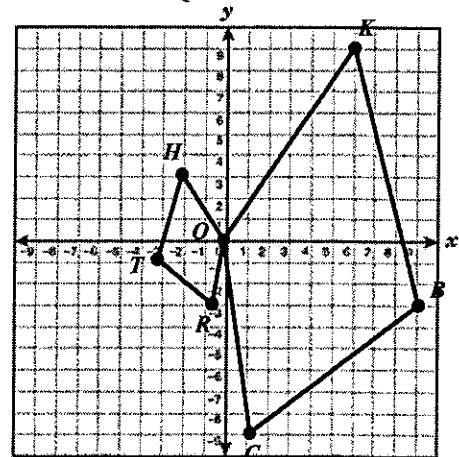1) 12
2) $14\frac{10}{11}$
3) 16
4) $18\frac{1}{9}$

15. In the diagram of trapezoid $ABCD$ below, $\overline{AB} \parallel \overline{DC}$, $\overline{AD} \cong \overline{BC}$, $m < A = 12x - 4$, and $m < C = 4x$.

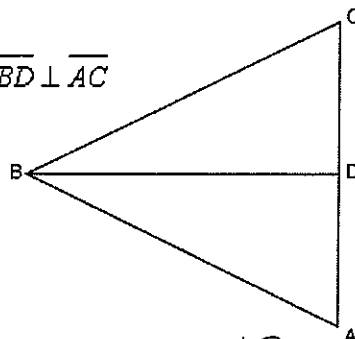Find: x_____   m<B_____   m<D_____

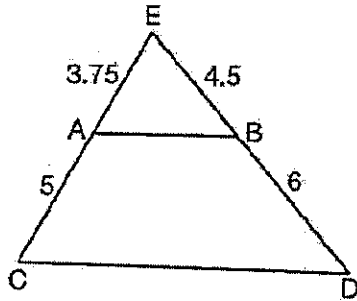16. Determine two similarity transformations that would map Quad. OKBC onto Quad. OHTR.

_____ followed by _____

17. Given: $\triangle ABC$, $\overline{BD}$ bisects AC, $\overline{BD} \perp \overline{AC}$
    Prove< $C \cong$ < A

12

18. In $\triangle CED$ as shown below, points A and B are located on sides $\overline{CE}$ and $\overline{ED}$, respectively. Line segment AB is drawn such that $AE = 3.75$, $AC = 5$, $EB = 4.5$, and $BD = 6$.

Explain why $\overline{AB}$ is parallel to $\overline{CD}$.

19. 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 $m\angle E$?
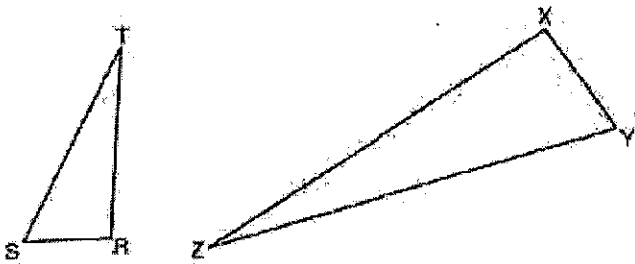1) 44°
2) 56°
3) 68°
4) 112°

20 In parallelogram $ABCD$, diagonals $\overline{AC}$ and $\overline{BD}$ intersect at E. Which statement does not prove parallelogram $ABCD$ is a rhombus?
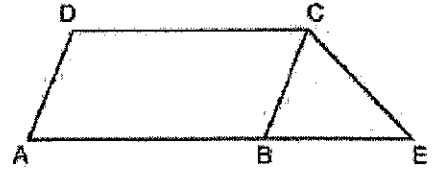1) $\overline{AC} \cong \overline{DB}$
2) $\overline{AB} \cong \overline{BC}$
3) $\overline{AC} \perp \overline{DB}$
4) $\overline{AC}$ bisects $\angle DCB$

21. Using the information given below, which set of triangles can not be proven similar?

1)

2)

3)

4)

22.

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.

13

23. On the graph below, point $A(3,4)$ and $\overline{BC}$ with coordinates $B(4,3)$ and $C(2,1)$ are graphed.
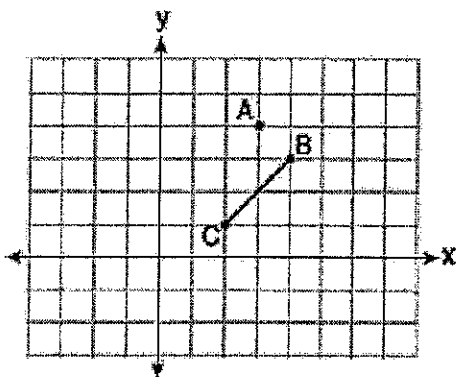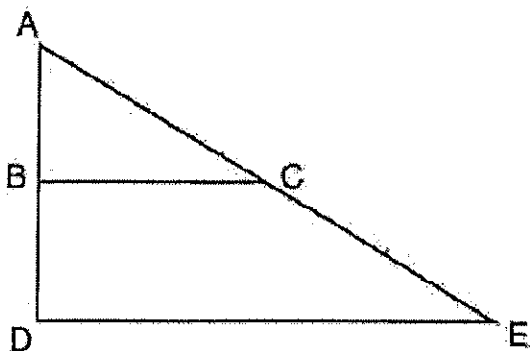

What are the coordinates of B' and C' after $\overline{BC}$ undergoes a dilation centered at point A with a scale factor of 2?
1) $B'(5,2)$ and $C'(1,-2)$
2) $B'(6,1)$ and $C'(0,-1)$
3) $B'(5,0)$ and $C'(1,-2)$
4) $B'(5,2)$ and $C'(3,0)$

24. The grid below shows $\triangle ABC$ and $\triangle DEF$.

Let $\triangle A'B'C'$ be the image of $\triangle ABC$ after a rotation about point A. Determine and state the location of B' if the location of point C' is $(8,-3)$. Explain your answer. Is $\triangle DEF$ congruent to $\triangle A'B'C'$? Explain your answer.
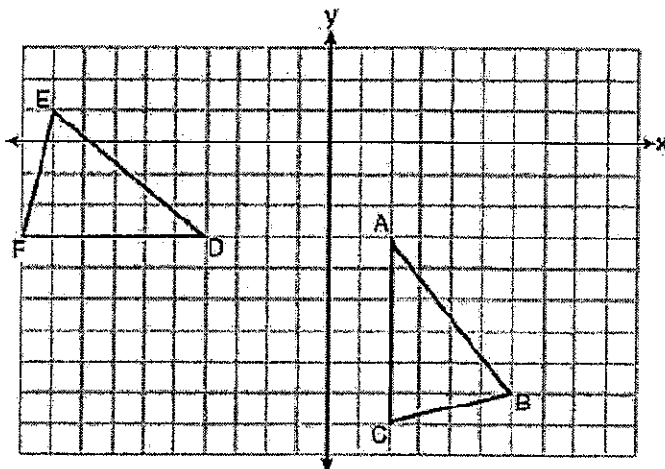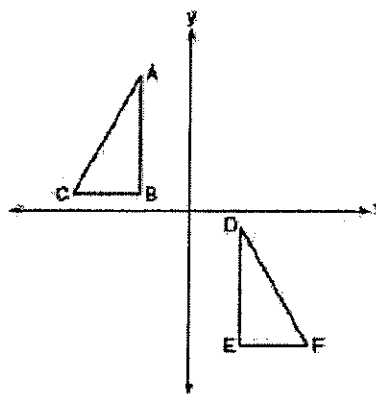
25.

The image of $\triangle ABC$ after a dilation of scale factor k centered at point A is $\triangle ADE$, as shown in the diagram below.

Which statement is always true?
1) $2AB = AD$
2) $\overline{AD} \perp \overline{DE}$
3) $AC = CE$
4) $\overline{BC} \parallel \overline{DE}$

26.
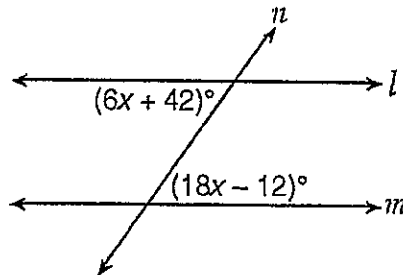In the diagram below, $\triangle ABC \cong \triangle DEF$.

Which sequence of transformations maps $\triangle ABC$ onto $\triangle DEF$?
1) a reflection over the x-axis followed by a translation
2) a reflection over the y-axis followed by a translation
3) a rotation of $180°$ about the origin followed by a translation
4) a counterclockwise rotation of $90°$ about the origin followed by a translation

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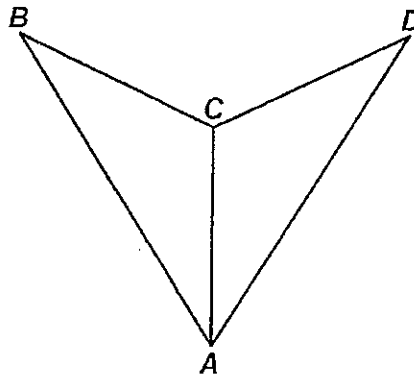NAME:_____   DATE:_____

GEOMETRY CC-Midterm Review #4   PERIOD:_____

1) Line n intersects lines ℓ and m, forming the angles shown in the diagram below.

Which value of x would prove $\ell \parallel m$?
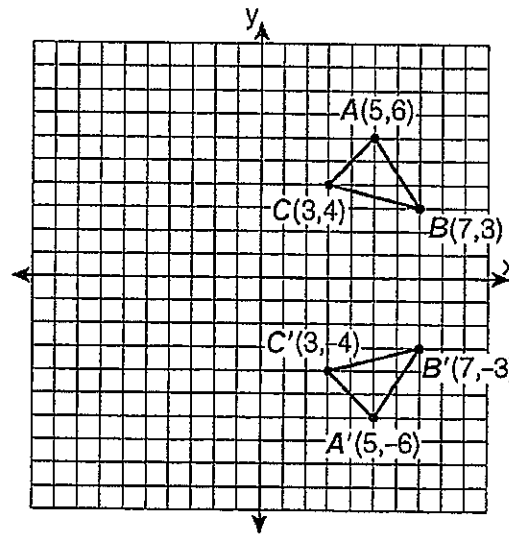
A) 4.5   B) 8.75   C) 2.5   D) 6.25

2) As shown in the diagram below, $\overline{AC}$ bisects $\angle BAD$ and $\angle B \cong \angle D$.


Which method could be used to prove $\triangle ABC \cong \triangle ADC$?

A) SAS   B) AAS   C) AAA   D) SSS

3) In parallelogram ABCD, $m\angle B = (4x + 4)^\circ$ and $m\angle D = (74 - x)^\circ$. Find $m\angle C$.

4) Which expression *best* describes the transformation shown in the diagram below?

A) same orientation; reflection in line

B) opposite orientation; reflection in line

C) opposite orientation; translation

D) same orientation; translation

5) As shown in the diagram below, the diagonals of parallelogram $QRST$ intersect at E. If $QE = x^2 + 6x$, $SE = x + 14$, and $TE = 6x - 1$, determine TE algebraically. [*Show all work.*]
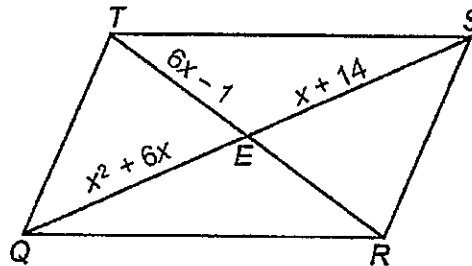

6) If the vertex angles of two isosceles triangles are congruent, then the triangles must be

A) acute

B) right

C) similar

D) congruent

7) In isosceles triangle DOG, the measure of the vertex angle is three times the measure of one of the base angles. Which statement about △DOG is true?

A) △DOG is a right triangle.

B) △DOG is an acute triangle.

C) △DOG is an obtuse triangle.

D) △DOG is a scalene triangle.

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8) What is the image of A(8,2) under $R_{90°}$? (centered at origin)
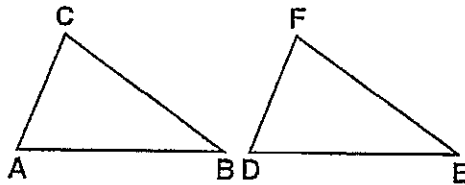
A) (-8,2)   B) (-2,8)   C) (8,-2)   D) (2,8)

9) In the accompanying diagram, $\overline{ABC} \parallel \overline{DE}$, $m\angle FDE = 25°$, $m\angle DFE = 130°$, and $m\angle ABD = x°$.
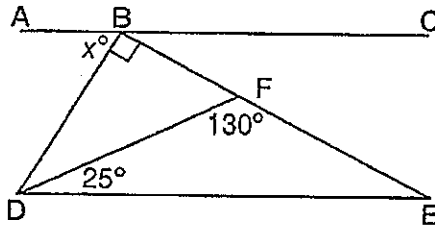
What is the value of x?

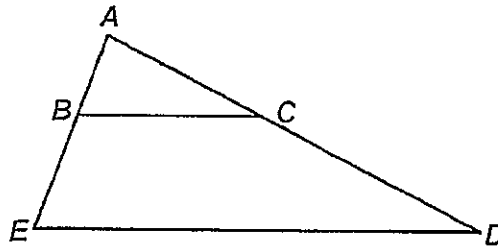10) In the diagram below, $\triangle ABC \cong \triangle DEF$.

Complete the statement $\angle DFE \cong \underline{?}$.

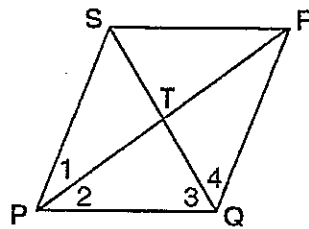A) $\angle CAB$ B) $\angle CBA$ C) $\angle ABC$ D) $\angle ACB$

11) Right triangle ABC has a right angle at C, altitude $\overline{CD}$ is drawn, AC = 10, and AB = 20. What is the length of $\overline{AD}$?

A) 2   B) 40   C) $\sqrt{200}$ D) 5

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12) In the diagram below of $\triangle ADE$, B is a point on $\overline{AE}$ and C is a point on $\overline{AD}$ such that $\overline{BC} \parallel \overline{ED}$, $AC = x - 3$, $BE = 20$, $AB = 16$, and $AD = 2x + 2$. Find the length of $\overline{AC}$. [*Show all work.*]

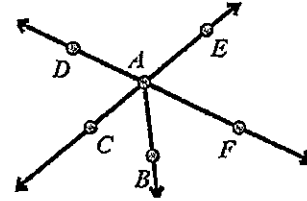13) In the diagram below, PQRS is a rhombus with diagonals $\overline{PR}$ and $\overline{SQ}$.

If m$\angle$SPQ = $(8x - 14)°$ and m$\angle 1 = (3x + 3)°$, find the value of x.

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14) What is the ^{minimum} angle of rotational symmetry for a Regular pentagon?

1) 120   2) 72   3) 90   4) 108
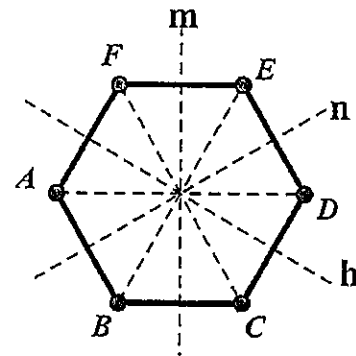
15) If $\overline{AB}$ bisects $\angle CAF$, and $m\angle CAB = 54°$, then the $m\angle DAC =$

1) 27°   2) 54°   3) 72°   4) 108°

16) Determine the name of the point that meets the given conditions.

a) $r_m (B) =$ _____

b) $r_{FC} (C) =$ _____

c) $r_h(A) =$ _____

d) $r_{AD}($ ___ $) = C$

e) $r_n(D) =$ _____

f) $r_m (E) =$ _____

17) Use a compass and a straightedge to construct $D_{o,-3}$ ($\triangle ADB$)

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