Name___*Answers*___ Date_____
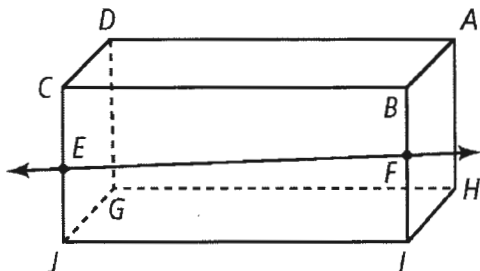
Semester 1 – Cumalative Final Review

Part 1 – Multiple Choice

Use the following figure for #1-3.

1) Which of the following planes intersect?

   A) planes ADC and GHI
   B) planes ABC and ABI
   C) planes CBF and ADG
   D) planes CBI and DAH
   E) None of the above

2) Which of the following planes is parallel to the plane that contains $\overline{EF}$?

   F) Plane AGH G) Plane BDF

   H) Plane ADE J) Plane CBH
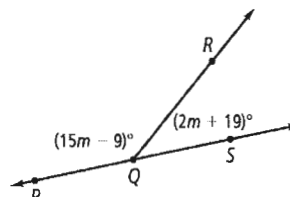
   K) None of the above

3) How many planes that are shown are perpendicular to the front face of the rectangular prism?

   A) 0   B) 1

   C) 4   D) 5

   E) None of the above

4) What is the next number in the sequence?
   8, -3, 5, -6, 2, -9, …

   F) 90   G) 29

   H) 6   J) 3

   K) None of the above

5) What is the measure of m?

   A) 10   B) 39

   C) 141   D) 180

   E) None of the above

Use the following conditional for #6 & 7

"If an animal has wings, then the animal can fly?"

6) What is the conclusion of the conditional?

   F) An animal has wings.
   G) The conditional is talking about birds.
   H) The animal can fly.
   J) Animals with wings can fly.
   K) None of the above

7) Which is a counterexample for the conditional?

   A) parrots   B) penguins

   C) hummingbirds   D) bats

   E) None of the above

8) What is the sum of the measures of the exterior angles of an equilateral triangle?

    F) 90°   G) 180°

    (H) 360°   J) 900°

    K) None of the above

9) What is the slope of a line parallel to $-8x + y = 2$?

    (A) 8   B) $\dfrac{8}{-1}$

    C) $\dfrac{-1}{8}$ D) $\dfrac{1}{8}$

    E) None of the above

10) Given $\triangle ABC$ with $m\angle B = (3x + 10)$ and $m\angle A = x$, if $m\angle C$ is the right angle, what is the value of x?

    F) 90°   G) 75°

    H) 45°   (J) 20°

    K) None of the above

11) Given that $m\angle 2 = 50°$, which postulate or theorem proves that $m\angle 2 = 50°$?

    A) Alternate Interior Angles Theorem
    B) Corresponding Angles Postulate
    C) Parallel Postulate
    D) Same-Side Interior Angles Theorem
    E) None of the above

12) A segment has a midpoint (-2, 9) and one endpoint (2, 8). What is the coordinate of the other endpoint?

    (F) (-6, 10)   G) (-4, 10)

    H) (-2, 0.5)   J) (0, 8.5)
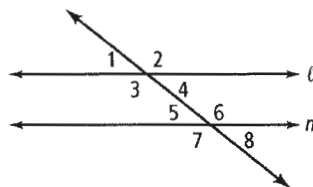
    K) None of the above

13) Given $\triangle ABC$ with $m\angle B = (3x + 10)$ and $m\angle A = x$, if $m\angle C$ is the right angle, what is the value of x?

    A) 90°   B) 75°

    C) 45°   D) 20°

    E) None of the above

14) If Joe turns off his alarm, then he sleeps too late. If Joe sleeps too late, then he misses his bus. Joe catches the bus. What can you conclude?
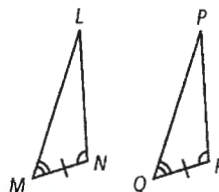
    F) Joe slept too late.
    G) Joe's mom woke him up.
    (H) Joe did not turn off his alarm.
    J) Joe set his alarm for the correct time.
    K) None of the above
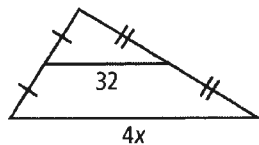
15) Which best describes $\angle 1$ and $\angle 5$?

    A) alternate interior angles
    B) alternate exterior angles
    (C) corresponding angles
    D) same-side exterior angles
    E) None of the above

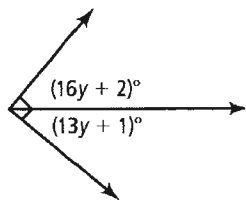16) Which postulate can be used to justify stating that $\triangle LMN \cong \triangle PQR$?

    (F) ASA   G) SAS

    H) SSS   J) AAS

    K) None of the above

17) What is the value of x in the diagram at the right?

A) 4   B) 8

C) 16   D) 32

E) None of the above

18) Which side lengths would not make a triangle?

F) 3, 4, 5   G) 3, 6, 2

H) 8, 8, 8   J) 10, 25, 30

K) None of the above

19) What is the value of y?

A) 90   B) 29
C) 6   D) 3
E) None of the above

20) The shadow of a fire hydrant is 5 ft. long. At the same time of day, the shadow of a nearby tree is 2 ft. less than 6 times as long as the shadow of the fire hydrant. If the fire hydrant is 2 ft. tall, how tall is the tree?

F) 11.2 ft.   G) 12.8 ft.

H) 35 ft.   J) 47.5 ft.

K) None of the above

21) Which is not a point of concurrency in a triangle?

A) incenter   B) orthocenter

C) altitude   D) centroid

E) None of the above

22) Which line is perpendicular to $3x + 5y = 2$?

F) $5x - 3y = -3$ G) $3x - 5y = -3$

H) $x - 3y = 3$ J) $3x + 5y = -3$

K) None of the above

23) What is the inverse of the statement, "If the sky is blue, then it is not raining"?

A) If the sky is not blue, then it is raining.
B) If it is not raining, then the sky is blue.
C) If it is raining, then the sky is not blue.
D) If the sky is blue, then it is raining.
E) None of the above

24) Which conditions are sufficient to prove a quadrilateral is a square?
   I. All four sides are congruent.
   II. The diagonals are congruent.
   III. The diagonals bisect each other.

F) I only   G) I and II
H) I and III   J) II and III
K) None of the above

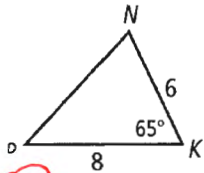25) Which of the following never contains an angle with a measure of 90°?

A) a right triangle
B) an isosceles triangle
C) an equilateral triangle
D) a trapezoid
E) None of the above
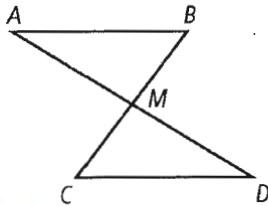
26) What type of construction is shown at the right?
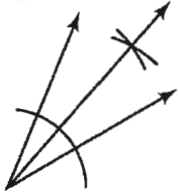
(F) angle bisector

G) perpendicular bisector

H) congruent angles

J) congruent segments

K) None of the above

27) What can you conclude from the diagram?

A) $m\angle P < m\angle N$　　B) $m\angle N < 65$

C) $m\angle P > 65$　　D) $NK < NP$

E) None of the above

28) If it is given that M is the midpoint of AD, what additional information do you need to prove $\triangle AMB \cong \triangle DMC$?


(F) $\overline{AB} \parallel \overline{CD}$　　G) $\overline{AM} \cong \overline{DM}$

H) $\angle A \cong \angle B$　　J) $\angle B \cong \angle D$

K) None of the above

29) Which of the following cannot be true of the median of a triangle?

A) It bisects the opposite side.

(B) It does not bisect the opposite side.

C) It is perpendicular to the opposite side.

D) It is not perpendicular to the opposite side.

E) None of the above

30) If it is given that $\overline{AC}$ bisects $\overline{BD}$, what additional information do you need to prove that quadrilateral $ABCD$ is a parallelogram?
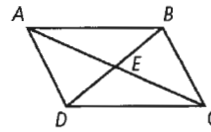
F) $\overline{AC} \perp \overline{BD}$　　G) $\overline{BC} \perp \overline{DC}$

(H) $\overline{BD}$ bisects $\overline{AC}$　　J) $\overline{BE} \cong \overline{DE}$

K) None of the above

31) A woman has a piece of wood that is 22 ft long and another that is 13 ft long. She wants to select another piece of wood so that she can put all the pieces together to make a triangular garden bed. How long could the third piece of wood be?
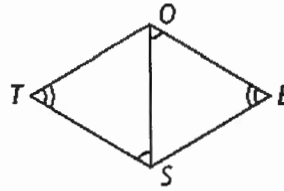
A) 8 ft.　　B) 8 ft 6 in.

(C) 12 ft.　　D) 36 ft.

E) None of the above

32) The lengths of the sides of a triangle are in the extended ratio 3 :7 : 9. The triangle's perimeter is 228 m. What are the lengths of the sides?

F) 30, 70, and 90 m

(G) 36, 84, and 108 m

H) 33, 77, and 107 m

J) 37, 84, and 111 m

K) None of the above

33) The coordinates of $\triangle ABC$ are $A(2, 3)$, $B(6, 5)$, and $C(3, 10)$. Which points describe a line segment parallel to $\overline{AB}$?

A) (4, 4) and (4.5, 7.5)

B) (5, 3) and (6, 10)

C) (2.5, 6.5) and (4, 4)

D) (2.5, 6.5) and (4.5, 7.5)

E) None of the above

Part 2 – Proofs

34) Given: $\overline{LO} \cong \overline{MN}, \overleftrightarrow{LO} \parallel \overrightarrow{MN}$

Prove: $\angle MLN \cong \angle ONL$

Statement	Reasons
$\overline{LO} \cong \overline{MN}$	Given
$\overleftrightarrow{LO} \parallel \overleftrightarrow{MN}$	Given
$\angle OLN \cong \angle MNL$	AIA
$\overline{LN} \cong \overline{LN}$	Reflexive Property
$\triangle MLN \cong \triangle ONL$	SAS
$\angle MLN \cong \angle ONL$	CPCTC

35)   Given: $\angle OTS \cong \angle OES$, $\angle EOS \cong \angle OST$

       Prove: $\overline{TO} \cong \overline{ES}$

Statement	Reasons
$\angle OTS \cong \angle OES$	Given
$\angle EOS \cong \angle OST$	Given
$\overline{OS} \cong \overline{OS}$	Reflexive
$\triangle OST \cong \triangle SOE$	AAS
$\overline{TO} \cong \overline{ES}$	CPCTC

36)   Given: $\overline{AM} \cong \overline{MB}$, $\overline{AD} \cong \overline{BC}$
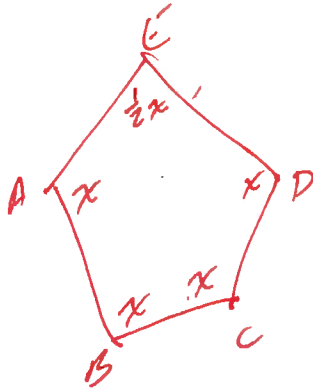 $\angle MDC \cong \angle MCD$

       Prove: $\overline{AC} \cong \overline{BD}$
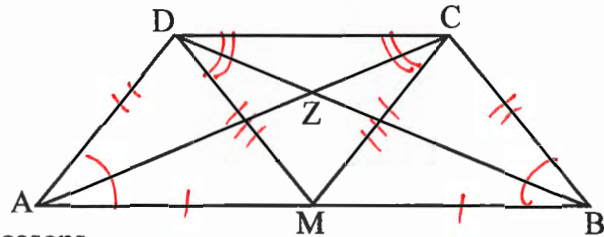
Statement	Reasons
$\overline{AM} \cong \overline{MB}$	Given
$\overline{AD} \cong \overline{BC}$	Given
$\angle MDC \cong \angle MCD$	Given
$\overline{DM} \cong \overline{CM}$	Converse of the Base Angles Th.
$\triangle ADM \cong \triangle BCM$	SSS
$\angle DAM \cong \angle CBM$	CPCTC
$\overline{AB} \cong \overline{AB}$	Reflexive Property
$\triangle DAB \cong \triangle CBA$	SAS
$\overline{AC} \cong \overline{BD}$	CPCTC

Part 3 – Word Problems

37) In pentagon ABCDE, $\angle A \cong \angle B \cong \angle C \cong \angle D$ and the ratio of $\angle A$ to $\angle E$ is 2: 1. What is $m\angle E$?

$4.5x = 540$

$x = 120$

$\boxed{m\angle E = 60°}$

38) Which two statements contradict each other? **Explain**.
   I. $\triangle ABC$ is scalene.
   II. $\triangle ABC$ is an isosceles right triangle.
   III. $m\angle B = 45°$

I + II. It's impossible for a triangle to be both scalene and isosceles.

39) What would be the first step of any indirect proof? **Explain**.

State whatever you are trying to prove is false. You then try to prove that this leads to contradictions to your given info and certain postulates and theorems.

40) $\triangle KMP$ is isosceles with $KM = KP$. $\overline{MX}$ and $\overline{PY}$ are angle bisectors.

   a. Is there enough information to prove $\triangle WMP$ is an isosceles triangle? **Explain**.

Yes. $\angle KMP \cong \angle KPM$ due to the base angles theorem. If you bisect these two angles, this means that $\angle WMP \cong \angle WPM$, since the bisection of 2 $\cong$ angles are congruent to each other. then $\overline{WM} \cong \overline{WP}$ due to the conv. of the base angles theorem. Therefore $\triangle WMP$ is isosceles.
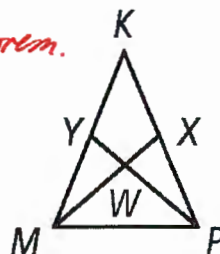
   b. Can you conclude that $\overline{MX}$ and $\overline{PY}$ are medians?

No.

   c. What one additional piece of information would allow you to prove that $\overline{MX}$ and $\overline{PY}$ are altitudes?

- 90.° angles
or - $\triangle KMP$ is equilateral.

   d. Why is it impossible for $\triangle WMP$ to be an equilateral triangle?

If it is equilateral, then $m\angle WMP$ and $m\angle WPM$ would both be 60°.

If this is the case, that means that the $m\angle KMP$ and $m\angle KPM$ would both be 120°.

This is impossible to have in $\triangle KMP$ due to the triangle sum theorem.