Name **Schlansky**
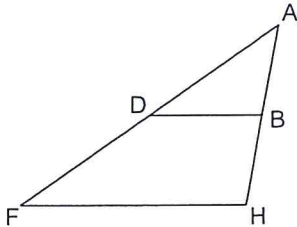Mr. Schlansky

2(midsegment)=opposite side
The midsegment is half of the opposite side.

Date _____
Geometry

Joining Midpoints of a Triangle

1. D is the midpoint of $\overline{FA}$ and B is the midpoint of $\overline{AH}$

a) If $\overline{DB} = 12$, find $\overline{FH}$

24

b) If $\overline{FH} = 6$, find $\overline{DB}$

3

c) If $\overline{AF} = 2$, find $\overline{FD}$
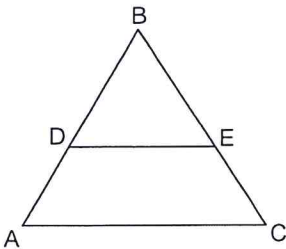
1

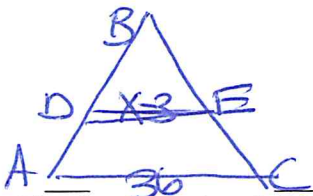d) If $\angle AHF = 109°$, find $\angle ABD$ Similar triangles have the same angles

109°

2. D and E are midpoints of $\overline{AB}$ and $\overline{BC}$ respectively.

a) If $\overline{AC} = 36$ and $\overline{DE} = x - 3$, find the measure of $\overline{DE}$.

$2(ms) = opp\ side$
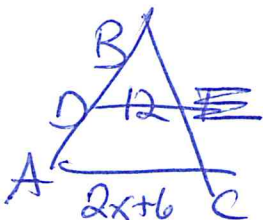$2(x-3) = 36$
$2x - 6 = 36$
$\quad +6 \quad +6$

$\dfrac{2x}{2} = \dfrac{42}{2}$
$x = 21$

$\overline{DE} = 21 - 3$
$\overline{DE} = 18$

b) If $\overline{AC} = 2x + 6$ and $\overline{DE} = 12$, find the value of x.
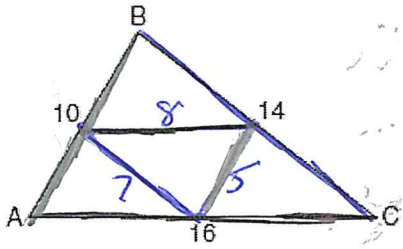
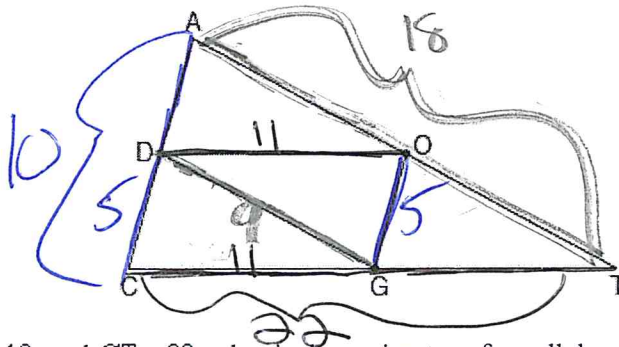$2(ms) = opp\ side$
$2(12) = 2x + 6$
$24 = 2x + 6$
$\quad -6 \qquad -6$

$\dfrac{18}{2} = \dfrac{2x}{2}$
$9 = x$

3. In the diagram of $\triangle ABC$ below, $AB = 10$, $BC = 14$, and $AC = 16$. Find the perimeter of the triangle formed by connecting the midpoints of the sides of $\triangle ABC$.

$8 + 7 + 5 = 20$

4. In the diagram below of $\triangle ACT$, D is the midpoint of $\overline{AC}$, O is the midpoint of $\overline{AT}$, and G is the midpoint of $\overline{CT}$.

$5 + 11 + 5 + 11 = 32$
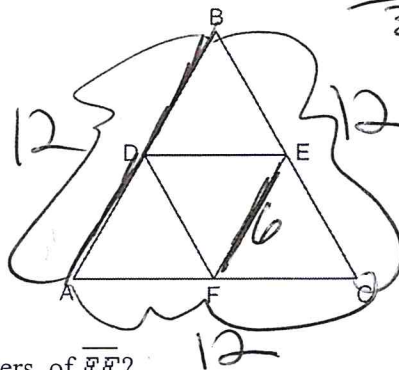
If $AC = 10$, $AT = 18$, and $CT = 22$, what is the perimeter of parallelogram $CDOG$?
1) 21   3) 32
2) 25   4) 40

5. In the diagram below, the vertices of $\triangle DEF$ are the midpoints of the sides of equilateral triangle ABC, and the perimeter of $\triangle ABC$ is 36 cm.
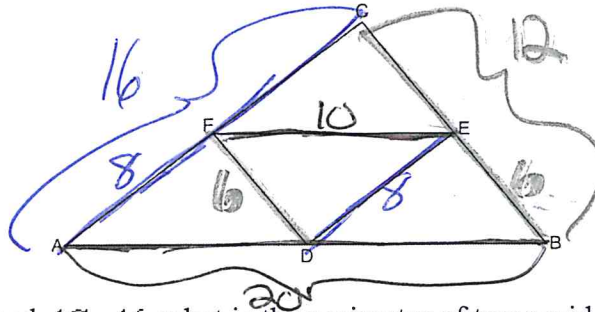
$\frac{36}{3} = 12$

What is the length, in centimeters, of $\overline{EF}$?
1) 6
2) 12
3) 18
4) 4

6. In the diagram of $\triangle ABC$ shown below, D is the midpoint of $\overline{AB}$, E is the midpoint of $\overline{BC}$, and F is the midpoint of $\overline{AC}$.
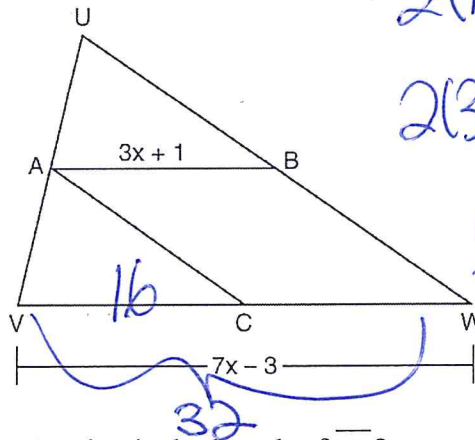
(handwritten on diagram: 16, 10, 8, 6, 8, 12, 10+8+6+20=44, 20)

If $AB = 20$, $BC = 12$, and $AC = 16$, what is the perimeter of trapezoid $ABEF$?
1) 24
2) 36
3) 40
4) 44 *(circled)*

7. In the diagram of $\triangle UVW$ below, A is the midpoint of $\overline{UV}$, B is the midpoint of $\overline{UW}$, C is the midpoint of $\overline{VW}$, and $\overline{AB}$ and $\overline{AC}$ are drawn.

(handwritten on diagram: 3x + 1, 16, 7x − 3, 32)

(handwritten work:)
$2(ms) = opp\ side$
$2(3x+1) = 7x-3$
$6x+2 = 7x-3$
$-6x \quad\quad -6x$
$2 = x - 3$
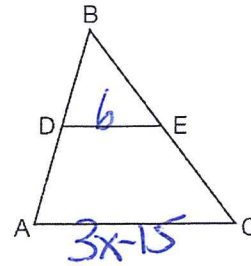$+3 \quad\quad +3$
$5 = x$
$7(5) - 3 = 32$

If $VW = 7x - 3$ and $AB = 3x + 1$, what is the length of $\overline{VC}$?
1) 5
2) 13
3) 16 *(circled)*
4) 32

8. In $\triangle ABC$, D is the midpoint of $\overline{AB}$ and E is the midpoint of $\overline{BC}$. If $AC = 3x - 15$ and $DE = 6$, what is the value of x?
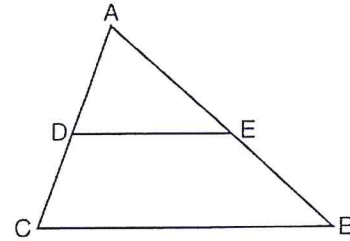
[handwritten: $2(ms) = $ opp side]
[handwritten: $2(6) = 3x-15$]

1) 6
2) 7
3) 9 *[circled]*
4) 12

[handwritten: $12 = 3x-15$ $9 = x$]
[handwritten: $+15 \quad +15$]
[handwritten: $\frac{27}{3} = \frac{3x}{3}$]

[diagram: triangle ABC with B at top, D and E on sides, 6 between D and E, base $3x-15$ from A to C]

9. Triangle ABC is shown in the diagram below.

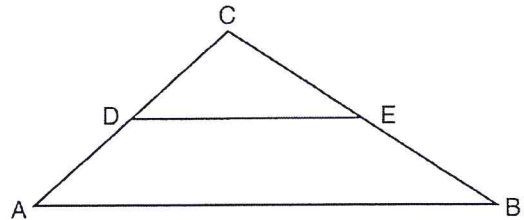If $\overline{DE}$ joins the midpoints of $\overline{ADC}$ and $\overline{AEB}$, which statement is *not* true?

1) $DE = \frac{1}{2} CB$ ✓

2) $\overline{DE} \parallel \overline{CB}$ ✓

3) $\frac{AD}{DC} = \frac{DE}{CB}$ *[circled, crossed out]* ✓

4) $\triangle ABC \sim \triangle AED$ ✓

*[diagram: triangle with A at top, D and E midpoints, C and B at base]*

10. In the diagram below, $\overline{DE}$ joins the midpoints of two sides of $\triangle ABC$.

Which statement is *not* true?

1) $CE = \frac{1}{2} CB$ ✓

2) $DE = \frac{1}{2} AB$ ✓

3) area of $\triangle CDE = \left(\frac{1}{2}\right) $ area of $\triangle CAB$ *[circled]* ✗ *[handwritten: exponent 2]*

4) perimeter of $\triangle CDE = \frac{1}{2}$ perimeter of $\triangle CAB$ ✓

[diagram: triangle with C at top, D and E midpoints, A and B at base]

11. In the diagram below of $\triangle ABC$, D, E, and F are the midpoints of $\overline{AB}$, $\overline{BC}$, and $\overline{CA}$, respectively.

[diagram: triangle with C at top, F and E midpoints, A, D, B at base]
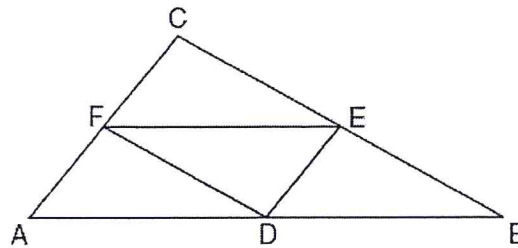
[handwritten: $ROCS = 1:2$]
[handwritten: ratio areas $= (ROCS)^2$]

What is the ratio of the area of $\triangle CFE$ to the area of $\triangle CAB$?
1) 1:1
2) 1:2
3) 1:3
4) 1:4 *[circled]*