# 5.1 & 5.2 Segments in Master Triangles

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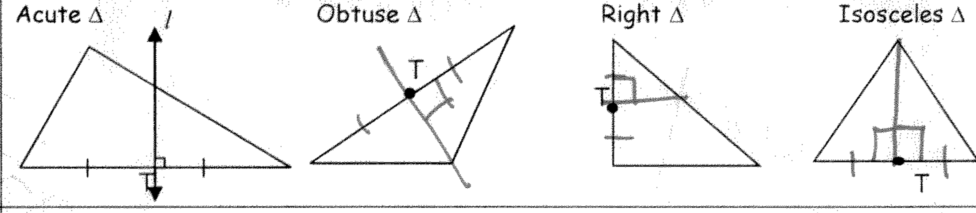
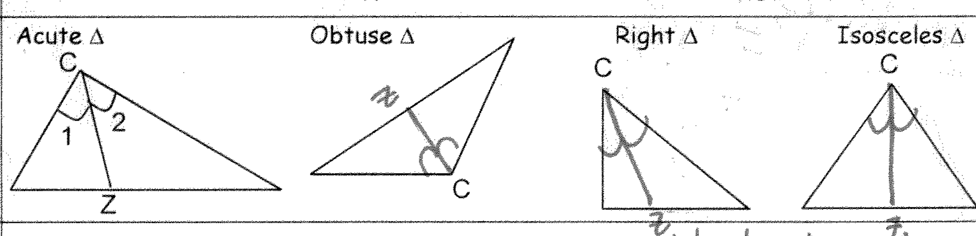
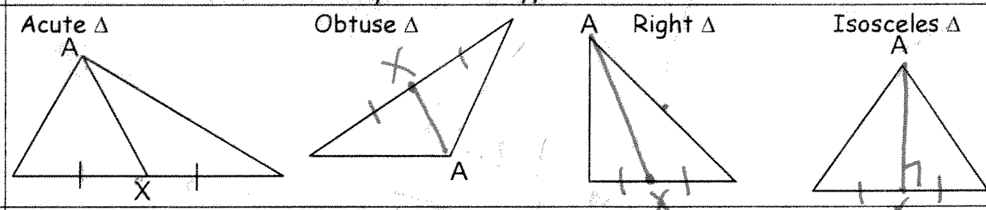
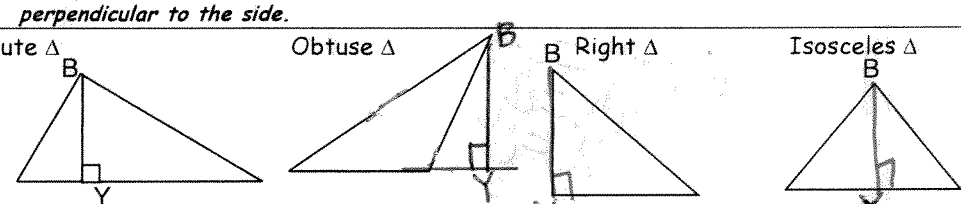
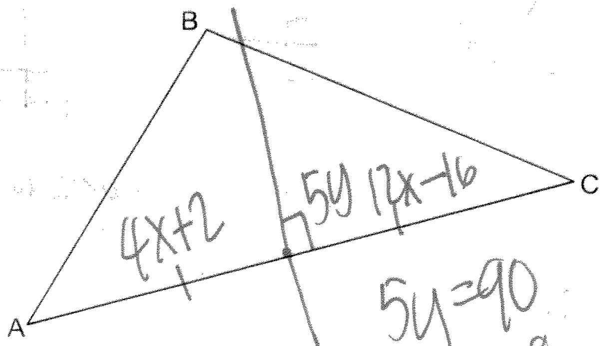
| PERPENDICULAR BISECTOR OF A TRIANGLE | A segment, line, or plane that intersects a side of a triangle at its midpoint.<br>◆ ***Goes through the midpoint of each side, not necessarily through the vertex!*** |
| Examples:<br><br>line $l$ (through T) |  |
| THEOREMS: | If a point is on the perpendicular bisector of a segment, then it is equidistant from the endpoints of the segment.<br>If a point is equidistant from the endpoints of a segment, then it is on the perp. bi. of the segment. |
| ANGLE BISECTOR OF A TRIANGLE | A line, segment, or ray that divides an angle into two ≅ angles.<br>◆ ***Goes from a vertex to the opposite side of the Δ and cuts the angle in half!*** |
| Examples:<br><br>$\overline{CZ}$ ($\angle 1 \cong \angle 2$) |  |
| THEOREMS: | If a point is on the bisector of an angle, then it is equidistant from the sides of the angle.<br>If a point in the interior of an angle is equidistant from the sides of the angle, then it si on the bisector of the angle. |
| MEDIAN OF A TRIANGLE | A segment with endpoints being a vertex of a triangle and the midpt. of the opposite side.<br>◆ ***Connects a vertex to the midpoint of the opposite side of the Δ!*** |
| Examples:<br><br>$\overline{AX}$ |  |
| ALTITUDE OF A TRIANGLE | A segment from a vertex to the line containing the opposite side and ⊥ to the line containing that side.<br>◆ ***Connects a vertex to the opposite side of a Δ at the point that makes the segment perpendicular to the side.*** |
| Examples:<br><br>$\overline{BY}$ |  |
| Observation: | **In all of the examples, what did you notice about triangle 4 (the isosceles Δ)?**<br>They are all the same segment! |

In the examples below solve for x and y. Show all work.

1. Draw a $\perp$ bisector equidistant from the endpoints of $\overline{AC}$ at point D. Label the $\angle$ formed $\angle 1$. Given: $AD = 4x + 2$, $DC = 12x - 6$ and $\angle 1 = 5y°$. Find x and y.




$5y = 90$

$y = 18$

$4x+2 = 12x-6$

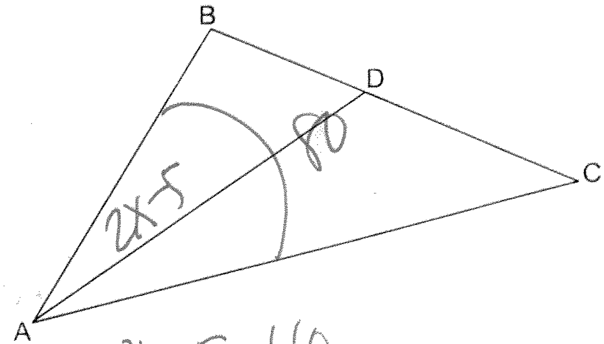
$8 = 8x$

$1 = x$

x = 1

y = 18

2. Segment AD is the angle bisector of $\angle BAC$. Given: $\angle BAD = 2x - 5$ and $\angle BAC = 80°$. Find x.



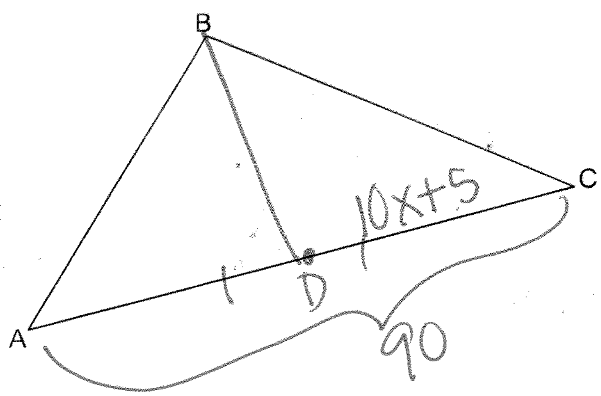

$2x-5 = 40$

$2x = 45$

$x = 22.5$

x = 22.5

3. Draw a median from point B to $\overline{AC}$ at point D. Given: $AC = 90$ m and $DC = (10x + 5)$ m. Find x.



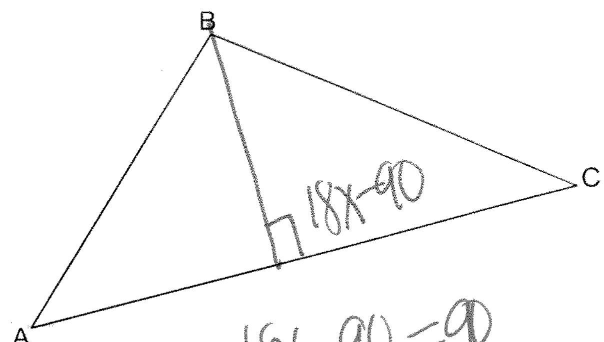

$10x+5 = 45$

$10x = 40$

$x = 4$

x= 4

4. Draw an altitude from point B to $\overline{AC}$. Label the point D formed on $\overline{AC}$. Given: $\angle BDC = (18x - 90)°$. Find x.




$18x - 90 = 90$

$18x = 180$

$x = 10$

x= 10