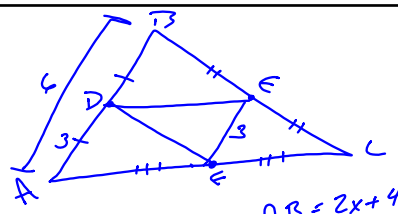
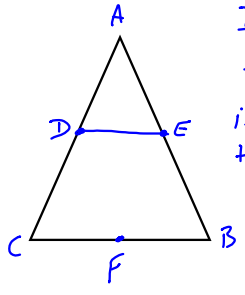
5.4 Midsegment Theorem

1 bisectors from side
2 bisectors
medians
Altitudes
} from Angle



$EF = \frac{1}{2}AB$
$DE = \frac{1}{2}AC$
$DF = \frac{1}{2}BC$

$AB = 2x+4$
$EF = 3x$
$3x = \frac{1}{2}(2x+4)$
$3x = x+2$
$2x = 2$
$x = 1$



$\overline{DE} \parallel \overline{BC}$

The midsegment is parallel to the other side

In Coordinate Planes

To show that a segment is $\frac{1}{2}$ the distance we must use the distance formula

DE is the midsegment in triangle ABC
if $BC = 6\sqrt{10}$
$DE = 3\sqrt{10}$

To prove parallel

same slope

$m = \frac{y_2 - y_1}{x_2 - x_1}$

$\frac{4-7}{-3-2} = \frac{-3}{-5} = \frac{3}{5}$

$A(2,7)\ B(-3,4)$ $\frac{-5-(-2)}{8-3} = \frac{-3}{5}$

$C(3,-2)\ D(8,-5)$ $AB \nparallel CD$

Finding Midsegments

Use Midpoint Formula to find all 3 midpoints then connect the dots

Midpoint $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

distance $d = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

P290 - 292

2 - 36 even
skip 20, 30
+ find and print a fractal triangle or other fractal