

Review: Angle Bisectors

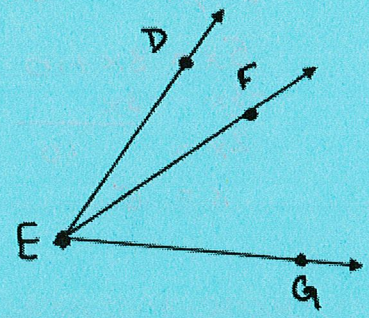
For # 1-5, \overline{EF} bisects $\angle DEG$. (The diagram is not drawn to scale.)

1. If $m\angle DEG = 88$, find $m\angle FEG = \frac{1}{2} \text{ of } 88 = 44$

Whole angle *1/2 angle*

2. If $m\angle FED = 27$, find $m\angle GED = 2 \times 27 = 54$

1/2 angle *whole angle*



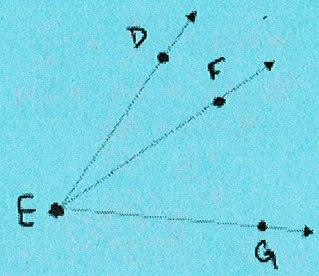
3. If $m\angle DEF = 3x+1$ and $m\angle DEG = 5x+19$, find the value of x.

1/2 angle *whole angle.*

$\frac{1}{2} \text{ angle} + \frac{1}{2} \text{ angle} = \text{whole angle.}$

$$3x+1 + 3x+1 = 5x+19$$

$$\begin{array}{r} 6x+2 = 5x+19 \\ -5x \quad -5x \\ \hline x+2 = 19 \\ \quad -2 \quad -2 \\ \hline \boxed{x=17} \end{array}$$



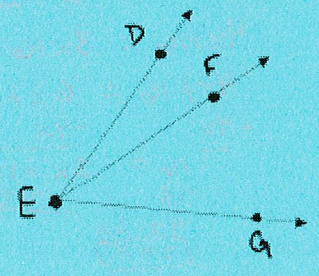
4. If $m\angle DEF = 5x-3$ and $m\angle FEG = 2x+15$, find the value of x.

1/2 angle *1/2 angle.*

$\frac{1}{2} \text{ angle} = \frac{1}{2} \text{ angle.}$

$$5x-3 = 2x+15$$

$$\begin{array}{r} -2x \quad -2x \\ \hline 3x-3 = 15 \\ \quad +3 \quad +3 \\ \hline \quad 3x = 18 \\ \quad \quad \div 3 \\ \hline \quad \quad x = 6 \end{array}$$



5. If $m\angle FEG = 6x-7$ and $m\angle FED = 2x+41$, find the $m\angle DEG$. (solve for x first!)

1/2 angle *1/2 angle*

whole angle.

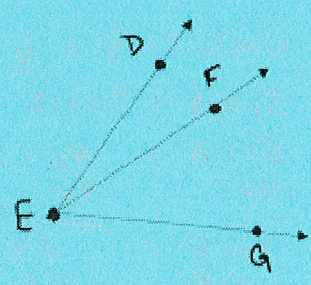
$\frac{1}{2} \text{ angle} = \frac{1}{2} \text{ angle}$

$$6x-7 = 2x+41$$

$$\begin{array}{r} -2x \quad -2x \\ \hline 4x-7 = 41 \\ \quad +7 \quad +7 \\ \hline 4x = 48 \\ \quad \div 4 \\ \hline \quad x = 12 \end{array}$$

$$\begin{aligned} \frac{1}{2} \text{ angle} &= 6(x) - 7 \\ &= 6(12) - 7 \\ &= 65 \end{aligned}$$

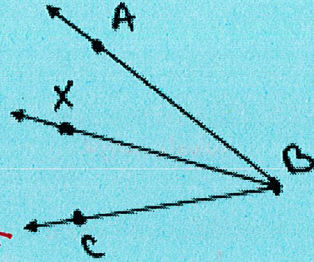
Whole angle = $65 + 65 = \boxed{130}$



For #6-9, \overline{BY} is the BISECTOR of $\angle ABC$. (Diagrams are not drawn to scale)

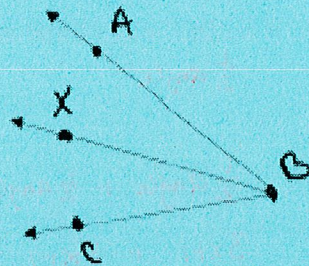
6. If $m\angle ABY = 5x$ and $m\angle YBC = 3x + 10$, find the $m\angle ABC$. (Solve for x first!)

$$\begin{array}{r} \frac{1}{2} \text{ angle} \\ 5x = 3x + 10 \\ \underline{-3x} \quad \underline{-3x} \\ 2x = 10 \\ x = 5 \end{array} \quad \begin{array}{r} \frac{1}{2} \text{ angle} \\ = 5x \\ = 5(5) \\ = 25 \end{array} \quad \begin{array}{r} \text{Whole} \\ \text{angle} \\ \text{whole angle} = 25 + 25 = \boxed{50} \end{array}$$



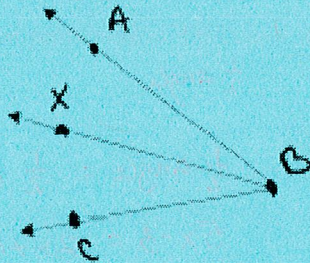
7. If $m\angle ABC = 4x - 12$ and $m\angle ABY = 24$, find the value of x .

$$\begin{array}{r} \text{Whole} \\ \text{angle} \\ \text{Whole} = \frac{1}{2} + \frac{1}{2} \\ 4x - 12 = 24 + 24 \\ 4x - 12 = 48 \\ \underline{+12} \quad \underline{+12} \\ 4x = 60 \\ \boxed{x = 15} \end{array} \quad \begin{array}{r} \frac{1}{2} \text{ angle} \end{array}$$



8. If $m\angle ABC = 4x + 16$ and $m\angle CBY = 3x + 6$, find the value of x .

$$\begin{array}{r} \text{Whole} \\ \text{Whole} = \frac{1}{2} + \frac{1}{2} \\ 4x + 16 = 3x + 6 + 3x + 6 \\ 4x + 16 = 6x + 12 \\ \underline{-4x} \quad \underline{-4x} \\ 16 = 2x + 12 \\ \underline{-12} \quad \underline{-12} \\ 4 = 2x \\ \boxed{2 = x} \end{array} \quad \begin{array}{r} \frac{1}{2} \end{array}$$



9. If $m\angle ABC = 5x + 18$ and $m\angle CBY = 2x + 12$, find the value of x , and the $m\angle ABC$.

$$\begin{array}{r} \text{Whole} \\ \text{Whole} = \frac{1}{2} + \frac{1}{2} \\ 5x + 18 = 2x + 12 + 2x + 12 \\ 5x + 18 = 4x + 24 \\ \underline{-4x} \quad \underline{-4x} \\ x + 18 = 24 \\ \underline{-18} \quad \underline{-18} \\ \boxed{x = 6} \end{array} \quad \begin{array}{r} \frac{1}{2} \end{array}$$

