Name: Key

Accelerated Angle Relationships: Class Work

$\overrightarrow{BA}$ and $\overrightarrow{BC}$ are opposite rays, which means $\overleftrightarrow{\quad\quad}$. ***$\overrightarrow{BF}$ bisects <CBE and $\overrightarrow{BD}$ bisects <ABE. Justify your steps.***

1. What does it mean to bisect an angle? Cut the ∠ into 2 ≅ ∠'s

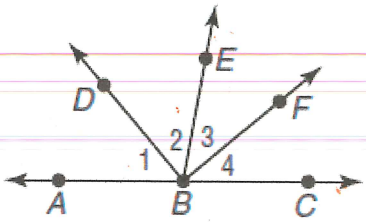
2. If $m < EBF = 6x + 4$ and $m < CBF = 7x - 2$, find $m < EBC$.

∠EBF ≅ ∠CBF def of ∠ bisector

$6x + 4 = 7x - 2$ substitution

$4 = x - 2$ subtraction

$\boxed{6 = x}$ addition



∠EBF + ∠CBF = ∠EBC angle addition

$6(6) + 4 + 7(6) - 2 = \angle EBC$ substsitution

$\boxed{83° = \angle EBC}$ CLT (subs)

3. If $m < 1 = 4x + 10$ and $m < 2 = 5x$, find $m < 2$.

∠1 ≅ ∠2 def of ∠ bisector

$4x + 10 = 5x$

$\boxed{10 = x}$

$m\angle 2 = 5(10)$ substitution

$\boxed{m\angle 2 = 50°}$

4. If $m < 2 = 6y + 2$ and $m < 1 = 8y - 14$, find $m < ABE$.

∠1 ≅ ∠2 def of ∠ bisector

$8y - 14 = 6y + 2$

$\boxed{y = 8}$

∠ABE = ∠1 + ∠2 angle addition

$\angle ABE = 8(8) - 14 + 6(8) + 2$

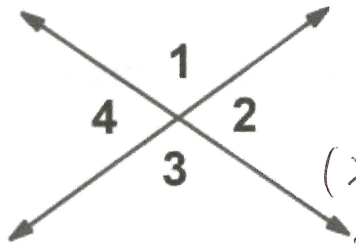
$\boxed{m\angle ABE = 100°}$

5. Is $< DBF$ a right angle? Explain.

If $m\angle 1 = 50°$ and $m\angle 2 = 50°$ that makes ∠EBC = 80° by linear pairs being Suppl. If ∠3 ≅ ∠4 because $\overrightarrow{BF}$ is an ∠ bisector, ∠3 = 40°

∠DBF = ∠2 + ∠3 by angle addition ∴ ∠DBF = 50 + 40 and $m\angle DBF = 90°$, which is a Right ∠.

6. If $\angle 1 = (x-4)^2$ and $\angle 3 = 9°$, find the possible value(s) of x, $\angle 1$, and $\angle 2$. Note: This figure is not drawn to scale.



$\angle 1 \cong \angle 3$ vertical $\angle$s are $\cong$

$(x-4)^2 = 9$

$(x-4)(x-4) = 9$

$x^2 - 4x - 4x + 16 = 9$

$x^2 - 8x + 16 = 9$

$-9 \quad -9$

$x^2 - 8x + 7 = 0$

$(x-1)(x-7) = 0$

$x = 1$ $x = 7$

1 · 7

$a \cdot c = 7$

$-1 \cdot -7 = 7$

$-1 + -7 = -8$

must check in angles!

Check work

Check $x = 1$ (yes!)

$\angle 1 = (1-4)^2 = (-3)^2 = 9°$ ✓

$\angle 3 = 9°$ ✓

Check $x = 7$ (yes!)

$\angle 1 = (7-4)^2 = 3^2 = 9°$ ✓

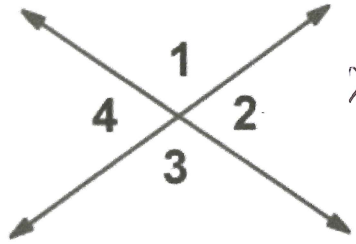
$\angle 3 = 9°$ ✓

Answers!

$x = 1$, $\angle 1 = 9°$, $\angle 2 = 171°$

$x = 7$, $\angle 1 = 9°$ $\angle 2 = 171°$

7. If $\angle 1 = x^2 + 2x$ and $\angle 2 = 4x + 140$, find the possible value(s) of x, $\angle 3$, and $\angle 4$. Note: This figure is not drawn to scale.



$\angle 1 + \angle 2 = 180°$ linear pairs are

$x^2 + 2x + 4x + 140 = 180°$ Suppl.

$x^2 + 6x - 40 = 0$

$(x-4)(x+10) = 0$ ← * Don't forget when $a \neq 1$ you must divide by a #

$x = 4$ $x = -10$

must check work!

check $x = 4$

$4^2 + 2(4) + 4(4) + 140 \stackrel{?}{=} 180$

$24° + 156° = 180°$

$180° = 180°$ ✓

check $x = -10$

$(-10)^2 + 2(-10) + 4(-10) + 140 \stackrel{?}{=} 180$

$80° + 100° = 180°$

$180° = 180°$ ✓

Answers:

$x = 4$, $\angle 3 = 24°$ $\angle 4 = 156°$

$x = -10$ $\angle 3 = 80°$ $\angle 4 = 100°$