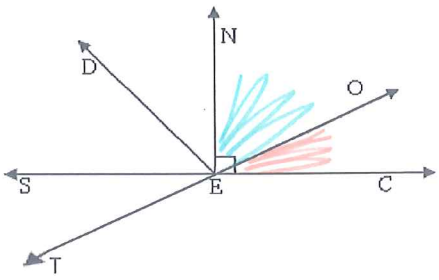
Name: Key

Angle Relationships Quiz Review

Directions: Use the diagram above to find the following. For each question you must show your geometry and justify your set up. Remember each question is independent and does not carry onto the next question. This diagram is not drawn to scale.

1. If $\angle NEO = 5x + 1$ and $\angle OEC = 3x + 9$, find x.



Geometry | Justification

$\angle NEO + \angle OEC = 90$ | def of compl.

$5x + 1 + 3x + 9 = 90$

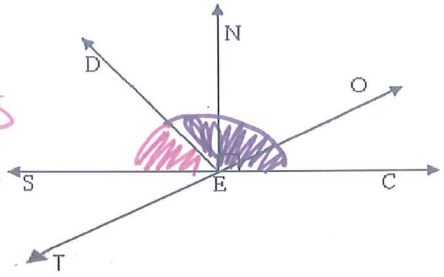
$8x + 10 = 90$

$8x = 80$

$\boxed{x = 10}$

X= 10

2. If $\angle DEC = 3x - 65$ and $\angle SED = x - 19$, find x.



Geometry | Justification

$\angle DEC + \angle SED = 180°$ | linear pairs are suppl.

$3x - 65 + x - 19 = 180$

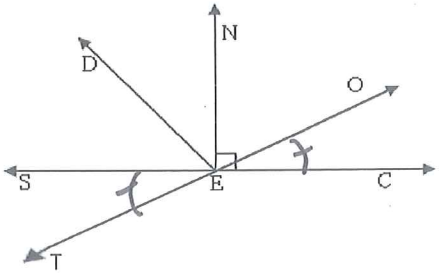
$4x - 84 = 180$

$4x = 264$

$\boxed{x = 66}$

X= 66

3. If $\angle SET = 3X + 2$ and $\angle OEC = 83°$, find x.



Geometry | Justification

$\angle SET \cong \angle OEC$ | Vertical $\angle$s are $\cong$

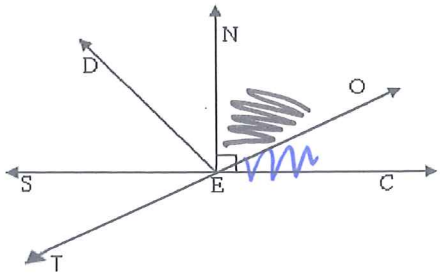
$3x + 2 = 83$

$\boxed{x = 27}$

X= 27

4. If $\angle NEO = 4x + 7$ and $\angle OEC = 4x + 11$, find x.

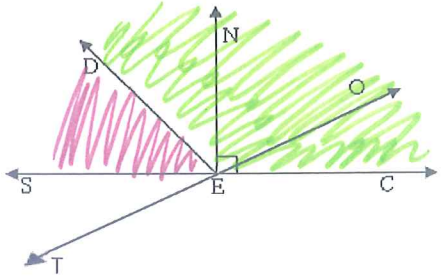
Geometry	Justification
$\angle NEO + \angle OEC = 90$	def of compl.
$4x+7+4x+11 = 90$	
$8x+18 = 90$	
$8x = 72$	



X= 9

5. If $\angle DEC = 2x + 18$ and $\angle SED = 5x + 1$, find x.

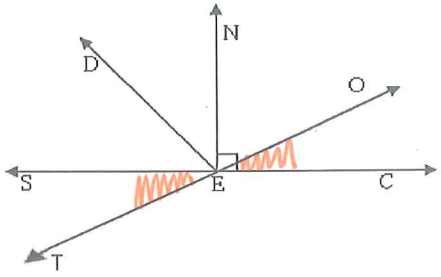
Geometry	Justification
$\angle DEC + \angle SED = 180°$	linear Pairs are suppl.
$2x+18+5x+1 = 180$	
$7x+19 = 180$	
$7x = 161$	
$x = 23$	



X= 23

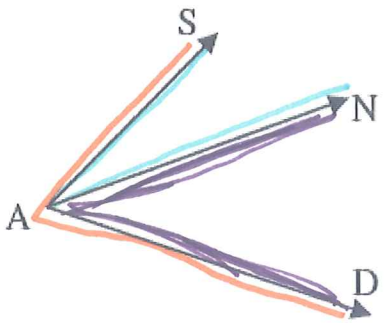
6. If $\angle SET = 3X + 1$ and $\angle OEC = 85°$, find x.

Geometry	Justification
$\angle SET \cong \angle OEC$	Vertical $\angle$s are $\cong$
$3x+1 = 85$	
$3x = 84$	
$x = 28$	



X= 28

7. Find x and the $m\angle SAN$ if $m\angle SAD = 135°, m\angle SAN = 3x + 1, and\ m\angle DAN = 2x - 6.$



Geometry: **Justification:**

$\angle SAN + \angle DAN = \angle SAD$ angle addition

$3x+1+2x-6 = 135$

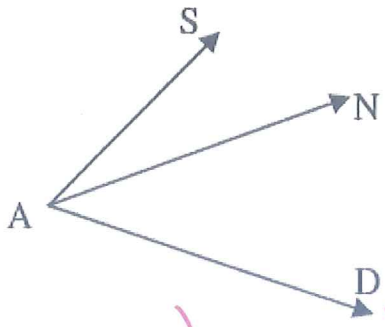
$5x-5 = 135$

$5x = 140$

$x = 28°$

$\angle SAN = 85°$

8. Find x and the $m\angle SAN$ if $m\angle SAD = 94°, m\angle SAN = 3x + 15, and\ m\angle DAN = x + 7.$



Geometry: **Justification:**

$\angle SAN + \angle DAN = \angle SAD$ angle addition

$9x-7+3x+17 = 16x-2$

$12x+10 = 16x-2$

$12 = 4x$

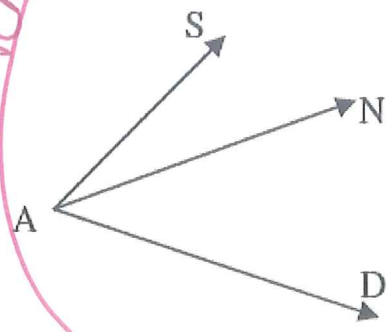
$3 = x$

$\angle SAD = 16(3)-2$

$\angle SAD = 46°$

Switch work apps!

9. Find x and the $m\angle SAD$ if $m\angle SAD = 16x - 2, m\angle SAN = 9x - 7, and\ m\angle DAN = 3x + 17.$



Geometry: **Justification:**

$\angle SAN + \angle DAN = \angle SAD$ angle addition

$3x+15+x+7 = 94$

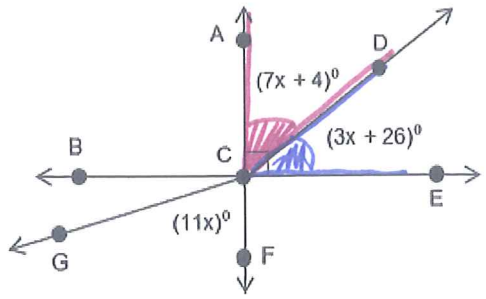
$4x+22 = 94$

$4x = 72$

$x = 18$

$\angle SAN = 69°$

10. Solve for x and find $m\measuredangle GCF$



Geometry: **Justification:**

$\angle ACD + \angle DCE = 90°$ def of compl.

$7x + 4 + 3x + 26 = 90$

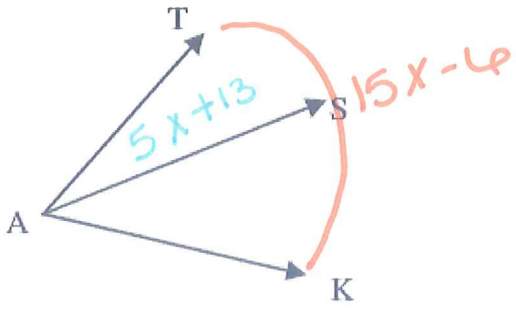
$10x + 30 = 90$

$10x = 60$

$\boxed{x = 6}$

$m\angle GCF = 66°$

11. Find x and the $m\angle KAS$ if $\overrightarrow{AS}$ *bisects* $\angle KAT, m\angle SAT = 5x + 13$ *and* $m\angle KAT = 15x - 6$.



Geometry: **Justification:**

$\angle KAT = 2\angle SAT$ def of $\angle$ bisector

$15x - 6 = 2(5x + 13)$

$15x - 6 = 10x + 26$

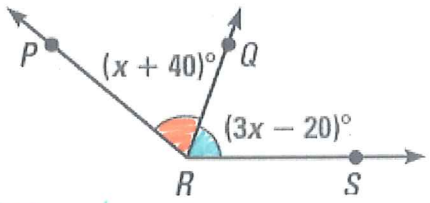
$5x - 6 = 26$

$5x = 32$

$\boxed{x = 6.4}$

$\angle KAS = 45°$

12. In the diagram, $\overrightarrow{RQ}$ bisects $\angle PRS$. The measures of the two congruent angles are $(x + 40)°$ and $(3x - 20)°$. Solve for x.



Geometry: **Justification:**

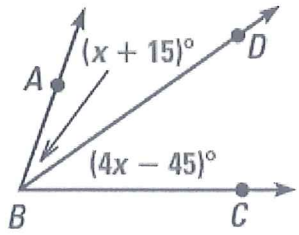
$\angle PRQ \cong \angle QRS$ def of $\angle$ bisector

$x + 40 = 3x - 20$

$60 = 2x$

$\boxed{30 = x}$

13. $\overrightarrow{BD}$ bisects $\angle ABC$. Find the value of x.



Geometry:

$\angle ABD \cong \angle DBC$

$x + 15 = 4x - 45$

$15 = 3x - 45$

$60 = 3x$

$20 = x$

Justification:

def of $\angle$ bisector

14. If $m\angle FGE = 5x + 10$ and $\overrightarrow{FC} \perp \overrightarrow{AE}$, find x.

Geometry:

$\angle FGE = 90$

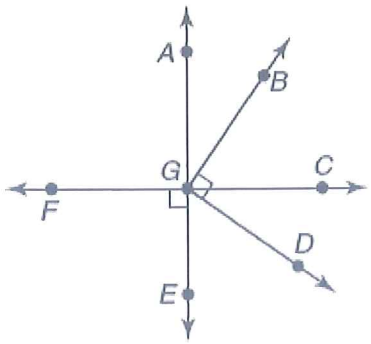
$5x + 10 = 90$

$5x = 80$

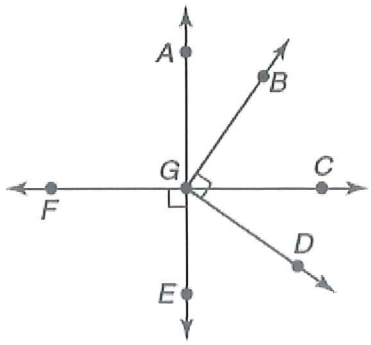
$x = 16$

Justification:

def of perpendicular or right angle



15. If $m\angle BGC = 16x - 4$, $m\angle CGD = 2x + 13$, and $\overrightarrow{BG} \perp \overrightarrow{GD}$, find x.



Geometry:

$\angle BGD = 90°$

$\angle BGC + \angle CGD = \angle BGD$

$16x - 4 + 2x + 13 = 90$

$18x + 9 = 90$

$18x = 81$

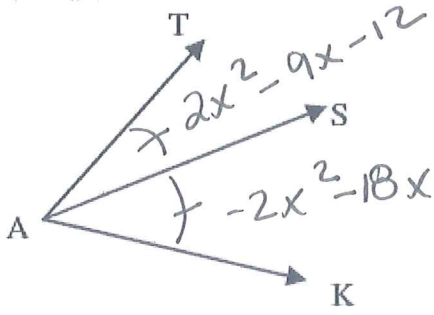
$x = 4.5$

Justification:

def of $\perp$

angle addition

16. Find the value(s) of x if
$\overrightarrow{AS}$ *bisects* $\angle KAT$, $m\angle SAT = 2x^2 - 9x - 12$ *and* $m\angle KAS = -2x^2 - 18x - 3$



Geometry:	Justification:
$\angle SAT \cong \angle KAS$	def of ∠ bisector

$2x^2-9x-12 = -2x^2-18x-3$

$4x^2+9x-9=0$

$(x-\frac{3}{4})(x+\frac{12}{4})=0$

$(4x-3)(x+3)=0$

$x=\frac{3}{4}$ $x=-3$

x = −3 only ..

check $x=\frac{3}{4}$

$\angle SAT = 2(\frac{3}{4})^2-9(\frac{3}{4})-12$

$\angle SAT = -17.625$

$\angle KAS = -2(\frac{3}{4})^2-18(\frac{3}{4})-3$

$\angle KAS = -17.625$

can't be neg!

check $x=-3$

$\angle SAT = 2(-3)^2-9(-3)-12$

$\angle SAT = 33°$

$\angle KAS = -2(-3)^2-18(-3)-3$

$\angle KAS = 33°$ yes!