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ALGEBRA AND ANGLES
N-GEN MATH[®] 7

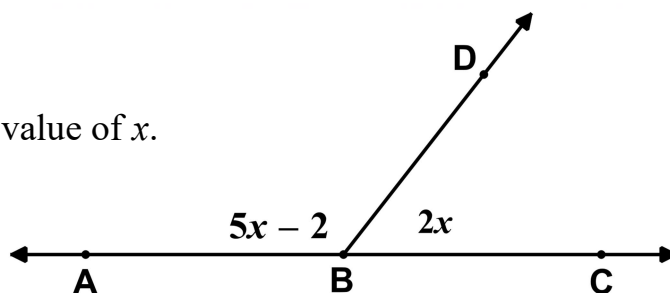


We've done some work so far setting up algebraic equations to help solve angle problems. In this lesson we will work more with these types of problems and the various **geometric relationships** we've seen so far, such as complementary, supplementary, and vertical angle pairs.

Exercise #1: In the diagram below points A, B, and C lie on a line. Ray \overrightarrow{BD} is drawn such that $m\angle ABD = 5x - 2$ and $m\angle CBD = 2x$.

(a) What is the relationship between the two angles?

(b) Use this relationship to set up and solve for the value of x .



(c) Find the measures of both angles.

We sometimes need to be able to set up and solve geometry problems when diagrams are not given. To do this we must be good with our terminology.

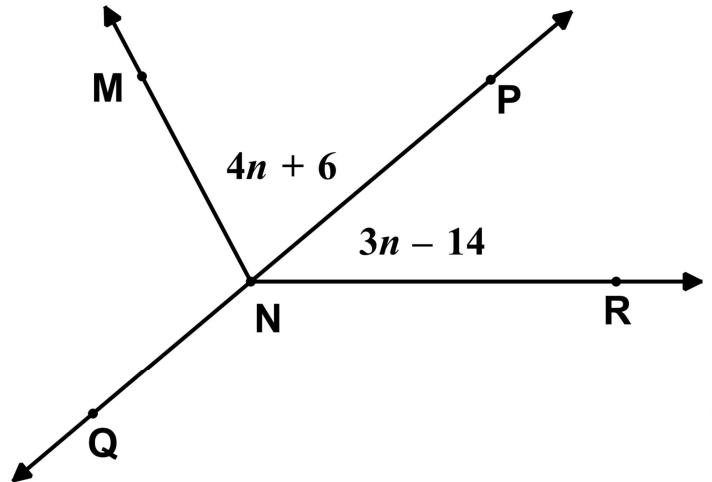
Exercise #2: Two angles, $\angle A$ and $\angle B$, are complementary. The measure of $\angle B$ is three less than twice the measure of $\angle A$. Find the measures of both angles. Show how you arrive at your answer.



Sometimes we must combine various pieces of information to solve the geometry problem. Remember to look for relations like adjacent angles, complementary angles, supplementary angles, and vertical angles.

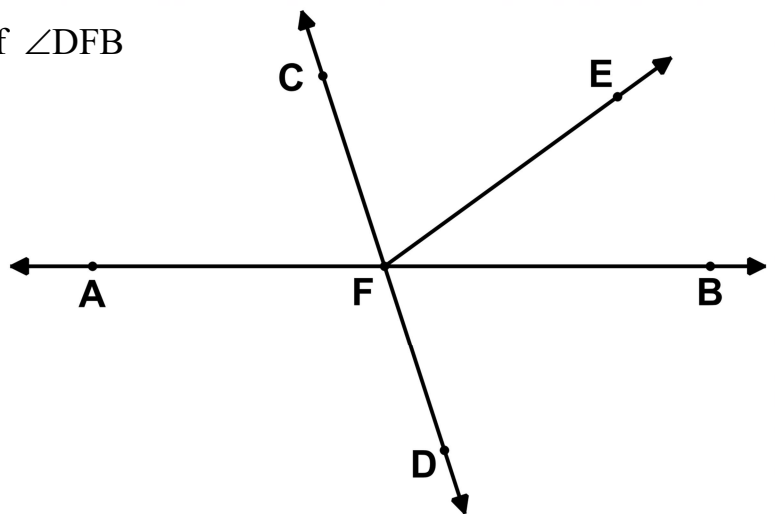
Exercise #3: In the diagram below points Q, N, and P lie on a straight line with rays \overrightarrow{NM} and \overrightarrow{NR} drawn such that $m\angle PNR = 3n - 14$, $m\angle MNP = 4n + 6$, and $m\angle MNR = 118^\circ$.

Find the measure of $\angle QNM$. Show how you found your answer.



Exercise #4: In the diagram shown, lines \overline{AB} and \overline{CD} intersect at F and ray \overrightarrow{FE} is drawn. The measures of $\angle AFC$ and $\angle CFE$ are equal and are twice that of $\angle BFE$.

Use this information to find the measure of $\angle DFB$
Show the work that leads to your answer.



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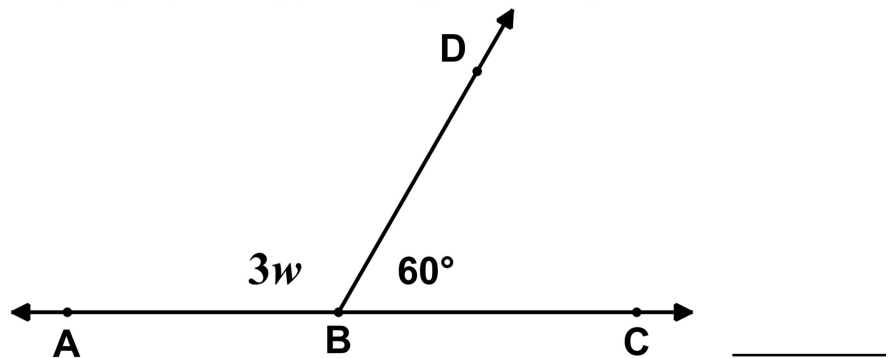
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ALGEBRA AND ANGLES
N-GEN MATH[®] 7 HOMEWORK

FLUENCY

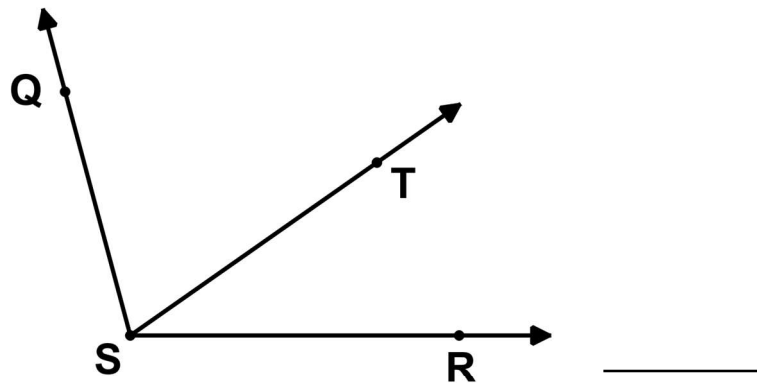
1. In the diagram shown A, B, and C lie on a line with ray \overrightarrow{BD} drawn such that $m\angle DBC = 60^\circ$ and $m\angle ABD = 3w$. Which of the following is the value of w ?

- (1) 15°
- (2) 20°
- (3) 40°
- (4) 120°



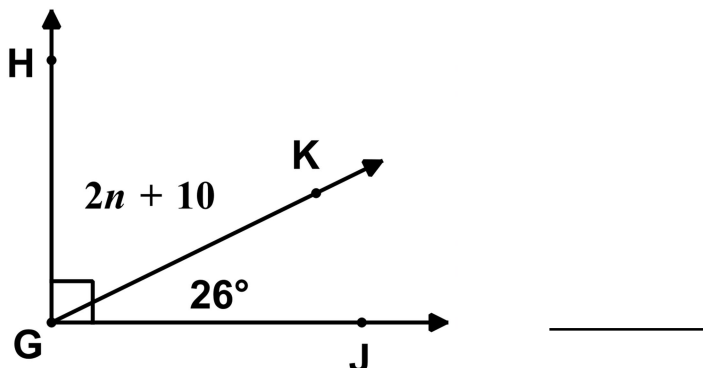
2. In the diagram shown \overrightarrow{SQ} , \overrightarrow{ST} , and \overrightarrow{SR} are drawn so that $m\angle QSR = 105^\circ$. If $\angle QST$ has a measure that is twice as large as the measure of $\angle TSR$ then which of the following is the measure of $\angle QST$?

- (1) 64°
- (2) 70°
- (3) 84°
- (4) 90°



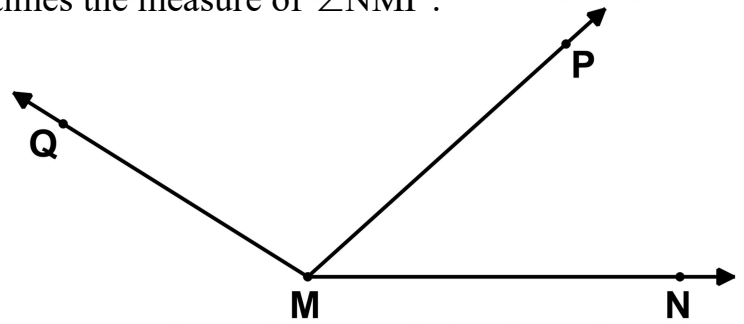
3. In the diagram, rays \overrightarrow{GH} and \overrightarrow{GJ} form a right angle. Ray \overrightarrow{GK} is drawn such that $m\angle JGK = 26^\circ$ and $m\angle KGH = 2n + 10$. Which of the following is the value of n ?

- (1) 13°
- (2) 18°
- (3) 24°
- (4) 27°



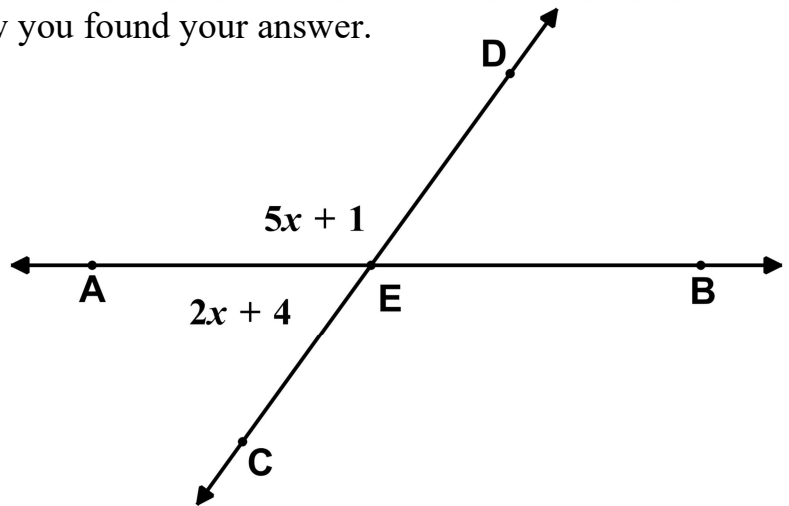
4. In the diagram shown, rays \overrightarrow{MQ} , \overrightarrow{MP} , and \overrightarrow{MN} are drawn such that $m\angle QMN = 148^\circ$. The measure of $\angle QMP$ is 20° less than three times the measure of $\angle NMP$.

Find the measures of both $\angle QMP$ and $\angle NMP$. Show how you arrived at your answers.



5. In the diagram below, lines \overleftrightarrow{AB} and \overleftrightarrow{CD} intersect at E such that $m\angle AEC = 2x + 4$ and $m\angle AED = 5x + 1$.

Find the measure of $\angle DEB$. Show how you found your answer.



USING YOUR MATH

6. A rectangle is a figure that is defined by having four right angles. In the diagram shown, rectangle EFGH has diagonal \overline{HF} drawn. It creates $\angle FHG$ and $\angle EHF$ such that the measure of $\angle EHF$ is 12° more than that of $\angle FHG$.

Find the measure of $\angle FHG$. Show your work.

