

NAME: \_\_\_\_\_

*G.G.38: Investigate, justify, and apply theorems about parallelograms involving their angles, sides, and diagonals*

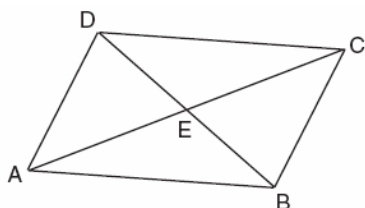
1. 060106a, P.I. G.G.38

Which statement is *not* always true about a parallelogram?

- [A] The opposite sides are parallel.  
[B] The opposite sides are congruent.  
[C] The opposite angles are congruent.  
[D] The diagonals are congruent.

2. 080202a, P.I. G.G.38

In the accompanying diagram of parallelogram  $ABCD$ , diagonals  $\overline{AC}$  and  $\overline{DB}$  intersect at  $E$ ,  $AE = 3x - 4$ , and  $EC = x + 12$ .

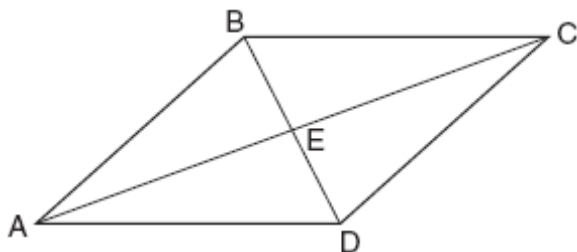


What is the value of  $x$ ?

- [A] 40    [B] 16    [C] 20    [D] 8

3. 060626a, P.I. G.G.38

In the accompanying diagram of parallelogram  $ABCD$ , diagonals  $\overline{AC}$  and  $\overline{BD}$  intersect at  $E$ ,  $BE = \frac{2}{3}x$ , and  $ED = x - 10$ .

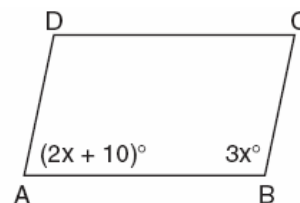


What is the value of  $x$ ?

- [A] 30    [B] -6    [C] 6    [D] -30

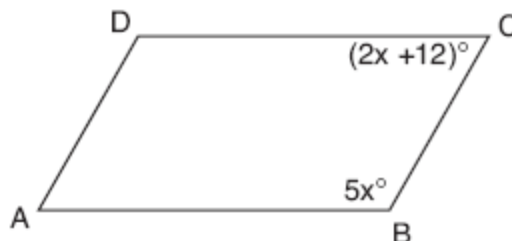
4. 060126a, P.I. G.G.38

In the accompanying diagram of parallelogram  $ABCD$ ,  $m\angle A = (2x + 10)$  and  $m\angle B = 3x$ . Find the number of degrees in  $m\angle B$ .



5. 060736a, P.I. G.G.38

In the accompanying diagram of parallelogram  $ABCD$ ,  $m\angle B = 5x$  and  $m\angle C = 2x + 12$ . Find the number of degrees in  $\angle D$ .



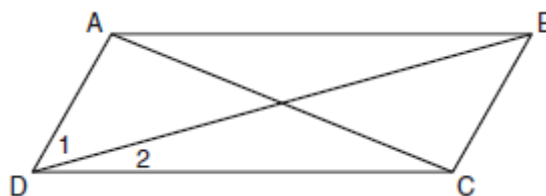
6. 080618a, P.I. G.G.38

The measures of two consecutive angles of a parallelogram are in the ratio 5:4. What is the measure of an obtuse angle of the parallelogram?

- [A]  $80^\circ$     [B]  $20^\circ$     [C]  $160^\circ$     [D]  $100^\circ$

7. 080907ge, P.I. G.G.38

In the diagram below of parallelogram  $ABCD$  with diagonals  $\overline{AC}$  and  $\overline{BD}$ ,  $m\angle 1 = 45$  and  $m\angle DCB = 120$ .



What is the measure of  $\angle 2$ ?

- [A]  $30^\circ$     [B]  $15^\circ$     [C]  $60^\circ$     [D]  $45^\circ$

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[1] D

[2] D

[3] A

[3] 102, and appropriate work is shown, such as using the equation  $2x + 10 + 3x = 180$  or an equivalent equation.

[2] The equation  $2x + 10 + 3x = 180$  is solved correctly for  $x$ , but  $m\angle B$  is not determined or is determined incorrectly.

[1] Appropriate work is shown, but one computational error is made or  $x$  is not determined.

or [1] The equation  $2x + 10 + 3x = 360$  is solved correctly, and an answer of 210 is found.

or [1] 102, but no work is shown.

[0] The equation  $2x + 10 = 3x$  where  $x = 10$  is given.

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an

[4] obviously incorrect procedure.

[3] 120, and appropriate work is shown, such as solving the equation  $5x + 2x + 12 = 180$ .

[2] Appropriate work is shown, but one computational error is made.

or [2] The correct equation is solved for  $x$ , but no further correct work is shown.

[1] Appropriate work is shown, but two or more computational errors are made.

or [1] Appropriate work is shown, but one conceptual error is made.

or [1] A correct equation is written, but no further correct work is shown.

or [1] An incorrect equation of equal difficulty is solved appropriately, and an appropriate measure is found for  $\angle D$ .

or [1] 120, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[5] incorrect procedure.

[6] D

[7] B