## G.GPE.B.7: Polygons in the Coordinate Plane

1   Triangle ABC has vertices at $A(3,0)$, $B(9,-5)$, and $C(7,-8)$. Find the length of $\overline{AC}$ in simplest radical form.

2   Square $ABCD$ has vertices $A(-2,-3)$, $B(4,-1)$, $C(2,5)$, and $D(-4,3)$. What is the length of a side of the square?
1) $2\sqrt{5}$
2) $2\sqrt{10}$
3) $4\sqrt{5}$
4) $10\sqrt{2}$

3   The vertices of square $RSTV$ have coordinates $R(-1,5)$, $S(-3,1)$, $T(-7,3)$, and $V(-5,7)$. What is the perimeter of $RSTV$?
1) $\sqrt{20}$
2) $\sqrt{40}$
3) $4\sqrt{20}$
4) $4\sqrt{40}$

4   Rhombus $STAR$ has vertices $S(-1,2)$, $T(2,3)$, $A(3,0)$, and $R(0,-1)$. What is the perimeter of rhombus $STAR$?
1) $\sqrt{34}$
2) $4\sqrt{34}$
3) $\sqrt{10}$
4) $4\sqrt{10}$

5   The endpoints of one side of a regular pentagon are $(-1,4)$ and $(2,3)$. What is the perimeter of the pentagon?
1) $\sqrt{10}$
2) $5\sqrt{10}$
3) $5\sqrt{2}$
4) $25\sqrt{2}$

6   Triangle ABC has coordinates $A(-6,2)$, $B(-3,6)$, and $C(5,0)$. Find the perimeter of the triangle. Express your answer in simplest radical form. [The use of the grid below is optional.]
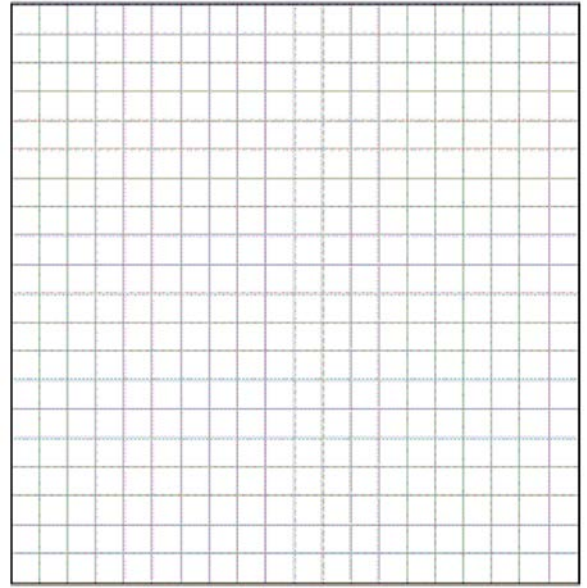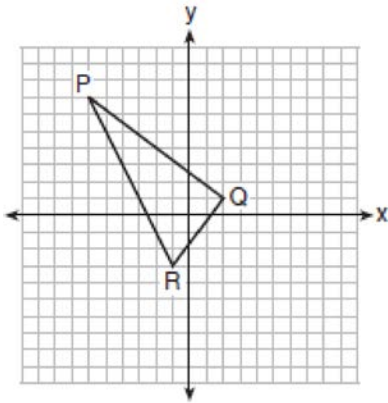

7   Hexagon $ABCDEF$ with coordinates at $A(0,6)$, $B(3,3)$, $C(3,1)$, $D(0,-2)$, $E(-3,1)$, and $F(-3,3)$ is graphed on the set of axes below.
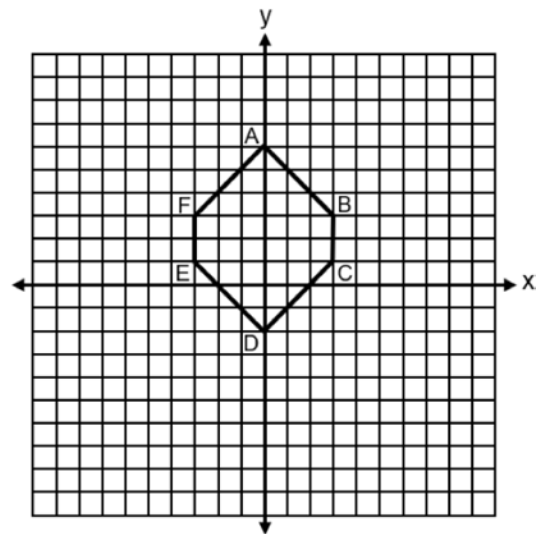
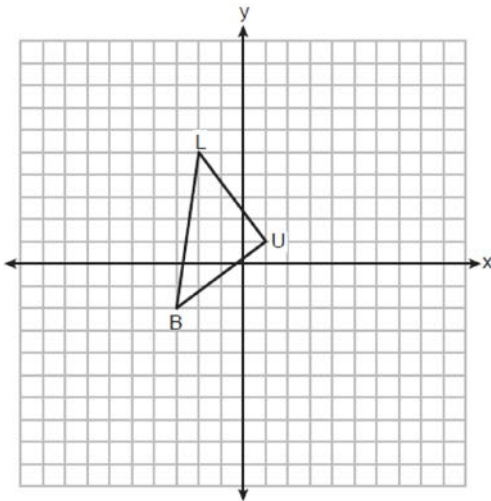
Determine and state the perimeter of $ABCDEF$ in simplest radical form.

8 On the set of axes below, the vertices of $\triangle PQR$ have coordinates $P(-6,7)$, $Q(2,1)$, and $R(-1,-3)$.
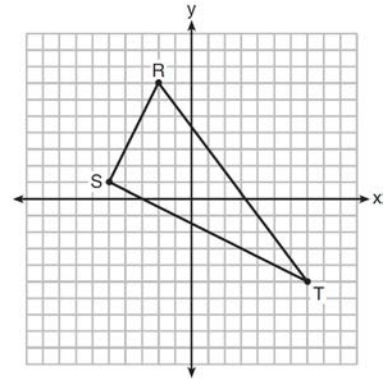

What is the area of $\triangle PQR$?
1) 10
2) 20
3) 25
4) 50

9 On the set of axes below, $\triangle BLU$ has vertices with coordinates $B(-3,-2)$, $L(-2,5)$, and $U(1,1)$.
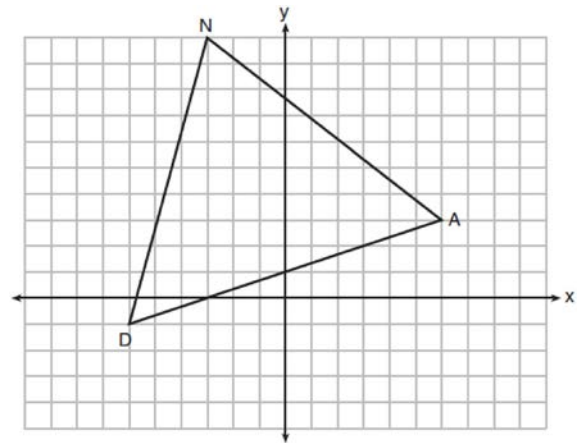

What is the area of $\triangle BLU$?
1) 11
2) 12.5
3) 14
4) 17.1

10 Triangle RST is graphed on the set of axes below.

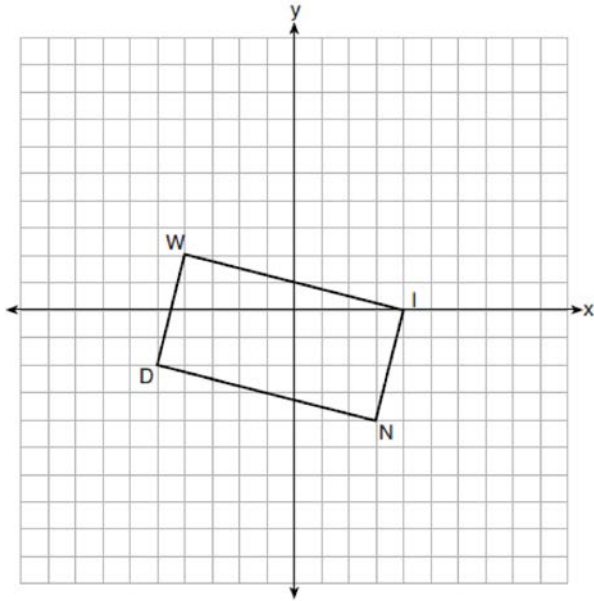

How many square units are in the area of $\triangle RST$?
1) $9\sqrt{3}+15$
2) $9\sqrt{5}+15$
3) 45
4) 90

11 Triangle DAN is graphed on the set of axes below. The vertices of $\triangle DAN$ have coordinates $D(-6,-1)$, $A(6,3)$, and $N(-3,10)$.

What is the area of $\triangle DAN$?
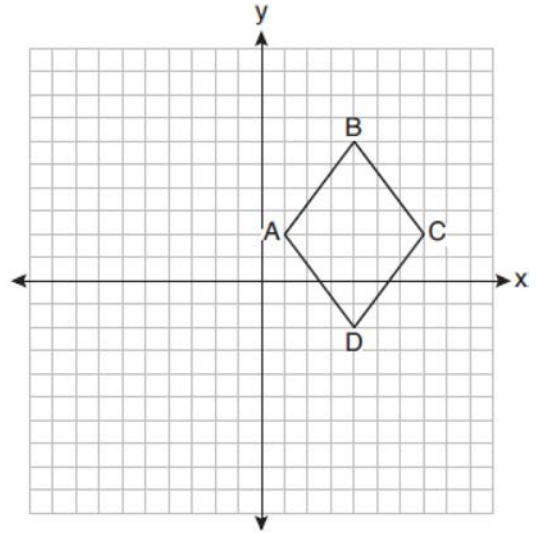1) 60
2) 120
3) $20\sqrt{13}$
4) $40\sqrt{13}$

12 On the set of axes below, rectangle *WIND* has vertices with coordinates $W(-4,2)$, $I(4,0)$, $N(3,-4)$, and $D(-5,-2)$.

What is the area of rectangle *WIND*?
1) 17
2) 31
3) 32
4) 34

13 On the set of axes below, rhombus *ABCD* has vertices whose coordinates are $A(1,2)$, $B(4,6)$, $C(7,2)$, and $D(4,-2)$.

What is the area of rhombus *ABCD*?
1) 20
2) 24
3) 25
4) 48

14 The coordinates of vertices *A* and *B* of $\triangle ABC$ are $A(3,4)$ and $B(3,12)$. If the area of $\triangle ABC$ is 24 square units, what could be the coordinates of point *C*?
1) $(3,6)$
2) $(8,-3)$
3) $(-3,8)$
4) $(6,3)$

15 Triangle ABC with coordinates $A(-2,5)$, $B(4,2)$, and $C(-8,-1)$ is graphed on the set of axes below.
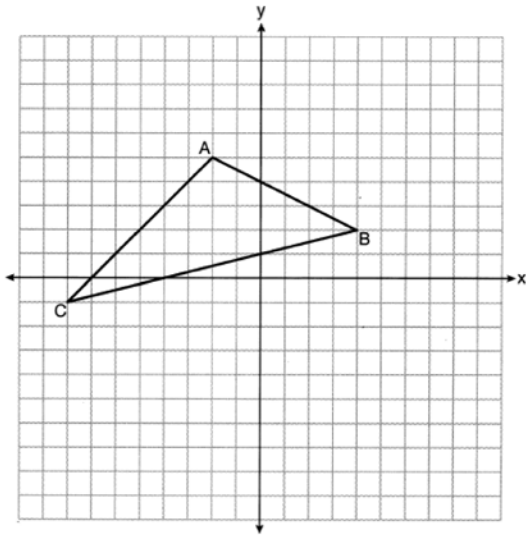
Determine and state the area of $\triangle ABC$.

16 On the set of axes below, $\triangle ABC$ is drawn with vertices that have coordinates $A(2,-3)$, $B(4,5)$, and $C(-5,1)$.
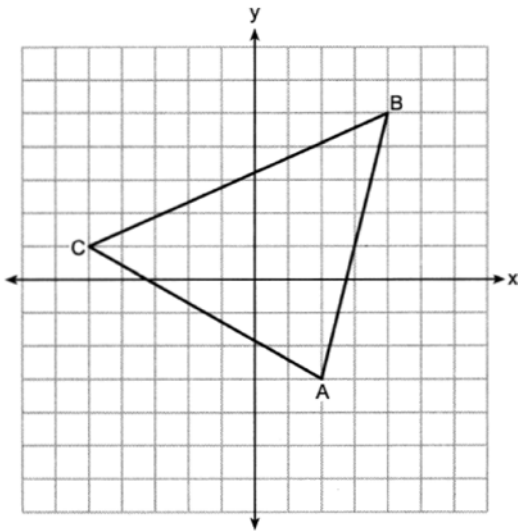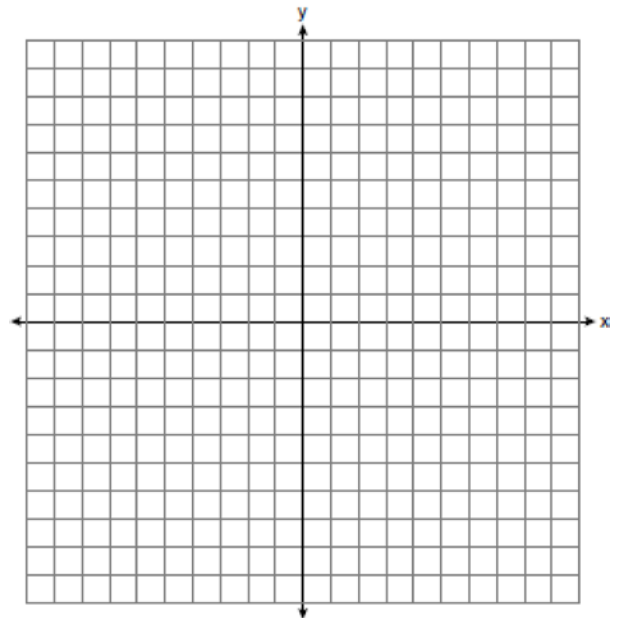
Determine and state the area of $\triangle ABC$.

17 The vertices of $\triangle ABC$ have coordinates $A(-2,-1)$, $B(10,-1)$, and $C(4,4)$. Determine and state the area of $\triangle ABC$. [The use of the set of axes below is optional.]
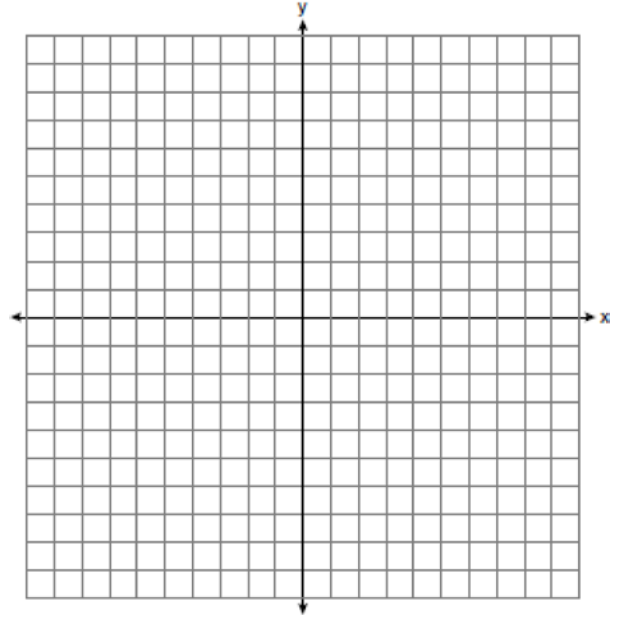
18 Determine and state the area of triangle PQR, whose vertices have coordinates $P(-2,-5)$, $Q(3,5)$, and $R(6,1)$. [The use of the set of axes below is optional.]

19 Triangle *MAX* has vertices with coordinates $M(-5,-2)$, $A(1,4)$, and $X(4,1)$. Determine and state the area of $\triangle MAX$. [The use of the set of axes below is optional.]
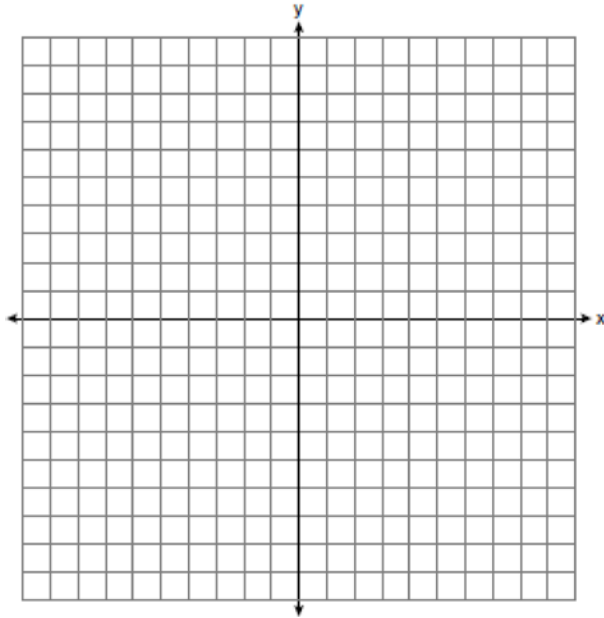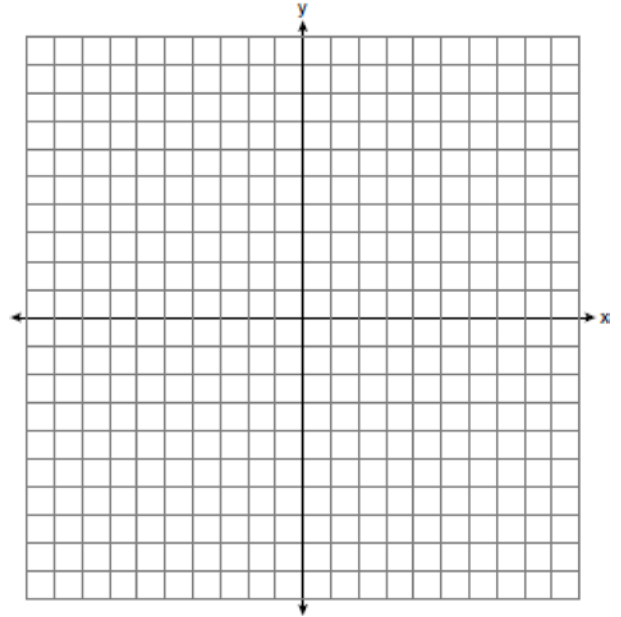
20 On the accompanying set of axes, graph and label the following lines:

$$y = 5$$

$$x = -4$$

$$y = \frac{5}{4}x + 5$$

Calculate the area, in square units, of the triangle formed by the three points of intersection.

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Answer Section

1 ANS:

$$\sqrt{(7-3)^2 + (-8-0)^2} = \sqrt{16+64} = \sqrt{80} = 4\sqrt{5}$$

REF: 061331ge

2 ANS: 2

$$\sqrt{(-2-4)^2 + (-3-(-1))^2} = \sqrt{40} = \sqrt{4}\sqrt{10} = 2\sqrt{10}$$

REF: 011313ge

3 ANS: 3

$$4\sqrt{(-1--3)^2 + (5-1)^2} = 4\sqrt{20}$$

REF: 081703geo
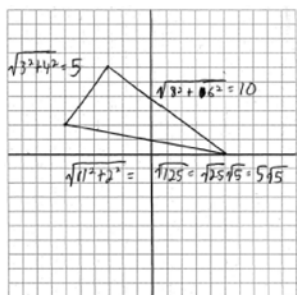
4 ANS: 4

$$4\sqrt{(-1-2)^2 + (2-3)^2} = 4\sqrt{10}$$

REF: 081808geo

5 ANS: 2

$$\sqrt{(-1-2)^2 + (4-3)^2} = \sqrt{10}$$

REF: 011615geo

6 ANS:

$15 + 5\sqrt{5}.$

REF: 060936ge

7 ANS:

$$4\sqrt{3^2 + 3^2} + 2(2) = 4\sqrt{18} + 4 = 12\sqrt{2} + 4$$
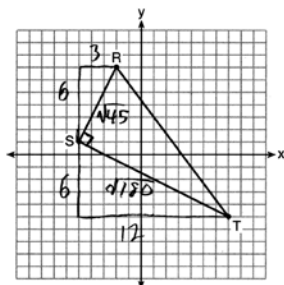
REF: spr2408geo

8 ANS: 3   REF: 061702geo

9 ANS: 2

$$7 \times 4 - \frac{1}{2}\Big((7)(1) + (3)(4) + (4)(3)\Big) = 28 - \frac{7}{2} - 6 - 6 = 12.5$$
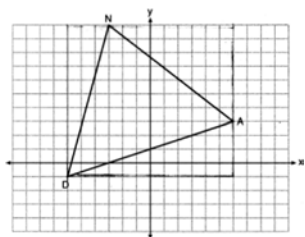
REF: 012407geo

10 ANS: 3

$$\sqrt{45} = 3\sqrt{5} \quad a = \frac{1}{2}\left(3\sqrt{5}\right)\left(6\sqrt{5}\right) = \frac{1}{2}(18)(5) = 45$$
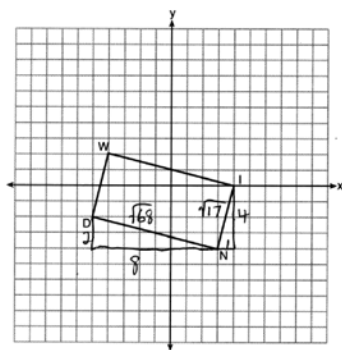$$\sqrt{180} = 6\sqrt{5}$$

REF: 061622geo

11 ANS: 1

$$(12 \cdot 11) - \left(\frac{1}{2}(12 \cdot 4) + \frac{1}{2}(7 \cdot 9) + \frac{1}{2}(11 \cdot 3)\right) = 60$$

REF: 061815geo

12 ANS: 4

$$\sqrt{8^2 + 2^2} \times \sqrt{4^2 + 1^2} = \sqrt{68} \times \sqrt{17} = \sqrt{4}\sqrt{17} \times \sqrt{17} = 2 \cdot 17 = 34$$

REF: 082214geo

13 ANS: 2

Create two congruent triangles by drawing $\overline{BD}$, which has a length of 8. Each triangle has an area of
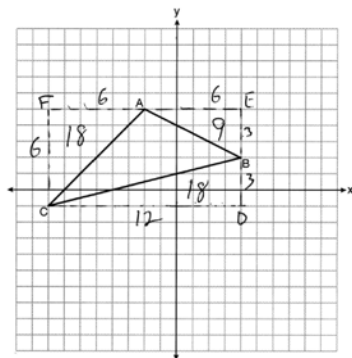$\frac{1}{2}(8)(3) = 12.$

REF: 012018geo

14 ANS: 3

$$A = \frac{1}{2} ab \quad 3 - 6 = -3 = x$$

$$24 = \frac{1}{2} a(8) \quad \frac{4 + 12}{2} = 8 = y$$
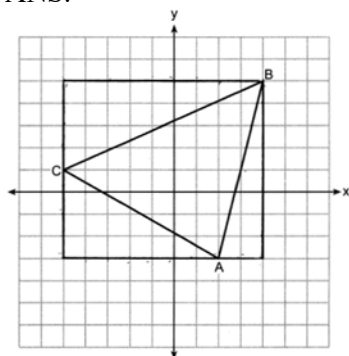
$$a = 6$$

REF: 081615geo

15 ANS:

$$6 \times 12 - \frac{1}{2}(12 \times 3) - \frac{1}{2}(6 \times 6) - \frac{1}{2}(6 \times 3) = 27$$
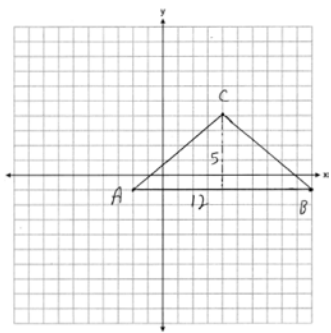
REF: 012331geo

16 ANS:

$$9 \times 8 - \frac{1}{2}(4 \times 7) - \frac{1}{2}(4 \times 9) - \frac{1}{2}(8 \times 2) = 32$$
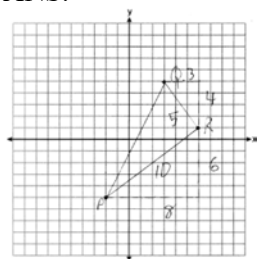
REF: 062430geo

17 ANS:

$\frac{1}{2}(5)(12) = 30$

REF: 081928geo
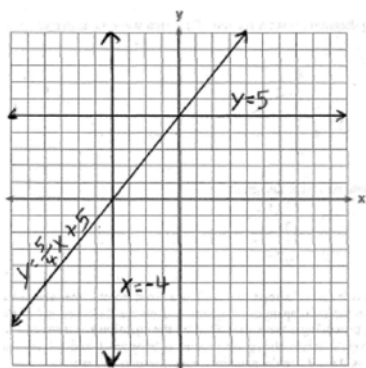
18 ANS:

$\frac{1}{2}(5)(10) = 25$

REF: 061926geo

19 ANS:

$m\overline{AX} = \frac{4-1}{1-4} = -1$ $\overline{AM}$ is an altitude. $A = \frac{1}{2}\sqrt{18}\sqrt{72} = \frac{1}{2}\sqrt{9}\sqrt{2}\sqrt{9}\sqrt{8} = 18$

$m\overline{AM} = \frac{4--2}{1--5} = 1$

REF: 082427geo

20 ANS:

. 10. $A = \frac{1}{2}bh = \frac{1}{2} \times 4 \times 5 = 10$

REF: 010335a