Algebra Connections to Geometry
Non Calculator Review

Name: KEY

S19

Algebraically: Determine the points of intersection for the given circle and line.

1. $(x-4)^2+(y-2)^2=4$, $y=x$

(4, 4)
(2, 2)

$(x-4)^2+(x-2)^2=4$
$x^2-8x+16+x^2-4x+4=4$
$2x^2-12x+16=0$
$2(x^2-6x+8)=0$
$2(x-4)(x-2)=0$
$x=4 \quad x=2$

2. $(x-3)^2+(y-3)^2=4$, $-x-y=-2$

(-1, 3)
(-3, 5)

$-y=x-2$
$y=-x+2$
$(x-3)^2+(-x+2-3)^2=4$
$(x+3)^2+(-x-1)^2=4$
$x^2+6x+9+x^2+2x+1=4$
$2x^2+8x+6=0$
$2(x^2+4x+3)=0$
$2(x+1)(x+3)=0$
$x=-1 \quad x=-3$

3. $(x+3)^2+y^2=16$, $x+y=1$

(-3, 4)
(1, 0)

$y=-x+1$
$(x+3)^2+(-x+1)^2=16$
$x^2+6x+9+x^2-2x+1=16$
$2x^2+4x-6=0$
$2(x^2+2x-3)=0$
$2(x+3)(x-1)=0$
$x=-3 \quad x=1$

Graphically: Determine the points of intersection for the given circle and line.

4. $(x+3)^2+(y-2)^2=4$, $y=-x+1$

(-3, 4)
(-1, 2)

5. $(x+3)^2+(y+4)^2=25$, $x+y=-2$

(-3, 1)
(2, -4)

6. $(x-3)^2+(y+4)^2=4$, $x+2y=-10$

None ∴

Converting: Change the form the equation of a circle to standard or the general form.

7. $(x+5)^2+(y-1)^2=144$

$x^2+10x+25+y^2-2y+1=144$
$\boxed{x^2+10x+y^2-2y-108=0}$

8. $(x+11)^2+(y-4)^2=61$

$x^2+22x+121+y^2-8y+16=61$
$\boxed{x^2+22x+y^2-8y+76=0}$

9. $x^2+8x+y^2-4y=12$

$(x+4)^2+(y-2)^2=12+16+4$
$\boxed{(x+4)^2+(y-2)^2=32}$
C: (-4, 2)
r: $\sqrt{32} \to 4\sqrt{2}$

10. $x^2-6y+y^2-4x=14$

$x^2-4x+y^2-6y=14$
$(x-2)^2+(y-3)^2=14+4+9$
$\boxed{(x-2)^2+(y-3)^2=27}$
C: (2, 3)
r: $\sqrt{27} \to 3\sqrt{3}$

Equations of a Line: Write an equation of a line that is parallel and perpendicular given the two points.

11. Through: (0, 5) and (-5, 5)

$\frac{y_2-y_1}{x_2-x_1} = \frac{5-5}{-5-0} = \frac{0}{-5} = 0$

// $y-5 = 0(x-0)$, $y = 5$

⊥ undefined $x = 5$

12. Through: (2, -5) and (4, -4)

$\frac{y_2-y_1}{x_2-x_1} = \frac{-4--5}{4-2} = \frac{1}{2}$

// $y--5 = \frac{1}{2}(x-2)$, $y+5 = \frac{1}{2}x-1$, $\boxed{y = \frac{1}{2}x-6}$

⊥ $y--5 = -2(x-2)$, $y+5 = -2x+4$, $\boxed{y = -2x-1}$

13. Through (-3, 1) and (0, -3)

$\frac{y_2-y_1}{x_2-x_1} = \frac{-3-1}{0--3} = \frac{-4}{3}$

$y-1 = -\frac{4}{3}(x--3)$, $y-1 = -\frac{4}{3}x-4$, $\boxed{y = -\frac{4}{3}x-3}$

$y-1 = \frac{3}{4}(x--3)$, $y-1 = \frac{3}{4}x+\frac{9}{4}$, $y = \frac{3}{4}x+\frac{9}{4}+\frac{4}{4}$, $\boxed{y = \frac{3}{4}x+\frac{13}{4}}$

Distance and Midpoint: Find the distance and midpoint between two points

14. (-5, 2) and (-2, 1)

D: $\sqrt{(-2--5)^2+(1-2)^2}$, $\sqrt{3^2+(-1)^2}$, $\sqrt{10}$

M: $\left(\frac{-2-5}{2}, \frac{1+2}{2}\right) = \left(-\frac{7}{2}, \frac{3}{2}\right)$

15. (-2, 4) and (4,5)

D: $\sqrt{(4--2)^2+(5-4)^2}$, $\sqrt{6^2+1^2}$, $\sqrt{37}$

M: $\left(\frac{4-2}{2}, \frac{5+4}{2}\right) = \left(\frac{2}{2}, \frac{9}{2}\right) = \left(1, 9/2\right)$

Midpoint: Find the other endpoint even the midpoint and one endpoint.

16. Endpoint: (7, 3) Midpoint: (9, 8) Endpt: (11, 13)

17. Endpoint: (-2, 9) Midpoint: (-6, 8) Endpt: (-10, 7)

Segment Partition: Find the partition given two points and a ratio.

18. Find the coordinates of the point R that lies along the directed segment from J (10, -5) to K (-2, -3) and partitions the segment in the ratio of 2 to 7. $\left(\frac{22}{3}, -\frac{14}{9}\right)$

$10+\frac{2}{9}(-2-10)$, $10+\frac{2}{9}(-12)$, $\frac{30}{3}+\frac{-8}{3}$, $\frac{22}{3}$

$-2+\frac{2}{9}(-3--5)$, $-2+\frac{2}{9}(2)$, $-\frac{18}{9}+\frac{4}{9}$, $-\frac{14}{9}$

19. Find the coordinates of the point P that lies along the directed segment from M (-5, -2) to N (-5, 8) and partitions the segment in the ratio of 4 to 6. $(-5, 2)$

$-5+\frac{4}{10}(-5--5)$, -5

$-2+\frac{4}{10}(8--2)$, $-2+4$

20. Find the coordinates of point P that is $\frac{3}{4}$ of the way along the directed line segment from C (6, -5) to D (-3, 4). $\left(-\frac{3}{4}, \frac{7}{4}\right)$

$6+\frac{3}{4}(-3-6)$, $6+\frac{3}{4}(-9)$, $\frac{24}{4}+\frac{-27}{4}$, $-\frac{3}{4}$

$-5+\frac{3}{4}(4--5)$, $-5+\frac{3}{4}(9)$, $-\frac{20}{4}+\frac{27}{4}$, $\frac{7}{4}$

Name _____ Date _____ Class _____

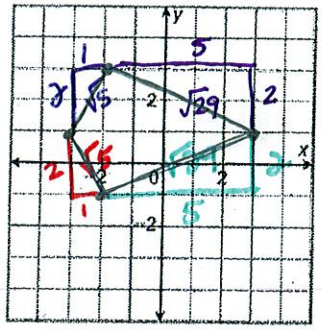
LESSON 25-5

Perimeter and Area on the Coordinate Plane

Practice and Problem Solving: A/B

Draw and classify each polygon with the given vertices. Find the perimeter and area of the polygon to the nearest tenth.

1. $A(-2, 3)$, $B(3, 1)$, $C(-2, -1)$, $D(-3, 1)$



KITE

$P: \sqrt{5} + \sqrt{29} + \sqrt{29} + \sqrt{5}$

A: Rectangle − 4 Δ's

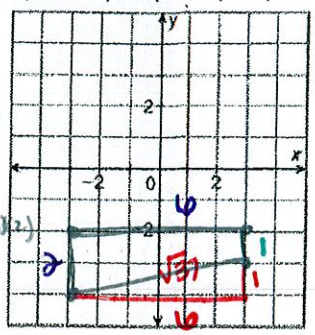
$4(6) - 2\left[\frac{1}{2}(2)(1)\right] + 2\left[\frac{1}{2}(5)(2)\right]$

$24 - 2(1) - 2(5)$

$24 - 2 - 10$

$P: 2\sqrt{5} + 2\sqrt{29}$ u $A: 12$ u²

2. $P(-3, -4)$, $Q(3, -3)$, $R(3, -2)$, $S(-3, 2)$



TRAP

$P: 2 + 6 + 1 + \sqrt{37}$

A: Rectangle − Δ

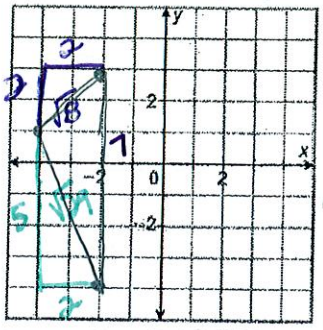
$2(6) - \frac{1}{2}(6)(1)$

$12 - \frac{1}{2}(6)$

$12 - 3$

$P: 9 + \sqrt{37}$ u $A: 9$ u²

3. $E(-4, 1)$, $F(-2, 3)$, $G(-2, -4)$



TRIANGLE

$P: \sqrt{8} + 7 + \sqrt{29}$

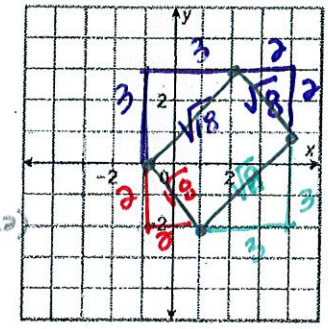
A: Rectangle − Δ's

$7(7) - \frac{1}{2}(2)(2) - \frac{1}{2}(5)(2)$

$49 - 2 - 5$

$P: 7 + 2\sqrt{2} + \sqrt{29}$ u $A: 42$ u²

4. $T(1, -2)$, $U(4, 1)$, $V(2, 3)$, $W(-1, 0)$



RECTANGLE

$P: \sqrt{18} + \sqrt{8} + \sqrt{18} + \sqrt{8}$

$3\sqrt{2}\quad 2\sqrt{2}\quad 3\sqrt{2}\quad 2\sqrt{2}$

A: Rectangle − Δ's

$(5)(5) - 2\left[\frac{1}{2}(3)(3)\right] - 2\left[\frac{1}{2}(2)(2)\right]$

$25 - 2\left(\frac{9}{2}\right) - 2(2)$

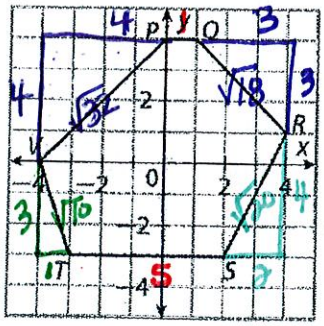
$25 - 9 - 4$

12

$P: 4\sqrt{2} + 6\sqrt{2}$ u $A: 12$ u²

Find the area and perimeter of each composite figure to the nearest tenth.

5.



A: Rectangle

$7(8) - \frac{1}{2}(4)(4) - \frac{1}{2}(3)(3) - \frac{1}{2}(3)(1) - \frac{1}{2}(2)(4)$

$56 - 8 - \frac{9}{2} - \frac{3}{2} - 4$

$44 - \frac{12}{2}$

$44 - 6$

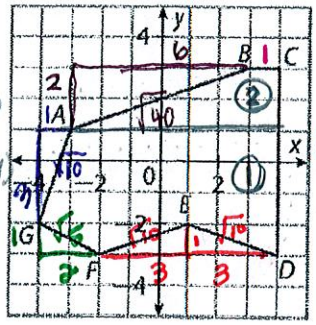
$A: 38$ u²

$P: \sqrt{32} + \sqrt{18} + 1 + 5 + \sqrt{20} + \sqrt{10}$

$4\sqrt{2} + 3\sqrt{2} + 6 + 2\sqrt{5} + \sqrt{10}$

$P: 6 + 7\sqrt{2} + 2\sqrt{5} + \sqrt{10}$ u

6.



① Rect − Δ's

$4(8) - \frac{1}{2}(3)(1) - \frac{1}{2}(1)(2) - 2\left[\frac{1}{2}(3)(1)\right]$

$32 - \frac{3}{2} - 1 - 3$

$28 - \frac{3}{2} = \frac{56}{2} - \frac{3}{2} = \frac{53}{2}$

② Rect − Δ

$(2)(7) - \frac{1}{2}(2)(6)$

$14 - 6$

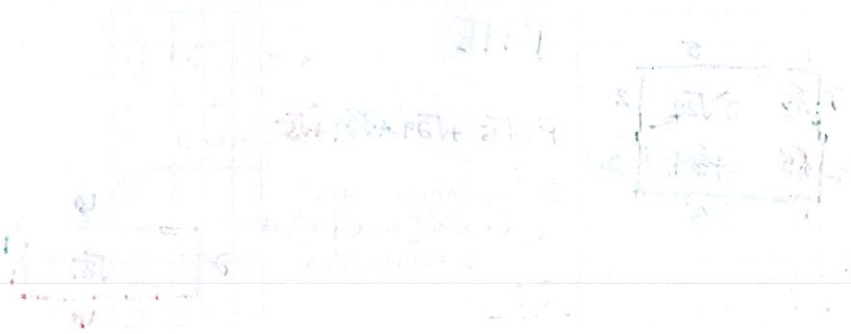
8

$A = A① + A② = 34.5$ u²

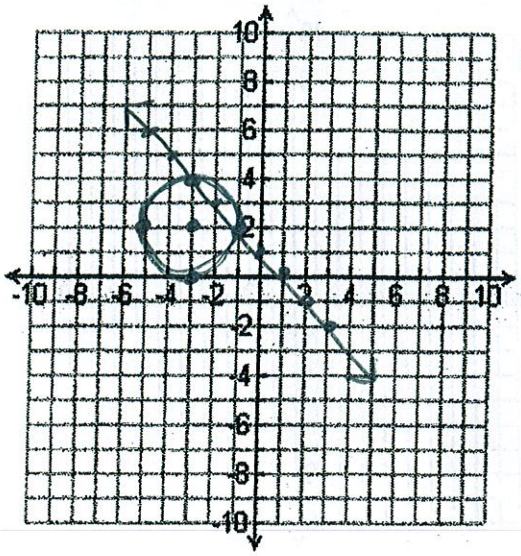
$P: \sqrt{5} + \sqrt{10} + \sqrt{40} + 1 + 6 + \sqrt{10} + \sqrt{10}$

$7 + 3\sqrt{10} + \sqrt{5} + 2\sqrt{10}$

$P: 7 + 5\sqrt{10} + \sqrt{5}$ u

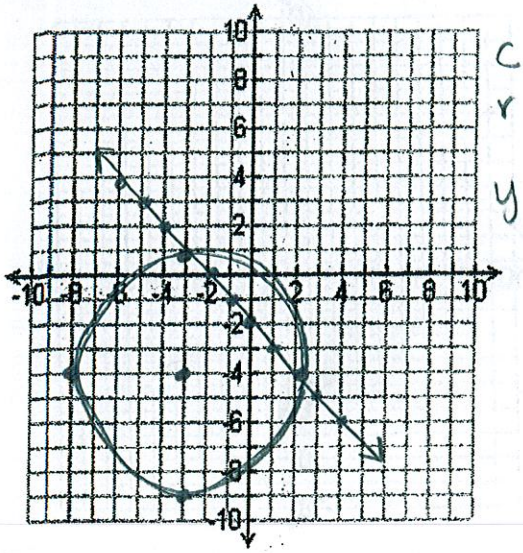


④



C : (-3, 2)
r : 2

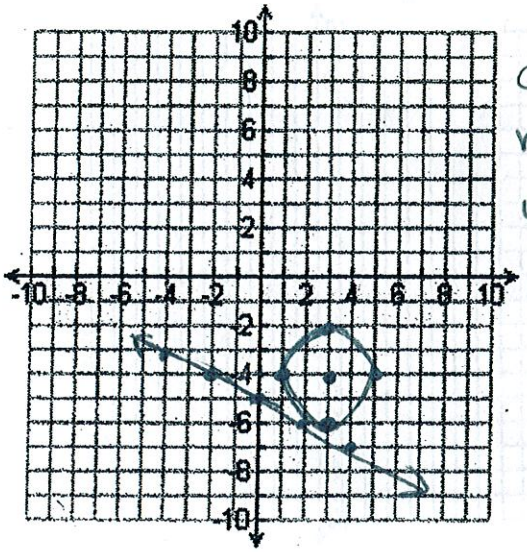
⑤



C : (-3, -4)
r : 5

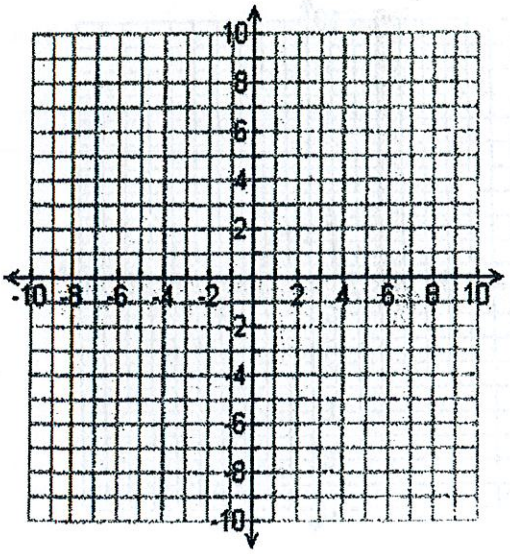
$y = -x - 2$

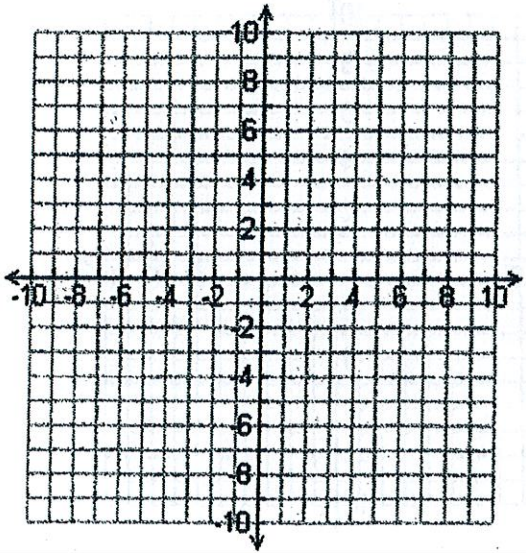
⑥

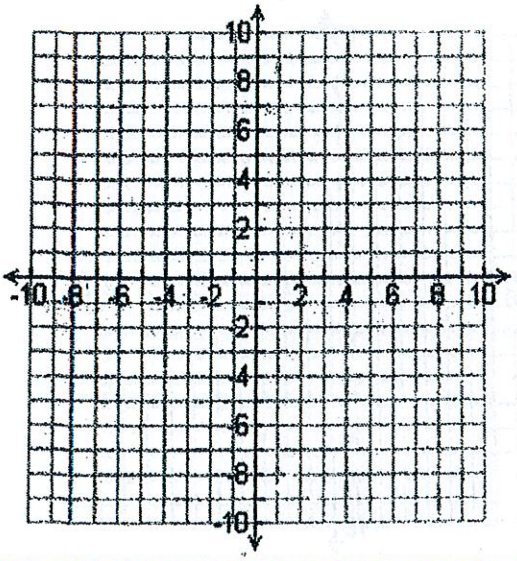


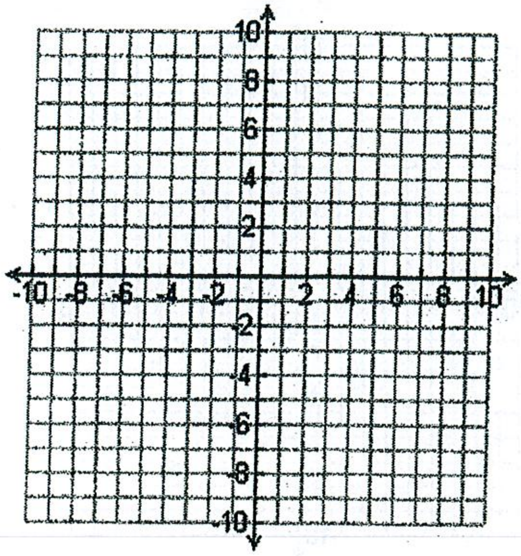
C : (3, -4)
r : 2

$y = -\frac{1}{2}x - 5$





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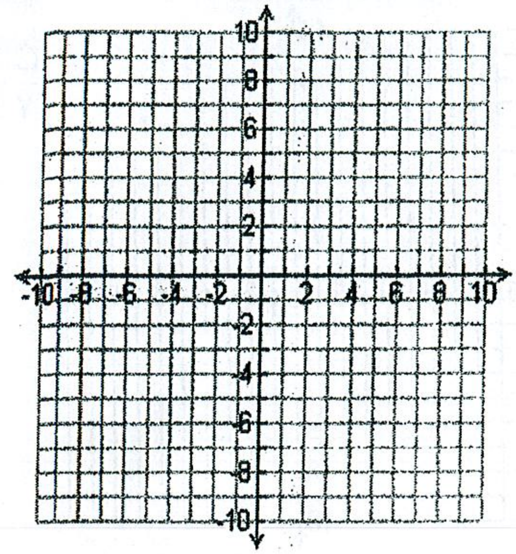
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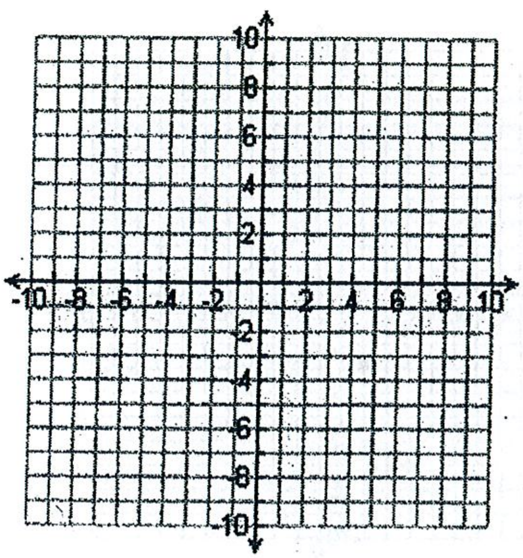
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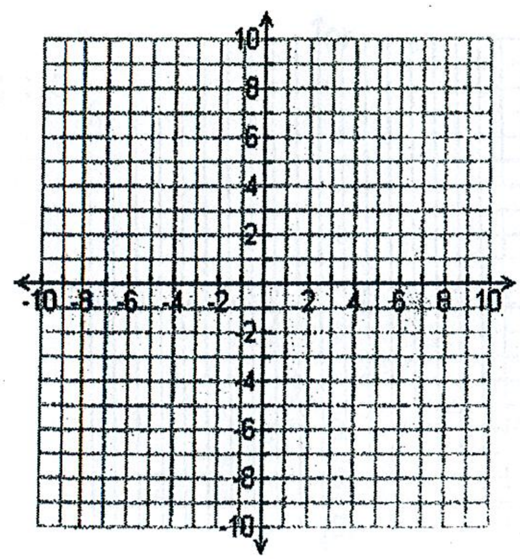
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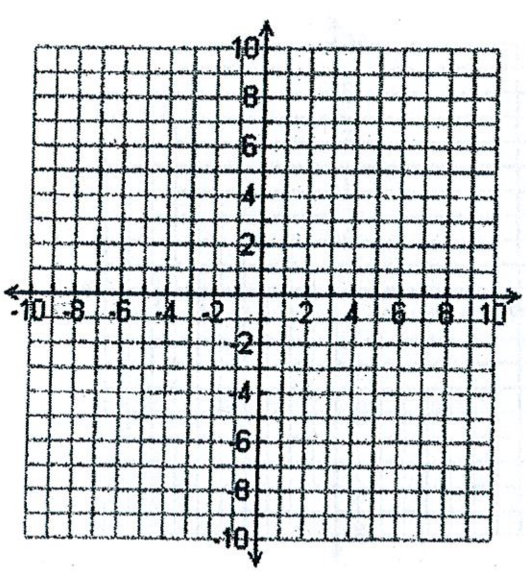
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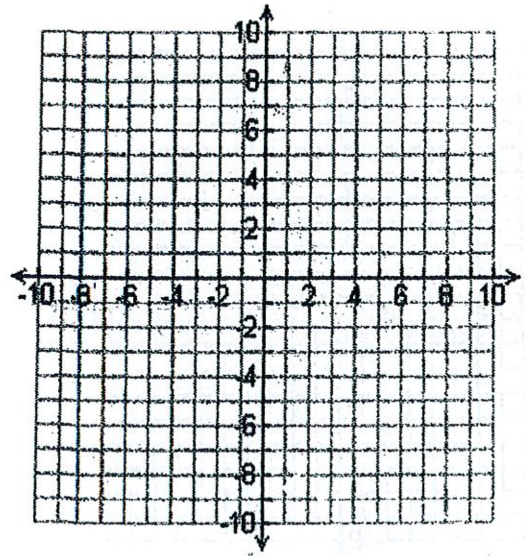
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