

Name: \_\_\_\_\_

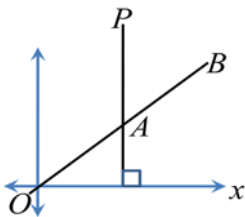
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**Math 9 Enriched: Section 3.5 Intersecting Lines**

1. Find the intersection points for each set of lines algebraically:

<p>a) <math>3x + y = 3</math> <math>2x + 3y = -5</math></p>	<p>b) <math>3x - 10y = 16</math> <math>4x + 2y = 6</math></p>	<p>c) <math>6x - 5y = \frac{4}{3}</math> <math>10x + 3y = 6</math></p>
<p>d) <math>3x + 7y = 3</math> <math>4x - 5y = 42</math></p>	<p>e) <math>\frac{x}{3} + \frac{y}{2} = \frac{1}{6}</math> <math>x - 6y = 8</math></p>	<p>f) <math>3x - 10y = 16</math> <math>4x + 2y = 6</math></p>
<p><math>0.5x - 0.6\bar{y} = 6</math> g) <math>0.25x + 0.3\bar{y} = -1</math></p>	<p><math>y + 2x = 10 + 4y</math> h) <math>4(x + y) = 42 - y</math></p>	<p><math>2(x - 2y) = 26 - 5y</math> i) <math>3(y - x) = -2(y - 7)</math></p>
<p><math>2x - 3y = 10</math> j) <math>-4x + 6y = -30</math></p>	<p>k) <math>y = x^2</math> <math>y = 0.5x + 5</math></p>	<p>l) <math>y = \frac{4}{x}</math> <math>1 = 3x - y</math></p>

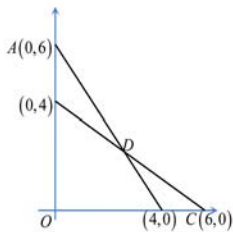
2. The lines with equations  $px + 3y = 15$  and  $6x + qy = 30$  pass through the point  $(4, -3)$ . What is the value of  $p+q$ ?
  
3. The lines  $x = \frac{1}{4}y + a$  and  $y = \frac{1}{4}x + b$  intersect at point  $(1, 2)$ . What is  $a+b$ ?
  
4. The line  $-2x - y + 19 = 0$  intersects the line  $y = cx - 10$  in the first quadrant. For how many values of " $c$ " will the point of intersection have integer coordinates?
  
5. If the point of intersection of the lines  $x - 3y = 8$  and  $2x - y = 6$  is also on the line  $kx + 5y - 12 = 0$ , determine the value of " $k$ ".
  
6. The lines  $y = ax + 1$  and  $y = 1x + a$ , with " $a$ " can not equal to 1, intersect in exactly one point. What is the x-coordinate of that point?
  
7. Lines are concurrent if they pass through the same point. The lines  $y = 2x + 3$ ,  $y = 8x + 15$ , and  $y = 5x + b$ , are concurrent. What is the value of " $b$ "?
  
8. In the diagram, " $A$ " lies on the line  $x - 2y = 0$ . Determine the length of  $AP$ .



9. A triangle of area 9units<sup>2</sup> is formed by the x-axis and the lines  $x = 1$  and  $y = mx - 4$ . Determine all possible values of “m”

10. A line through the point  $(-2,6)$  forms with the axes a triangle with area 25. Determine all possible values for the x-intercept of such a line.

11. Calculate the area of the quadrilateral AOCD shown in the diagram.



12. Two perpendicular lines with x-intercepts -2 and 8 intersect at  $(0,b)$ . Determine all values of “b”:

13. If “a”, “b”, and “c” are numbers such that the equations are all true, what is the value of “a + b – c”?

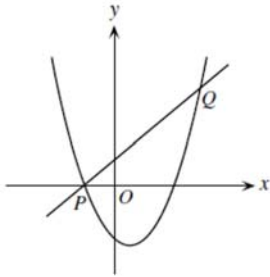
$$\begin{aligned} -3b + 7c &= -10 \\ b - 2c &= 3 \\ a + 2b - 5c &= 13 \end{aligned}$$

14. Through a point on the hypotenuse of a right triangle, lines are drawn parallel to the legs of the triangle so that the triangle is divided into a square and two smaller right triangles. The area of one of the two small right triangle is “m” times the area of the square. The ratio of the area of the other small right triangle to the area of the square is:

(A)  $\frac{1}{2m+1}$       (B)  $m$       (C)  $1-m$       (D)  $\frac{1}{4m}$       (E)  $\frac{1}{8m^2}$

15. The solution to the pair of equations  $4x - y + 17 = 0$  and  $3x + 2y - 1 = 0$  is also a solution to the equation  $kx - 2y + 4 = 0$ . What is the value of "k"?

16. In the diagram, the line  $y = x + 1$  intersects the parabola  $y = x^2 - 3x - 4$  at the points P and Q. Determine the coordinates of P and Q:



17. The lines  $y = mx + 1$ , where "m" is a positive integer, and  $13x + 9y = 183$  intersect at a point P. What is the number of values of "m", for which the coordinates of "P" are integers?

18. The vertices of a trapezoid are  $(0,0)$ ,  $(10,0)$ ,  $(10+m)$ , and  $(0,4)$ . The line  $y=x/m$  divides the trapezoid into two polygons of equal area. What is the value of "m"? Express your answer as a common fraction:

