

PART I GET STARTED

Today's Mathematics

We will graph $Ax + By = C$ using its axis intercepts.

Essential Question

How can intercepts help you graph a linear equation?

DO NOW

1. Identify m and b in $y = -2x + 6$.
2. Graph it on graph paper using slope and the y -intercept.
3. Where does its graph cross the x -axis?

SEE IT

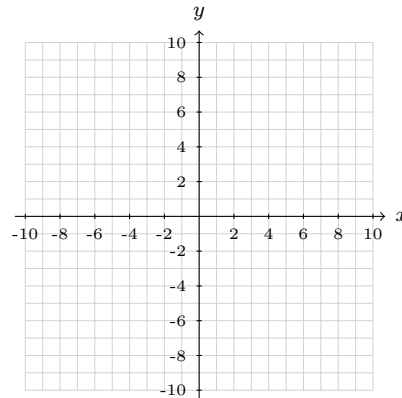
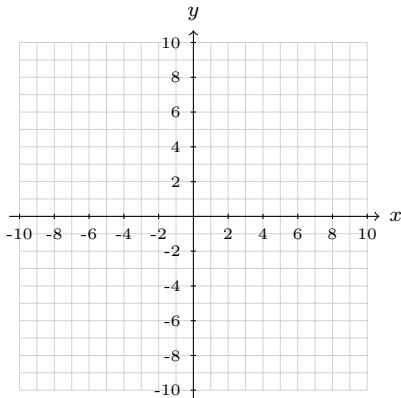
For $3x + 2y = 12$, predict what happens when $y = 0$ and when $x = 0$.

QUICK WRITE | 2 MINUTES

Explain why an x -axis point must have $y = 0$.

PART II INVESTIGATE**BUILD THE IDEA**

1. Find both intercepts of $2x + 3y = 12$.
2. Graph $4x - y = 8$ using its intercepts. Label the scale on each axis.



3. Compare intercept graphing with rewriting into slope-intercept form.
4. A \$60 budget buys notebooks at \$4 each and pens at \$2.50 each. Write a standard-form equation and interpret both intercepts.

COMPARE AND EXPLAIN

Which method gives two usable graphing points most directly? Explain when the other method might be better.

APPLY

1. On graph paper, graph $6x - 3y = 18$ by intercepts.
2. Rewrite it in slope-intercept form. Check that both methods give the same line.

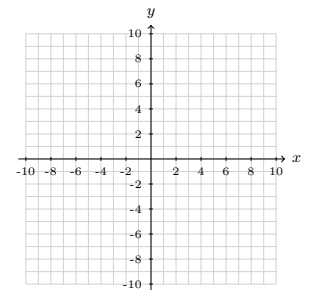
PART III MAKE SENSE AND PRACTICE

WHAT WE CAN CONCLUDE

For $Ax + By = C$, set $y = 0$ to find the x -intercept; set $x = 0$ to find the y -intercept. Two distinct intercepts determine the line. If both coincide at the origin, find another point.

WORKED MODEL

For $3x + 4y = 24$: $y = 0$ gives $(8, 0)$; $x = 0$ gives $(0, 6)$. Both fit the supplied grid. Plot and connect.



FOCUSED PRACTICE

1. On graph paper, graph $5x + 2y = 10$ using intercepts.
2. Find both intercepts of $-3x + 6y = 18$.
3. Explain when intercept graphing may be inefficient.

MATH WRITE | 5 MINUTES

Explain why setting one variable equal to zero locates an axis intercept.

PART IV PUZZLE PRACTICE**Homework****How Do Kangaroos Travel Across The Ocean?**

Write the letter of each answer in the box containing the exercise number.

Find the x - and y -intercepts for the linear equation.

1. $-3x + 5y = 15$

2. $2x - y = 4$

3. $7x + 9y = 63$

4. $3x + 2y = 6$

5. $4x - 9y = 36$

6. $x + \frac{1}{3}y = -3$

7. $\frac{1}{2}x + \frac{1}{3}y = 15$

8. $\frac{2}{5}x - \frac{3}{4}y = 12$

9. $3.5x + 4.2y = 35.7$

10. $7.6x + 15.2y = 38$

11. The booster club sells popcorn at basketball games for \$0.75 per bag. Their cost for supplies is \$12. The equation $-0.75x + y = -12$ represents the booster club's income y after selling x bags of popcorn. Find the x - and y -intercepts of the linear equation.

12. You upload digital photos to an online photo processing website. You can print 4-inch by 6-inch photos for \$0.30 each and 5-inch by 7-inch photos for \$0.75 each. The linear equation $0.30x + 0.75y = 15$ represents the ways you can print x 4-inch by 6-inch photos and y 5-inch by 7-inch photos for \$15. Find the x - and y -intercepts of the linear equation.

Answers**H.** x -intercept: 2;
 y -intercept: 3**S.** x -intercept: 5;
 y -intercept: 2.5**H.** x -intercept: -3 ;
 y -intercept: -9 **J.** x -intercept: 50;
 y -intercept: 20**M.** x -intercept: 2;
 y -intercept: -4 **Y.** x -intercept: 30;
 y -intercept: -16 **U.** x -intercept: 9;
 y -intercept: -4 **P.** x -intercept: 16;
 y -intercept: -12 **T.** x -intercept: 30;
 y -intercept: 45**E.** x -intercept: -5 ;
 y -intercept: 3**P.** x -intercept: 10.2;
 y -intercept: 8.5**I.** x -intercept: 9;
 y -intercept: 7

7	4	1	8		12	5	2	9		10	6	3	11
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