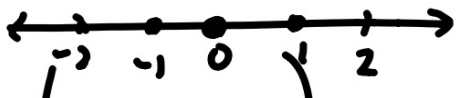
Algebra 1 3.1

Identify linear equations, intercepts, and zeros

Graph linear equations

integer Whole + opposite



linear equation graph is a straight line

standard form

constant number

variable unknowns not 0 + 1 x

x-intercept cross x-axis t l 3.5

y-intercept cross y-axis t 3(5)

whiteboards

KeyConcept Standard Form of a Linear Equation

Words	The standard form of a linear equation is $Ax + By = C$, where $A \geq 0$, A and B are not both zero, and A, B, and C are integers with a greatest common factor of 1.
Examples	In $3x + 2y = 5$, $A = 3$, $B = 2$, and $C = 5$. In $x = -7$, $A = 1$, $B = 0$, and $C = -7$.

tomorrow

Format
GCF
Pos x

Linear equations	Nonlinear equations
$4x - 5y = 16$	$2x + 6y^2 = -25$
$x = 10$	$y = \sqrt{x} + 2$
$y = -\frac{2}{3}x - 1$	$x + xy = -\frac{5}{8}$
$y = \frac{1}{2}x$	$y = \frac{1}{x}$

How can we tell by inspection?

Example 1 Identify Linear Equations

Determine whether each equation is a linear equation. Write the equation in standard form.

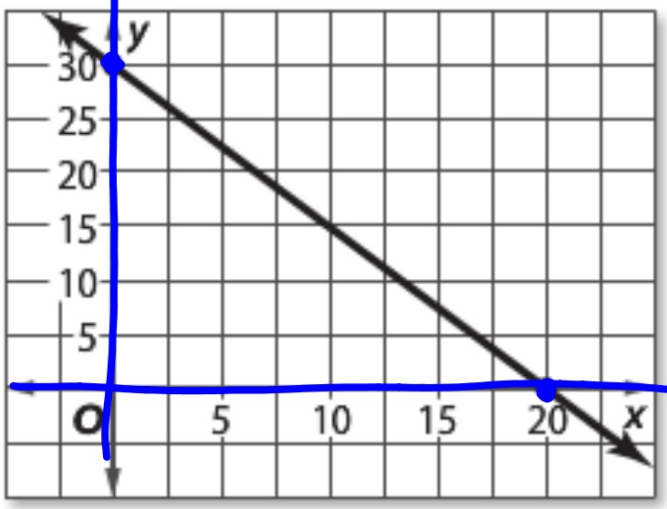
a. $y = 4 - 3x$ yes

b. $6x - xy = 4$ no x·y

Standardized Test Example 2 Find Intercepts

Find the x- and y-intercepts of the line graphed at the right.

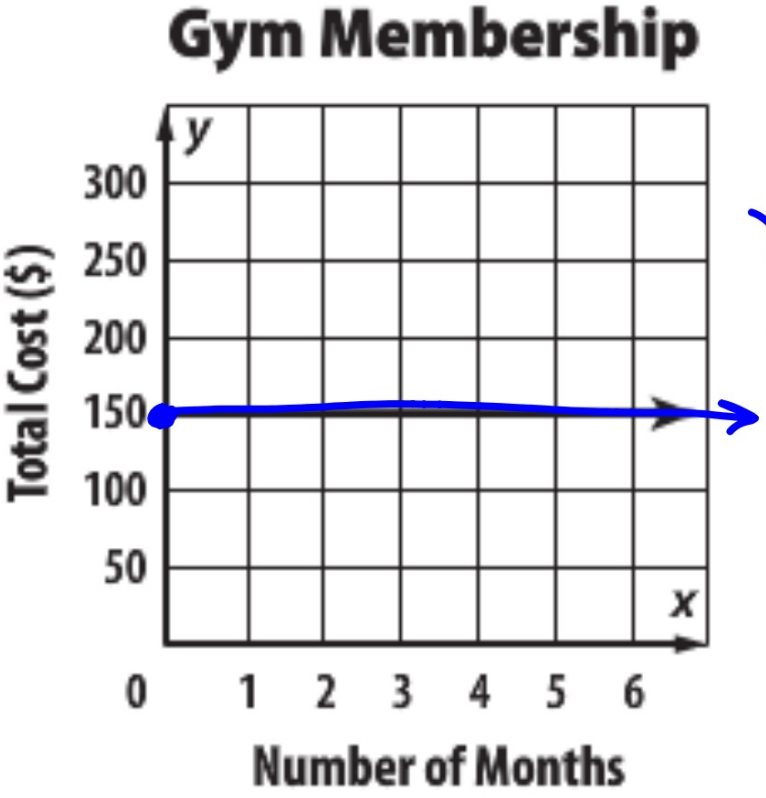
(0, 30) yint (20, 0) x-int



30

20

2. **HEALTH** Find the x- and y-intercepts of the graph.



Y-int (0, 150)

X-int none

Real-World Example 3 Find Intercepts from a Table

SWIMMING POOL A swimming pool is being drained at a rate of 720 gallons per hour. The table shows the function relating the volume of water in a pool and the time in hours that the pool has been draining.

a. Find the x- and y-intercepts of the graph of the function.

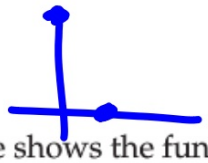
b. Describe what the intercepts mean in this situation.

Draining a Pool	
Time (h)	Volume (gal)
x	y
0	10,080
2	8640
6	5760
10	2880
12	1440
14	0

y-int (0, 10,080) pool is full

x-int (14, 0) pool empty

GuidedPractice



3. DRIVING The table shows the function relating the distance to an amusement park in miles and the time in hours the Torres family has driven. Find the x- and y-intercepts. Describe what the intercepts mean in this situation.

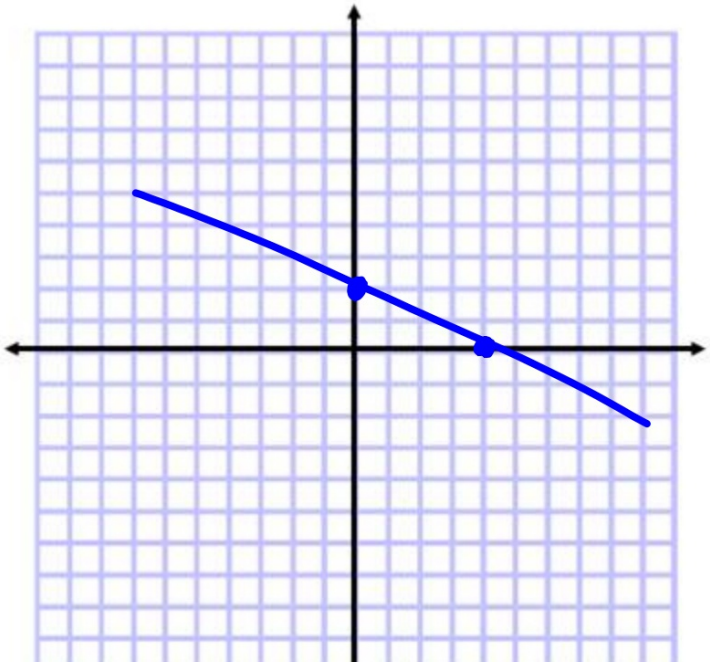
Time (h)	Distance (mi)
0	248
1	186
2	124
3	62
4	0

(0, 248) y int just left

(4, 0) x int arrived at destination

When @ x-intercept, what is the y-coordinate? $y = 0$

When @ y-intercept, what is the x-coordinate? $x = 0$



How can I use what I know about intercepts?

Example 4 Graph by Using Intercepts

Graph $2x + 4y = 16$ by using the x- and y-intercepts.

$2x + 0 = 16$

$\frac{2x}{2} = \frac{16}{2}$

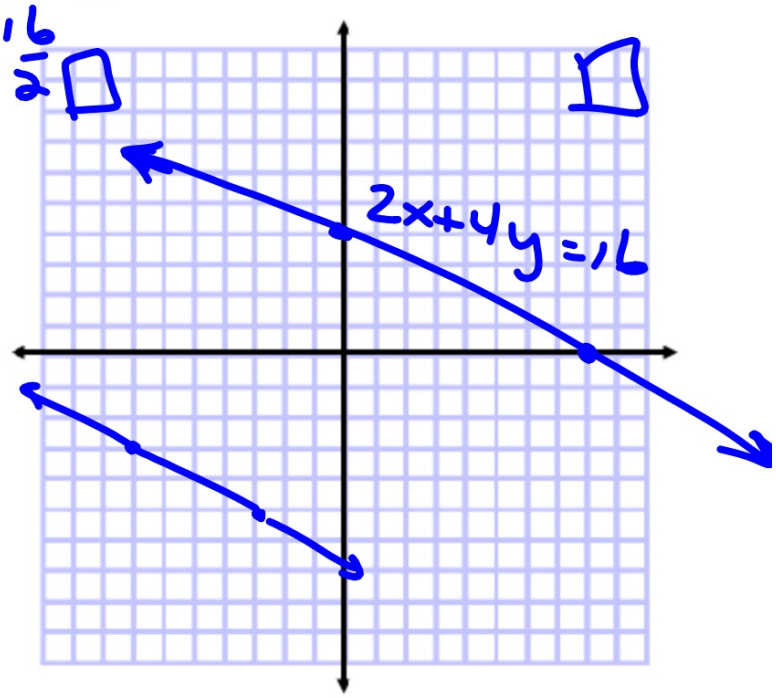
x-int $(8, 0)$

y-int $(0, 4)$

$0 + 4y = 16$

$\frac{4y}{4} = \frac{16}{4}$

$y = 4$

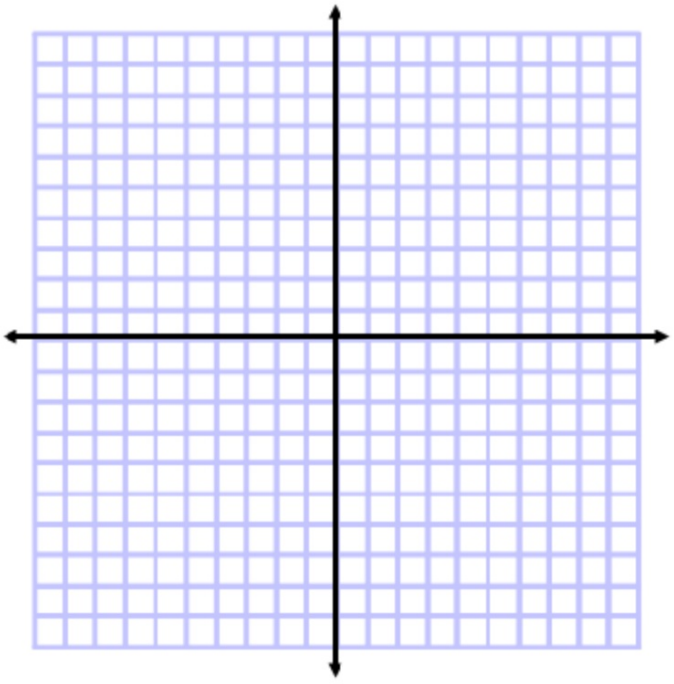


Graph each equation by using the x- and y-intercepts.

4A. $-x + 2y = 3$

4B. $y = -x - 5$

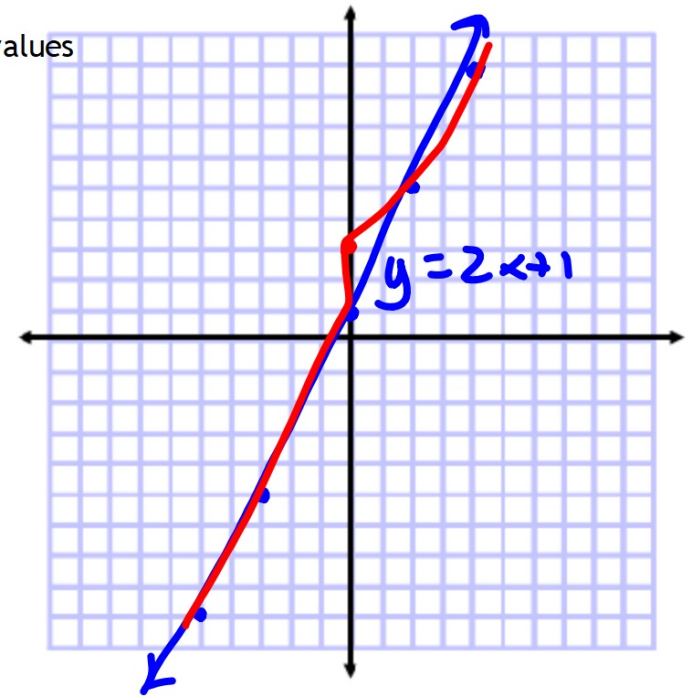
whiteboards



Graph by making a table of values

$y = 2x + 1$

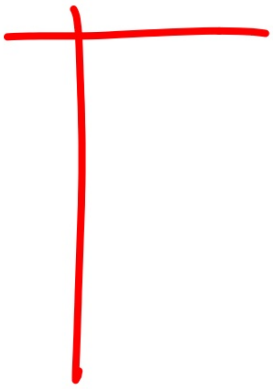
x	$2x+1$	y
4	$2\cdot4+1$	9
2	$2\cdot2+1$	5
0	$2\cdot0+1$	1
-3	$2\cdot-3+1$	-5
-5	$2\cdot-5+1$	-9

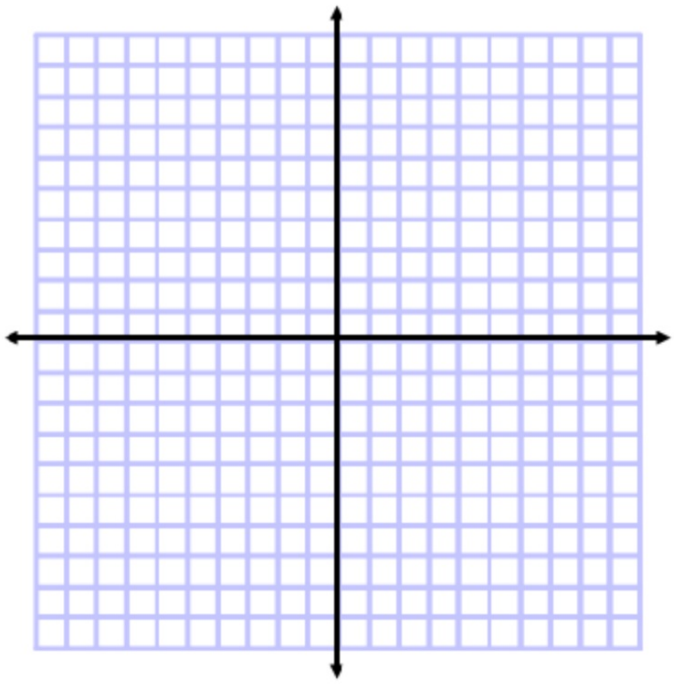


Example 5 Graph by Making a Table

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

Std Form "



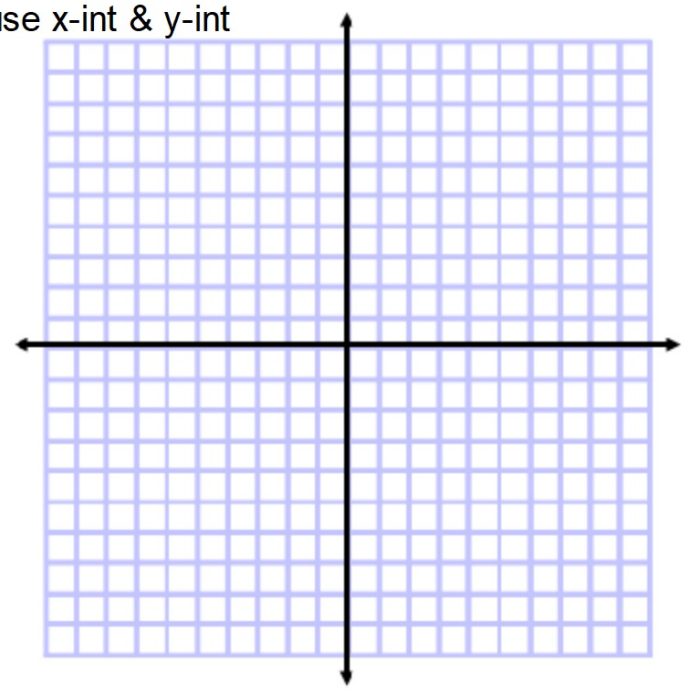


Solve for y OR use x-int & y-int

GuidedPractice

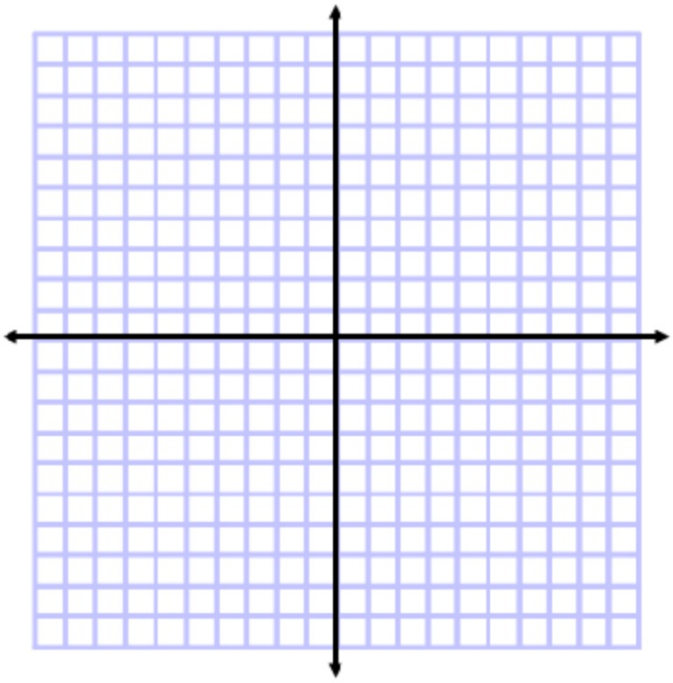
Graph each equation

5A. $2x - y = 2$



You can only choose 3 for x

5B. $x = 3$



You will get -2 for y, no matter what...

5C. $y = -2$