Linear equations

You have to be able to rearrange linear equations into specific forms.

There are three forms of linear equations that you need to be comfortable with:

- $y = mx + c$, this is the most important form. We will use it to graph and analyse linear functions.
- $ax + by + d = 0$, where $a, b, d \in \mathbb{Z}$, this form is useful for graphing equations by hand and you are often asked to convert into this form on exam questions.
- $ax + by = e$ this form is very similar to the above, but we will often want our equations in this one, because we can then use the equation solve on GDC.

Converting between different forms

Convert the following equations into the form $ax + by + d = 0$, where $a, b, d \in \mathbb{Z}$.

a) $y = \frac{2}{3}x - 1$

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Convert the following equations into the form $ax + by + d = 0$, where $a, b, d \in \mathbb{Z}$.

a) $y = \frac{2}{3}x - 1$ move the y to the RHS.

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$0 = \frac{2}{3}x - y - 1$

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   $0 = \frac{2}{3}x - y - 1$ multiply both sides by 3 to get rid of fractions.

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$2x - 3y - 3 = 0$

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Note that I could have multiplied by any multiple of 3. In the final equation I've swapped the sides of the equation.

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b) $y = \frac{3}{4}x + \frac{1}{2}$

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b) $y = \frac{3}{4}x + \frac{1}{2}$ move the y to the RHS.

$0 = \frac{3}{4}x - y + \frac{1}{2}$ multiply both sides by 4 to get rid of fractions.

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Convert the following equations into the form $ax + by + d = 0$, where $a, b, d \in \mathbb{Z}$.

a) $y = \frac{2}{3}x - 1$ move the y to the RHS.

$0 = \frac{2}{3}x - y - 1$ multiply both sides by 3 to get rid of fractions.

$2x - 3y - 3 = 0$

Note that I could have multiplied by any multiple of 3. In the final equation I've swapped the sides of the equation.

b) $y = \frac{3}{4}x + \frac{1}{2}$ move the y to the RHS.

$0 = \frac{3}{4}x - y + \frac{1}{2}$ multiply both sides by 4 to get rid of fractions.

$3x - 4y + 2 = 0$

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c) $y = -\frac{1}{2}x - \frac{1}{3}$

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c) $y = -\frac{1}{2}x - \frac{1}{3}$ move the y to the RHS.

$0 = -\frac{1}{2}x - y - \frac{1}{3}$

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c) $y = -\frac{1}{2}x - \frac{1}{3}$ move the y to the RHS.

$0 = -\frac{1}{2}x - y - \frac{1}{3}$ multiply both sides by -6 to get rid of fractions.

Converting between different forms

Convert the following equations into the form $ax + by = d$, where $a, b, d \in \mathbb{Z}$.

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$3x + 6y + 2 = 0$

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d) $y = -\frac{2}{5}x + \frac{2}{3}$

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$3x + 6y + 2 = 0$

d) $y = -\frac{2}{5}x + \frac{2}{3}$ move the y to the RHS.

$0 = -\frac{2}{5}x - y + \frac{2}{3}$ multiply both sides by -15 to get rid of fractions.

Converting between different forms

Convert the following equations into the form $ax + by = d$, where $a, b, d \in \mathbb{Z}$.

c) $y = -\frac{1}{2}x - \frac{1}{3}$ move the y to the RHS.

$0 = -\frac{1}{2}x - y - \frac{1}{3}$ multiply both sides by -6 to get rid of fractions.

$3x + 6y + 2 = 0$

d) $y = -\frac{2}{5}x + \frac{2}{3}$ move the y to the RHS.

$0 = -\frac{2}{5}x - y + \frac{2}{3}$ multiply both sides by -15 to get rid of fractions.

$6x + 15y - 10 = 0$

Converting between different forms

Convert the following equations into the form $y = mx + c$.

a) $2x + 3y - 1 = 0$

Converting between different forms

Convert the following equations into the form $y = mx + c$.

a) $2x + 3y - 1 = 0$ move the $2x$ and -1 to the RHS.

Converting between different forms

Convert the following equations into the form $y = mx + c$.

a) $2x + 3y - 1 = 0$ move the $2x$ and -1 to the RHS.

$3y = -2x + 1$

Converting between different forms

Convert the following equations into the form $y = mx + c$.

a) $2x + 3y - 1 = 0$ move the $2x$ and -1 to the RHS.

   $3y = -2x + 1$ divide both side by 3.

Converting between different forms

Convert the following equations into the form $y = mx + c$.

a) $2x + 3y - 1 = 0$ move the $2x$ and -1 to the RHS.

  $3y = -2x + 1$ divide both side by 3.

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

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a) $2x + 3y - 1 = 0$ move the $2x$ and -1 to the RHS.

$3y = -2x + 1$ divide both side by 3.

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

b) $4x - 2y - 3 = 0$

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  a) $2x + 3y - 1 = 0$ move the $2x$ and -1 to the RHS.

    $3y = -2x + 1$ divide both side by 3.

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

  b) $4x - 2y - 3 = 0$ move the $4x$ and -3 to the RHS.

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$-2y = -4x + 3$

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

b) $4x - 2y - 3 = 0$ move the $4x$ and -3 to the RHS.

$-2y = -4x + 3$ divide both sides by -2.

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Convert the following equations into the form $y = mx + c$.

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  $3y = -2x + 1$ divide both side by 3.

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b) $4x - 2y - 3 = 0$ move the $4x$ and -3 to the RHS.

  $-2y = -4x + 3$ divide both sides by -2.

  $y = 2x - \frac{3}{2}$

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Convert the following equations into the form $y = mx + c$.

c) $3x + 2y + 10 = 0$

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Convert the following equations into the form $y = mx + c$.

c) $3x + 2y + 10 = 0$ move the $3x$ and 10 to the RHS.

$2y = -3x - 10$ divide both side by 2.

$y = -\frac{3}{2}x - 5$

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  d) $x + 5y + 1 = 0$

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   $y = -\frac{3}{2}x - 5$

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   $5y = -x - 1$ divide both sides by 5.

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

On the short test you will be asked to convert between the two forms.

In case of any questions you can email me at T.J.Lechowski@gmail.com.