1.5 Finding Linear Equations

Study 1.5

1 - 15, 21,25,29, 33, 41, 45, 49-55, 59, 63, 67

Class Notes: Prof. G. Battaly, Westchester Community College, NY

College Algebra Home Page

Homework Problems

1.5 Finding Linear Equations

Given: m = 2, (0, -1) Find: equation of line

1. Start with
Slope-intercept Form: _____

2. Substitute m = 2: _____

3. (0,-1) is y-intercept
Substitute b = -1: _____

Class Notes: Prof. G. Battaly, Westchester Community College, NY

College Algebra Home Page

Homework Problems

geogebra, interactive: slope-intercept form, y = mx + b
http://www.battaly.com/collegealgebra/geogebra/slopeIntercept/

1.5 Finding Linear Equations

Given: m = -(1/3), (0, 0.1) Find: equation of line

1. Start with
Slope-intercept Form: _____

2. Substitute m = -(1/3): _____

3. (0,0.1) is y-intercept
Substitute b = 0.1: _____

Previous example:

Given: m = 2, (0, -1) Find: equation of line

1. Start with
Slope-intercept Form: y = mx + b

2. Substitute m = 2: y = 2x + b

3. (0,-1) is y-intercept
Substitute b = -1: y = 2x - 1

Class Notes: Prof. G. Battaly, Westchester Community College, NY

College Algebra Home Page

Homework Problems

geogebra, interactive: slope-intercept form, y = mx + b
http://www.battaly.com/collegealgebra/geogebra/slopeIntercept/

1.5 Finding Linear Equations

Given: m = -(1/3), (0, 0.1) Find: equation of line

1. Start with
Slope-intercept Form: $y = mx + b$
2. Substitute m = -(1/3): $y = -(1/3)x + b$
3. (0,0.1) is y-intercept
Substitute b = 0.1: $y = -(1/3)x + 0.1$

Previous example:

Given: m = 2, (0, -1) Find: equation of line

1. Start with
Slope-intercept Form: $y = mx + b$
2. Substitute m = 2: $y = 2x + b$
3. (0,-1) is y-intercept
Substitute b = -1: $y = 2x - 1$

1.5 Finding Linear Equations

Given: m = 2, (1, 0) Find: equation of line

1. Start with
Slope-intercept Form: _____

2. Substitute m = 2: _____

1.5 Finding Linear Equations

Given: m = 2, (1, 0) Find: equation of line

1. Start with
Slope-intercept Form: $y = mx + b$
2. Substitute m = 2: $y = 2x + b$
3. (1, 0) is NOT a y-intercept
? Substitute b =? $y = 2x + ?$

How can we find b? $y = 2x + b$

★ We need to solve the equation for b. ★

$y = 2x + b$

What can we use?

1.5 Finding Linear Equations

Given: m = 2, (1, 0)
Find: equation of line

How can we find b? $y = 2x + b$

We need to solve the equation for b.

$y = 2x + b$

What can we use?

Do we have a solution (x_1, y_1) that we can substitute?

Yes!! Substitute the solution (1, 0)

Substitute the solution (1,0)

or let x=1 and y=0: $\square = 2(\square) + b$

Class Notes: Prof. G. Battaly, Westchester Community College, NY

College Algebra Home Page

Homework Problems

geogebra, interactive: slope-intercept form, y = mx + b
http://www.battaly.com/collegealgebra/geogebra/slopeIntercept/

1.5 Finding Linear Equations

Given: m = 2, (1, 0)
Find: equation of line

How can we find b? $y = 2x + b$

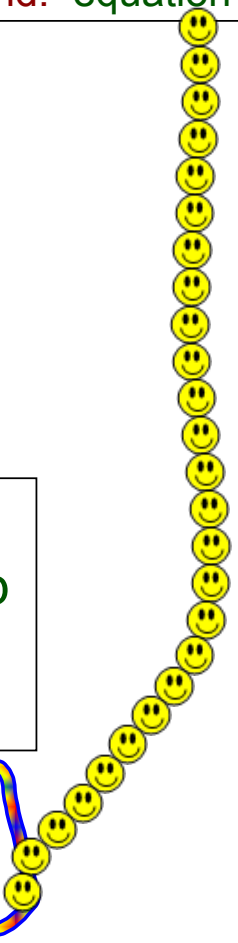
We need to solve the equation for b.
$y = 2x + b$
What can we use?

Do we have a solution (x_1, y_1)
that we can substitute?

Yes!! Substitute the solution (1, 0)

Substitute the solution (1,0)
or let x=1 and y=0: $0 = 2(1) + b$
then: $0 = 2 + b$
and: $b = -2$

Finally, $y = 2x + b$
Substitute b= -2 $y = 2x - 2$



Class Notes: Prof. G. Battaly, Westchester Community College, NY

College Algebra Home Page

Homework Problems

geogebra, interactive: slope-intercept form, y = mx + b
http://www.battaly.com/collegealgebra/geogebra/slopeIntercept/

1.5 Finding Linear Equations

Do even problems:

Given: m = __, (___, ___) Find: equation of line

Class Notes: Prof. G. Battaly, Westchester Community College, NY

College Algebra Home Page

Homework Problems

geogebra, interactive: slope-intercept form, y = mx + b
http://www.battaly.com/collegealgebra/geogebra/slopeIntercept/

1.5 Finding Linear Equations

Do even problems:

Given: m = __, (___, ___) Find: equation of line

Class Notes: Prof. G. Battaly, Westchester Community College, NY

College Algebra Home Page

Homework Problems

geogebra, interactive: slope-intercept form, y = mx + b
http://www.battaly.com/collegealgebra/geogebra/slopeIntercept/

1.5 Finding Linear Equations

A different approach for problems:

Given: m = __, (___, ___) Find: equation of line

Start: $m = \frac{y_2 - y_1}{x_2 - x_1}$

(x,y) represents any point on the line, each of which is a solution to the equation

Replace (x_2,y_2) with (x,y):

$$m = \frac{y - y_1}{x - x_1}$$

Multiply both members of eq. by $(x - x_1)$:

$$(x - x_1)\, m = \frac{y - y_1}{x - x_1}\,(x - x_1)$$

Simplify: $(x - x_1)\, m = (y - y_1)$

Rewrite: $(y - y_1) = m(x - x_1)$

Class Notes: Prof. G. Battaly, Westchester Community College, NY

College Algebra Home Page

Homework Problems

geogebra, interactive: slope-intercept form, y = mx + b
http://www.battaly.com/collegealgebra/geogebra/slopeIntercept/

1.5 Finding Linear Equations

A different approach for problems:

Given: m = __, (___, ___) Find: equation of line

(x,y) represents any point on the line, each of which is a solution to the equation

Start: $m = \frac{y_2 - y_1}{x_2 - x_1}$

Replace (x_2,y_2) with (x,y):

$m = \frac{y - y_1}{x - x_1}$

Multiply both members of eq. by $(x - x_1)$:

$(x - x_1)\, m = \frac{y - y_1}{x - x_1}(x - x_1)$

Simplify: $(x - x_1)\, m = (y - y_1)$

Rewrite: $(y - y_1) = m(x - x_1)$

Point - Slope Form of Linear Equation:

$$(y - y_1) = m\,(x - x_1)$$

Non-vertical line, (x_1,y_1) point on the line

Class Notes: Prof. G. Battaly, Westchester Community College, NY

College Algebra Home Page

Homework Problems

geogebra, interactive: slope-intercept form, y = mx + b
http://www.battaly.com/collegealgebra/geogebra/slopeIntercept/

1.5 Finding Linear Equations

Do even problems:

Given: m = __, (___, ___) Find: equation of line

Class Notes: Prof. G. Battaly, Westchester Community College, NY

College Algebra Home Page

Homework Problems

geogebra, interactive: slope-intercept form, y = mx + b
http://www.battaly.com/collegealgebra/geogebra/slopeIntercept/

1.5 Finding Linear Equations

Do even problems:

Given: m = __, (___, ___) Find: equation of line

Class Notes: Prof. G. Battaly, Westchester Community College, NY

College Algebra Home Page

Homework Problems

geogebra, interactive: slope-intercept form, y = mx + b
http://www.battaly.com/collegealgebra/geogebra/slopeIntercept/

1.5 Finding Linear Equations

How do find equation when 2 points are given and no slope?

Given: (___, ___) , (___, ___) Find: equation of line

Start by finding the slope: $m = \frac{y_2 - y_1}{x_2 - x_1}$

Then use either the Slope-Intercept or
the Point-Slope Form of a Linear Equation

1.5 Finding Linear Equations

How do find equation when 2 points are given and no slope?

Given: (___, ___) , (___, ___) Find: equation of line

Start by finding the slope: $m = \frac{y_2 - y_1}{x_2 - x_1}$

Then use either the Slope-Intercept or
the Point-Slope Form of a Linear Equation

1.5 Finding Linear Equations

Do even problems:

Given: (___, ___), (___, ___) Find: equation of line

Class Notes: Prof. G. Battaly, Westchester Community College, NY

College Algebra Home Page

Homework Problems

geogebra, interactive: slope-intercept form, y = mx + b
http://www.battaly.com/collegealgebra/geogebra/slopeIntercept/

1.5 Finding Linear Equations

Do even problems:

Given: (___, ___), (___, ___) Find: equation of line

Class Notes: Prof. G. Battaly, Westchester Community College, NY

College Algebra Home Page

Homework Problems

geogebra, interactive: slope-intercept form, y = mx + b
http://www.battaly.com/collegealgebra/geogebra/slopeIntercept/