

Review:

Things we (should) know about lines:

slope-intercept form

$$y = mx + b$$

point-slope equation

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

Slope

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

horizontal lines

$$y = k \text{ for some constant } k \text{ (0 slope)}$$

vertical lines

$$x = k \text{ (no slope)}$$

Parallel

$$m_1 = m_2$$

Perpendicular

$$m_1 = -\frac{1}{m_2}$$

Thinking ahead:

What is the difference between a function and an equation?

What is the difference between an x-intercept of a function and a zero of a function?

Homework questions?

$$y = f(x) \longrightarrow y = f(-x)$$

~~$$y = (-x)^2$$~~

$$-x^2$$

$$-(x-8)^2$$

Section 2.1 Linear Equations, Functions, and Models

Linear function v. Linear equation

Recall that a **function** is a relation in which each input has exactly one output.

A **linear function** takes the form $f(x)=mx+b$. Recall that $f(x)$ is the same as y , so a function really has two variables.

An **equation** is a statement that two expressions are equal.

A **linear equation** takes the form $Ax+B=0$, where A is non-zero (otherwise there would be no x !). Note that a linear equation only has one variable of degree 1.

Rules for solving equations:

For any real numbers a , b , and c :

If $a=b$ is true, then $a+c=b+c$ is true.
(you can add the same thing on both sides of an equation)

If $a=b$ is true, then $ac=bc$ is true.
(you can multiply the same thing on both sides of an equation)

$$24. \quad 3(2x-5)+4=2(4x+3)$$

$$6x-15+4=8x+6$$

$$-15+4-6=8x-6x$$

$$-17=2x$$

$$\boxed{\frac{-17}{2}}=x$$

Application Problems:Motion:

The distance d traveled by an object moving at a rate r in time t is given by

$$d = r t$$

Simple Interest:

The simple interest I on a principal of P dollars at interest rate r for t years is given by

$$I = P r t$$

48. private airplane flies east @ 180 km/h
2 hours later, jet flies east @ 900 km/h
how far from the airport will the jet
overtake the private plane?

	rate	time	distance
private airplane	180 km/h	$t+2$	$180(t+2)$
jet	900 km/h	t	$900t$

$$180(t+2) = 900t$$

$$180t + 360 = 900t$$

$$360 = 720t$$

time → $\frac{1}{2} = t$

$$\text{distance} = 900 \left(\frac{1}{2}\right) = 450 \text{ km}$$

54. total for 2 loans is \$9000

	Principal	Rate	time	Interest
5% loan	$9000 - x$	0.05	1	$0.05(9000 - x)$
6% loan	x	0.06	1	$0.06x$

after 1 year, Dimitri owes \$492 in interest

$$0.05(9000 - x) + 0.06x = 492$$

...

\$4800 @ 5% & \$4200 @ 6%

Zeros of a function v. x-intercepts

A **zero** of a function is the input value for which the function's output is 0, that is,

c is a zero of f if $f(c)=0$.

In particular, the **zero of a linear function** $f(x)=mx+b$ is the solution of the linear equation $mx+b=0$, and is the **first coordinate of the x-intercept** of the graph of $f(x)=mx+b$.

To find the zero(s) of any function, we **set $f(x)=0$ and solve for x**.

x-intercept: $(x, 0)$

Zero: x-value that gives you $f(x)=0$

$$72. f(x) = -3x + 13$$

zero: $-3x + 13 = 0$
 $-3x = -13$
 $x = \boxed{\frac{13}{3}}$

x-int: $\boxed{\left(\frac{13}{3}, 0\right)}$

y-int: $-3(0) + 13$
 $= 13$
 $\boxed{(0, 13)}$

2.2 - Complex # review

$$a + bi, \quad i = \sqrt{-1}$$

a = real part, b = imaginary part

$$i^2 = -1$$

complex conjugate of $a + bi$
is $a - bi$

Given $ax^2+bx+c=0$

Quadratic formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

If $b^2 - 4ac = 0$, 1 real "double root"

If $b^2 - 4ac > 0$, 2 real roots

If $b^2 - 4ac < 0$, 2 complex conjugate roots

Homework #2 (to be turned in on Friday):

Assigned Friday 3/1:

1.5 #51-73odd

Assigned Monday 3/4:

1.6 #23,29,31,71,75,81

1.7 #9,11,39-47odd

Assigned Wednesday 3/6:

1.7 #59-69odd, 77-83odd, 93-101odd, 115-121odd

Assigned Thursday 3/7:

2.1 #33,47,77-81odd, 91-99 odd