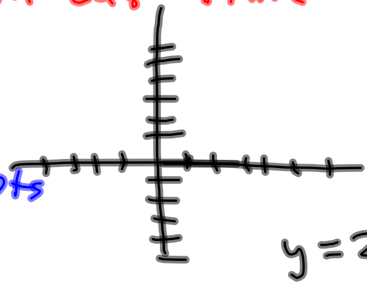
FROM Last Time

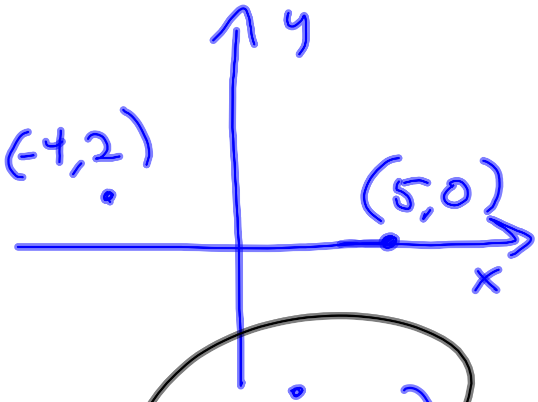
$y = 2x - 1$

2 most important points:

x- & y-intercepts



$y = 2x - 1$



x-int

$0 = 2x - 1$

$2x - 1 = 0$

$\underline{\quad +1 = +1}$

$2x = 1$

$\frac{2x}{2} = \frac{1}{2}$

$x = \frac{1}{2}$

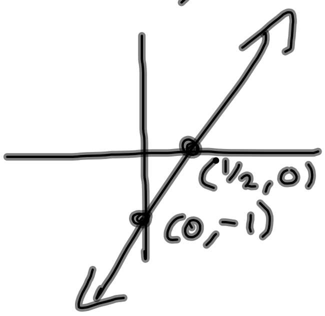
$(\frac{1}{2}, 0)$

y-int

$y = 2(0) - 1$

$y = -1$

$(0, -1)$



What?!

No. It's more like (1,-5). x>0 in QIV

Recall:

$\mathbb{N} = \{1, 2, 3, \dots\}$

$\mathbb{Z} = \{\dots, -2, -1, 0, 1, 2, \dots\}$

$\mathbb{Q} = \{ \frac{a}{b} \mid a, b \in \mathbb{Z} \text{ and } b \neq 0 \}$

in the integers club

Irrationals = Anything real that isn't rational.

$\pi, e, \sqrt{2}, \sqrt{168}$

$= \mathbb{R} \setminus \mathbb{Q} =$ Irrationals

Simplify $\sqrt{44100}$

$$\begin{array}{r|l} 2 & 44100 \\ 2 & 22050 \\ 3 & 11025 \\ 3 & 3675 \\ 5 & 1225 \\ 5 & 245 \\ 7 & 49 \\ & 7 \end{array}$$

$$\sqrt{44100} = \sqrt{2^2\cdot 3^2\cdot 5^2\cdot 7^2}$$

(Every pair, you can pull out one!)

$$= 2\cdot 3\cdot 5\cdot 7\sqrt{1} = 2\cdot 3\cdot 5\cdot 7$$

$\sqrt{a}$ means $a^{\frac{1}{2}}$

$$\sqrt{2^2\cdot 3^2\cdot 5^2\cdot 7^2}$$

$$= \left(2^2\cdot 3^2\cdot 5^2\cdot 7^2\right)^{\frac{1}{2}}$$

Powers Distribute over products.

$$= (2^2)^{\frac{1}{2}}\cdot(3^2)^{\frac{1}{2}}\cdot(5^2)^{\frac{1}{2}}\cdot(7^2)^{\frac{1}{2}}$$

Power of the power? Multiply powers.

$$= \left(2^{2\cdot\frac{1}{2}}\right)\cdot\left(3^{2\cdot\frac{1}{2}}\right)\cdot\left(5^{2\cdot\frac{1}{2}}\right)\cdot\left(7^{2\cdot\frac{1}{2}}\right)$$

$$= 2^1\cdot 3^1\cdot 5^1\cdot 7^1 = 2\cdot 3\cdot 5\cdot 7$$

§1.2 Theory

Commutativity of Addition: $x+y=y+x$

$3+2=2+3$

Associativity of Addition: $x+(y+z)=(x+y)+z$

commutativity and associativity of multiplication

$x\cdot y=y\cdot x$ $\qquad$ $x\cdot(y\cdot z)=(x\cdot y)\cdot z$

$x\cdot 3=3\cdot x=3x$ $\qquad$ $3\cdot(5x)=(3\cdot 5)\cdot x=15x$

Distributive Law of Multiplication over addition

Products $\cdot\cdot$ Sums

Right

$a\cdot(b+c)=a\cdot b+a\cdot c$

Left

$(b+c)\cdot a=b\cdot a+c\cdot a$

$= a\cdot(b+c)$

$= a\cdot b+a\cdot c$

$= b\cdot a+c\cdot a$

} proof, using commutativity.

Combining Like Terms

↳ common

$3x-37x=-34x$

$3x^2+\underbrace{7x-2x}+15$

$3x^2+5x+15$

MORE DETAIL:

$3x-37x$

$=3\cdot x-37\cdot x$

$=(3-37)\cdot x$

$=-34\cdot x$

Multiplication properties of exponents:

① $a^r \cdot a^s = a^{r+s}$

② $(a^r)^s = a^{r \cdot s} = a^{rs}$

$a^{(r \cdot s)}$

a to the quantity r times s, close quantity.

③ $(a \cdot b)^r = a^r \cdot b^r$

But it don't work like this away:

$(a+b)^r = a^r + b^r$

POWERS DO NOT DISTRIBUTE OVER SUMS, AT ALL.

$3^2 + 4^2 \neq (3+4)^2$

Monomial = Power Function

$3x^2$, 217 , $52ab^2$

Exponent

coefficient

variable(s)

ONE TERM.

Binomial : The sum of 2 monomials.

Trinomial : " " " 3 "

Bi :

$3x^1+2$ (Linear are most common)

$2x-7$

x^1 power

(1 power)

Tri :

$3x^2+2x-5$

Quadratics are most common.

(highest power is '2')

Polynomial, in general is a finite sum of monomials

Multiplying Polynomials

Forget Foil

Use Distributive Law, which boils down to Distribute everything in the first poly. times every in the 2^{nd}

$a \cdot b = (a)(b)$

$(3x-1)(5x^2+3x+2) =$

$(3x)(5x^2)+(3x)(3x)+(3x)(2)$
$+(-1)(5x^2)+(-1)(3x)+(-1)(2)$

$= (3)(5)(x^1 \cdot x^2) + (3)(3)(x^1 \cdot x^1) + (3)(2)(x)$
$(-1)(5)(x^2) + (-1)(3)(x) - 2$

$1+2$

$= 15x^3 + 9x^2 + 6x - 5x^2 - 3x - 2$

$= 15x^3 + 4x^2 + 3x - 2$

$9x^2 - 5x^2$
$= (9-5)x^2$
$= 4x^2$

$$
\left.\begin{aligned}
&(3x-1)(5x^2+3x+2) = \\
&\quad 15x^3+9x^2+6x \\
&\qquad\quad -5x^2-3x-2 \\
\hline
&\quad 15x^3+4x^2+3x-2
\end{aligned}\right\}
$$

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§1.1 #s 1–39, 43–57 ODDS

§1.2 #s 1–87 ODDS,
#s 91–101 ODDS Don't sweat "vertical" Just distribute correctly like the last example.)

§1.3 #s 1–69 odds

Special — Square of a Binomial

$(x+y)^2 = (x+y)(x+y)$

$= x^1 \cdot x^1 + x^1 \cdot y^1 + y^1 \cdot x^1 + y^1 \cdot y^1$

$= x^{1+1} + xy + yx + y^{1+1}$

$= x^2 + xy + xy + y^2$

$= x^2 + 2xy + y^2$

1
$1 \quad 1$
$1 \quad 2 \quad 1$
$1 \quad 3 \quad 3 \quad 1$
$1 \quad 4 \quad 6 \quad 4 \quad 1$

#1 $x^2+2xy+y^2$ way

$(x+y)^2 = x^2 + 2xy + y^2$

$= 1x^2 + 2x^1y^1 + 1y^2$

$(3x+5y)^2 = \boxed{(3x)^2 + 2(3x)(5y) + (5y)^2}$

$= 3^2x^2 + 2\cdot 3\cdot 5\,xy + 5^2y^2$

$= \boxed{9x^2 + 30xy + 25y^2}$

#2 FOIL

$(3x+5y)(3x+5y) =$

$= (3x)(3x) + (3x)(5y) + (5y)(3x) + (5y)(5y)$

$= 9x^2 + 15xy + 15xy + 25y^2$

Hidden commutative property going on in here.

$= 9x^2 + 30xy + 25y^2$

S 1.2
#s 81-84,
Do Both ways

§1.2 #s 39-60

40 $10(0.2x + 0.5y)$

$10(.2x) + 10(.5y)$

$((10)(.2))x + ((10)(.5))y$

$\rightarrow 2x + 5y$

$\begin{array}{r} 10 \\ .2 \\ \hline 2.0 \end{array}$

$(5)(-\frac{1}{5}) =$

$-(\frac{5}{1})(\frac{1}{5})$

$= -\frac{5 \cdot 1}{1 \cdot 5} = -1$

52 $5(x - \frac{1}{5}) = (5)(x) + (5)(-\frac{1}{5})$

$= 5x - 1$

60 $-1(6-y) = (-1)(6) + (-1)(-y)$

$= -6 + y$

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62 $(9x^2)(-3x^5)$

$-27x^7$

38 $12(\frac{y}{3} - \frac{y}{6} + \frac{y}{2})$

$= (\frac{\cancel{12}^{4}}{1})(\frac{y}{\cancel{3}_{1}}) + (\frac{\cancel{12}^{2}}{1})(-\frac{y}{\cancel{6}_{1}}) + (\frac{\cancel{12}^{6}}{1})(\frac{y}{\cancel{2}_{1}})$

$= 4y + (-2y) + 6y$

$= 8y$

LCD = $6 = 2 \cdot 3$

$12(\frac{y}{3} - \frac{y}{6} + \frac{y}{2}) =$

what's the LCD 9 of that my denominator doesn't?

$= 12(\frac{y}{3} \cdot \frac{2}{2} - \frac{y}{6} + \frac{y}{2} \cdot \frac{3}{3})$

$= 12\left[\frac{2y - y + 3y}{6}\right] = 12\left[\frac{4y}{6}\right]$

$= 12\left[\frac{2y}{3}\right] = 4\left[\frac{2y}{1}\right] = 8y$

§1.1 will be due on Monday.

§1.2 will answer questions

§1.3 Wed.

will work on formatting homework.