Michelle shares these videos from Doctah Delaware on Algebra. She reports that lectures 6, 7, 8 seem to be close to where we're at in the book. You need to scroll down, because of the way they're ordered.

https://www.youtube.com/playlist?list=PLDE28CF08BD313B2A

S1.3 Due today
Homework: one side only
Leave space
Darken your pencil (Soften Lead)

(1.3)
63a

$(x-h)^2+(y-k)^2=r^2$

$(h,k)=(0,0)$

$r=7$

$(x_1,y_1)=P_1 \quad (x_2,y_2)=P_2$

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

$$D=\sqrt{(x_1-x_2)^2+(y_1-y_2)^2}$$
$$=\sqrt{(\pi-\frac{\pi}{2})^2+(0-1)^2}$$
$$=\sqrt{(\frac{\pi}{2})^2+(-1)^2}$$
$$=\sqrt{\frac{\pi^2}{4}+1\cdot\frac{4}{4}}$$
$$=\sqrt{\frac{\pi^2+4}{4}}$$
$$=\frac{\sqrt{\pi^2+4}}{\sqrt{4}}$$
$$=\frac{\sqrt{\pi^2+4}}{2}$$

$$\pi+\frac{\pi}{2}=\frac{2\pi}{2}+\frac{\pi}{2}=\frac{3\pi}{2}$$

$$\frac{2\pi}{2}-\frac{\pi}{2}=\frac{\pi}{2}$$

$$Mid=(\frac{x_1+x_2}{2},\frac{y_1+y_2}{2})$$
$$=(\frac{\pi+\frac{\pi}{2}}{2},\frac{0+1}{2})$$
$$=(\frac{\frac{3\pi}{2}}{2},\frac{1}{2})$$
$$=(\frac{3\pi}{4},\frac{1}{2})$$

$$\frac{\frac{2\pi}{2}}{\frac{2}{1}}=\frac{3\pi}{2}\cdot\frac{1}{2}=\frac{3\pi}{4}$$

$(1+\sqrt{2}, -2), (1-\sqrt{2}, 2)$ S'1.3 #26 I got wrong.

$\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right) = (1, 0)$ is correct.

James caught my mistake.

12.1 Homework

§1.1 #s 1-8 ALL, 9, 10, 13, 17, 23, 25, 27, 28, 33, 37, 38, 42, 49, 53, 55, 62, 63, 65, 73, 78, 85, 88, 94, 96, 101

§1.2 #s 1-4 ALL, 5, 7, 11, 13, 16, 21, 23, 31, 35, 37, 42

§1.3 #s 1-8 ALL, 9-17 ODDS, 19, 23, 26, 27, 30, 31, 33, 35, 41, 44, 47, 51, 54, 55, 63bc, 67, 69, 72, 73, 77, 79, 80, 90, 91

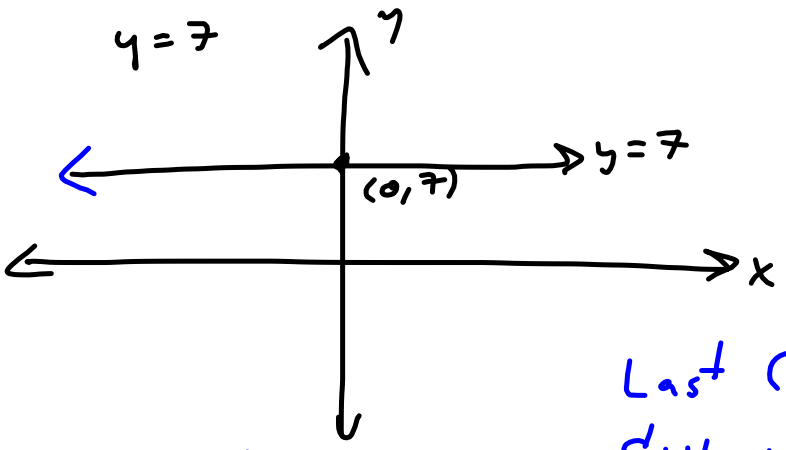
§1.4 #s 1-8 ALL, 9, 10, 13, 15, 17, 19, 22, 23, 25, 27, 29 35, 38, 40, 43, 45, 47, 57, 59, 66, 67, 69, 70, 71, 73, 76, 80, 85, 86, 104

§1.5 I #s 1-14 ALL SEE Instructions for #s 5-14!

§1.5 II #s 51-56 SEE Instructions for #s 51-56!
ALSO DO #s 61, 71, 91, 102, 104

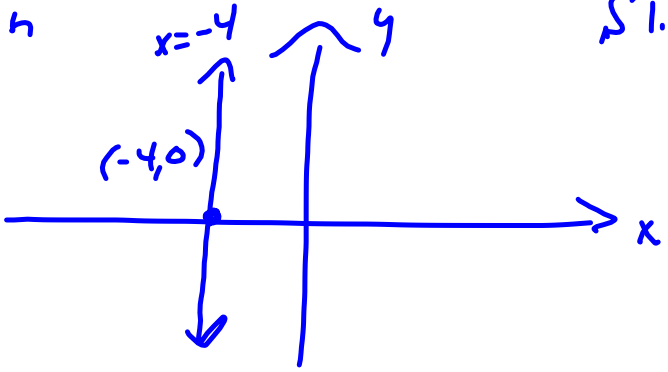
Horizontal Lines $y = k$

$y = 7$



Last call for S1.4 questions.

$x = h$ $x = -4$



$y = m(x - x_1) + y_1$ Point-Slope

$y = x$ (x_1, y_1)

§1.4 (66) $\left(-\frac{3}{8}, \frac{1}{4}\right)$

$\left(\frac{1}{2}, -\frac{1}{6}\right)$
(x_2, y_2)

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

Is it $\frac{2x}{3}$ or $\frac{2}{3x}$?

$\frac{2}{3}x$

find eq'n of line in standard form, with integer coefficients.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-\frac{1}{6} - \frac{1}{4}}{\frac{1}{2} - \left(-\frac{3}{8}\right)} = \frac{\frac{-2-3}{12}}{\frac{4+3}{8}} = \frac{\frac{-5}{12}}{\frac{7}{8}}$$

$$= -\frac{5}{12} \cdot \frac{8}{7} = -\frac{5 \cdot 2}{3 \cdot 7} = -\frac{10}{21} = m$$

Keep your x_1's & x_2's straight.

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

$y = -\frac{10}{21}\left(x - \left(-\frac{3}{8}\right)\right) + \frac{1}{4}$ is "an equation."

want standard form, integer coefficients.

$Ax + By = C$ $A, B, C \in \mathbb{Z}$

$$y = -\frac{10}{21}x - \frac{5}{28}\left(\frac{3}{8}\right) + \frac{1}{4}$$

$$= -\frac{10}{21}x - \frac{5}{28} + \frac{1}{4} \cdot \frac{7}{7}$$

$$= -\frac{10}{21}x + \frac{-5+7}{28}$$

$$= -\frac{10}{21}x + \frac{2}{28}$$

$42\left(y = -\frac{10}{21}x + \frac{1}{14}\right)$ Slope-Intercept form

LCD: $3 \cdot 7$, $2 \cdot 7$

$42y = -20x + 3$

LCD $= 2 \cdot 3 \cdot 7 = 42$

$20x + 42y = 3$

Standard form w/ integer coefficients.

§1.5 Special Instructions

#s 5–14 solve in 3 ways

(A) Quadratic Formula

(B) Completing the Square

(C) Factoring*

*Any time you do (A) or (B), you can get (C) with the Factor Theorem:

Any time $x = r$ is a root, $x - r$ is a factor.

$(x+b)^2 = x^2 + 2bx + b^2$ $\qquad \left(\frac{2b}{2}\right)^2 = b^2$

$(x-b)^2 = x^2 - 2bx + b^2$

$x^2 + 5x + \left(\frac{5}{2}\right)^2 = \left(x + \frac{5}{2}\right)^2$

$5 = 2b$

$\frac{5}{2} = b$

$\left(\frac{5}{2}\right)^2 = b^2$

S' 1.5 I #9

$2x^2 - 5x - 3 = 0$

(A) $a = 2, b = -5, c = -3$

$b^2 - 4ac = (-5)^2 - 4(2)(-3)$

$= 25 + 24 = 49$

$\sqrt{b^2 - 4ac} = \sqrt{49} = 7$

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

$= \dfrac{-(-5) \pm 7}{2(2)} = \dfrac{5 \pm 7}{4}$

$\dfrac{12}{4} = 3$

$\dfrac{-2}{4} = -\dfrac{1}{2}$

$x \in \{-\frac{1}{2}, 3\}$

(B) $2x^2-5x-3=0$ Divide by leading coefficient:

$x^2-\frac{5}{2}x-\frac{3}{2}=0$

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

$x^2-\frac{5}{2}x+\left(\frac{5}{4}\right)^2 = \frac{3}{2}+\frac{25}{16}$ $\quad x^2-2bx+b^2$

$\frac{\frac{5}{2}}{2}=\frac{5}{4} \rightsquigarrow \left(\frac{5}{4}\right)^2=\frac{5^2}{4^2}=\frac{25}{16}$

$\left(x-\frac{5}{4}\right)^2 = \frac{49}{16}$ $\quad \frac{8}{8}\cdot\frac{3}{2}+\frac{25}{16}=\frac{24+25}{16}=\frac{49}{16}$

$\sqrt{\left(x-\frac{5}{4}\right)^2}=\sqrt{\frac{49}{16}}=\frac{\sqrt{49}}{\sqrt{16}}$

$\left|x-\frac{5}{4}\right| = \frac{7}{4}$

$x-\frac{5}{4}=\pm\frac{7}{4}$

$x=\frac{5}{4}\pm\frac{7}{4}$ $\rightarrow \frac{12}{4}=3$, $-\frac{2}{4}=-\frac{1}{2}$

$x\in\{-\frac{1}{2}, 3\}$

(C) Factoring Leading Coefficient: 2

$2\left(x-\left(-\frac{1}{2}\right)\right)(x-3)$ by Factor Theorem.

$\left(2x+2\left(\frac{1}{2}\right)\right)(x-3)$ Now hide your sins.

$(2x+1)(x-3)$ & you have it factored!

Reconstruct Factorization from knowledge of zeros/roots.

$x=-\frac{1}{2}$ is a root.

$\left(x-\left(-\frac{1}{2}\right)\right)$ is a factor.

$x=3$ is a root

$(x-3)$ is a factor.

#14

$6x^2-7x+2=0$

(A) $a=6, b=-7, c=2$

$b^2-4ac=(-7)^2-4(6)(2)$

$=49-48=1$

$\sqrt{b^2-4ac}=\sqrt{1}=1$

$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}=\frac{7\pm1}{2(6)}$

$\frac{8}{12}=\frac{2}{3}$

$\frac{6}{12}=\frac{1}{2}$

$x\in\{\frac{1}{2},\frac{2}{3}\}$

$\frac{144}{3}=48$

(C) $a=6$: $x=\frac{1}{2},\frac{2}{3}$ are roots.

$6(x-\frac{1}{2})(x-\frac{2}{3})$

$2\cdot3(x-\frac{1}{2})(x-\frac{2}{3})$

$2(x-\frac{1}{2})(3)(x-\frac{2}{3})$

$(2x-1)(3x-2)=0$

(B) $6x^2-7x+2=0$

$x^2-\frac{7}{6}x=-\frac{1}{3}$

$x^2-\frac{7}{6}x+(\frac{7}{12})^2=-\frac{1}{3}\cdot\frac{48}{48}+\frac{49}{144}$

$(x-\frac{7}{12})^2=\frac{1}{144}$

$x-\frac{7}{12}=\pm\frac{1}{12}$

$x=\frac{7\pm1}{12}$

$\frac{8}{12}$

$\frac{6}{12}$