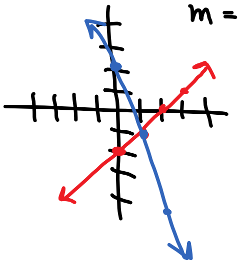
ALGEBRA I LEARNING TARGET STUDY GUIDE SHEET

Name: ______________________________

7.1 – solve systems by graphing

$y=x-2$ $y=-3x+2$



$m=\text{slope}=\frac{\text{rise}}{\text{run}}$

$y=mx+b$

answer $=(1,-1)$

7.2 – solve systems by substitution

$3x+y=-9$

$y=5x+7$

$3x+5x+7=-9$

$8x+7=-9$

$8x=-16$

$x=-2$

To find y, sub $x=-2$ in for x.

$y=5(-2)+7$

$y=-10+7$

$y=-3$

$\boxed{(-2,-3)}$

7.3 - solve systems by adding or subtracting

$5x-y=8$

$+\ -5x+4y=-17$

$\frac{3y}{3}=\frac{-9}{3}$

$y=-3$

$5x-(-3)=8$

$5x+3=8$

$5x=5$

$x=1$

$(1,-3)$

7.4 – solve systems by elimination

$x-2y=-7$

$3x-y=4 \xrightarrow{\times 2} -\ 6x-2y=8$

$x-2y=-7$

$-5x=-15$

$x=3$

$3-2y=-7$

$-2y=-10$

$y=5$

$\boxed{(3,5)}$

7.5 – solve consistent and inconsistent systems

same lines

never cross

$-2x+y=-3$

$y=2x+1$

$-2x+2x+1=-3$

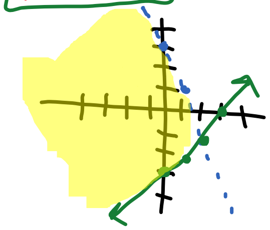
$\cancel{1=-3}$

no solution, lines are Parallel

7.6 - solve systems of linear inequalities

$y<-2x+3$

$y\geq x-3$



8.1 – apply exponent properties for products

$x^2\cdot x^3=x\cdot x\cdot x\cdot x\cdot x=x^5$

$(3y^3)^4\cdot y^5=3^4y^{12}y^5$

$=\boxed{81y^{17}}$

8.2 – apply exponent properties for quotients

$\frac{x^6}{x^3}=\frac{\cancel{x}\cdot\cancel{x}\cdot\cancel{x}\cdot x\cdot x\cdot x}{\cancel{x}\cdot\cancel{x}\cdot\cancel{x}}=\boxed{x^3}$

$\left(\frac{x^3}{y}\right)^4\cdot\frac{2}{x^5}=\frac{x^{12}}{y^4}\cdot\frac{2}{x^5}=\frac{2x^{12}}{y^4x^5}$

$=\boxed{\frac{2x^7}{y^4}}$

8.3 – apply zero, negative and fraction exponents

$\boxed{a^0=1}$ $\boxed{a^{-2}=\frac{1}{a^2}}$ $\boxed{\frac{1}{x^{-3}}=x^3}$

$(2x^0y^{-5})^3=(2y^{-5})^3$

$=\left(\frac{2}{y^5}\right)^3$

$=\boxed{\frac{8}{y^{15}}}$

8.5a/8.6a write an exponential function for data

x	-2	-1	0	1	2
y	3	6	12	24	48

initial value (y-int)

×2 ×2 ×2 ×2

$y=ab^x$

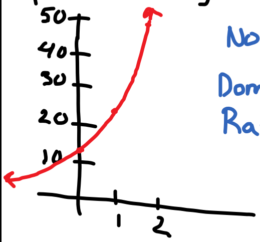
a = initial value

b = growth factor

$\boxed{y=12\cdot 2^x=12(2^x)}$

8.5b/8.6b graph exponential functions

Graph the function in the prior learning target: $y=12\cdot 2^x$



Note: y-int = 12

Domain: all x-values

Range: $y>0$

9.1 – add and subtract polynomials

$(3x^2+2)-(4x^2-x-9)$

Line them up

$$\begin{array}{r} 3x^2+0x+2 \\ -\quad 4x^2-x-9 \\ \hline -1x^2+1x+11 \end{array}$$

$-x^2+x+11$

9.2 – multiply polynomials

$(5x+6)(x-3)$

① Table Method

	5x	6
x	$5x^2$	$6x$
-3	$-15x$	-18

$\boxed{5x^2-9x-18}$

② Distribution/Foil Method

$(5x+6)(x-3)=5x^2-15x+6x-18$

$=\boxed{5x^2-9x-18}$

9.3 – factor out the greatest common monomial

Can be used to solve.

$6x^2+42x=0$

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

$6x(x+7)=0$

So $6x=0$ or $x+7=0$

$x=0$ or $x=-7$

9.4 – solve polynomials by factoring out greatest common monomial

Just like 9.3 learning target

$5y^2=-50y$

$5y^2+50y=0$

$5(y^2+10y)=0$

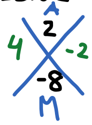
$5y(y+10)=0$

$y=0$ $y=-10$

9.5 – factor and solve $x^2 + bx + c$

Factor and solve $x^2+2x-8=0$.

$\underbrace{\overset{A}{1x^2}+2x-8}_{M}$



	x	4
x	x^2	4x
-2	-2x	-8

$(x+4)(x-2)=0$

$\boxed{x=-4}$ $\boxed{x=2}$

9.6 - factor and solve $ax^2 + bx + c$

Factor and solve $2x^2-x-6=0$.

$\underbrace{\overset{A}{2x^2}-1x-6}_{M}$

	x	-2
2x	$2x^2$	-4x
3	3x	-6

$2x^2-4x+3x-6=0$

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

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

$x=2$ $x=-3/2$

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

$x=2$ $x=3/2$

10.1/10.2 – graph $y = ax^2 + bx + c$ through transformations and axis of symmetry/vertex

Explain how the following differ from the parent function $y=x^2$.

① $y=-2x^2$ is steeper and opens downward

② $y=\frac{1}{4}x^2+3$ is wider and shifted up 3.

10.3 – solve quadratic equations by graphing

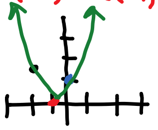
Graph $x^2+2x+1=0$ to solve.

We are trying to find x-values that make y=0 (x-intercepts).

$\frac{-b}{2a}=\frac{-2}{2}=-1$ Vertex $=\left(\frac{-b}{2a},\ \right)$

$(-1)^2+2(-1)+1=1-2+1=0$ $=(-1,0)$

y-int = c = 1



Since x=-1 is only intercept, $\boxed{x=-1}$ is answer.

10.4 – solve quadratic equations by using square roots

$5\underline{(x-6)}^2=30$

get by itself

$\sqrt{(x-6)^2}=\sqrt{6}$

$x-6=\pm2.45$

$x-6=2.45$ or $x-6=-2.45$

$x=8.45$ $x=4.45$

10.5 – solve quadratic equations by completing the square

$x^2+4x=6$

+4 +4

$\underbrace{x^2+4x+4}_{\text{factor}}=10$

↓

$(x+2)^2=10$

$x+2=\pm\sqrt{10}$

$x=1.16$ or $x=-5.16$

	x	2
x	x^2	2x
2	2x	4

10.6 – solve quadratic equations by using the quadratic formula

* If $ax^2+bx+c=0$

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

Solve

$4x^2+3x=1$

$4x^2+3x-1=0$

$x=\frac{-3\pm\sqrt{9-4(4)(-1)}}{8}$

$x=\frac{-3\pm\sqrt{9+16}}{8}$

$x=\frac{-3\pm5}{8}$

$x=\frac{-3+5}{8}=\frac{1}{4}$

$x=\frac{-3-5}{8}=-1$

10.7 – use the discriminant to state # of x-intercepts for a quadratic

Discriminant tells you the # of x-int.

Discriminant = b^2-4ac

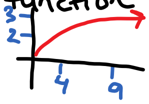
If disc>0, 2 x-int

If disc=0, 1 x-int

If disc<0, 0 x-int

11.1 – graph square root functions

Describe how the following differ from the parent function $y=\sqrt{x}$, graphed as



a) $y=2\sqrt{x}+3$ is steeper and shifted up 3.

b) $y=\frac{1}{4}\sqrt{x+3}$ is flatter and shifted left 3.

11.2 – simplify radicals and perform operations on them

$7\sqrt{5}-\sqrt{45}$

$7\sqrt{5}-\sqrt{9}\sqrt{5}$

$7\sqrt{5}-3\sqrt{5}$

$4\sqrt{5}$

11.3 – solve radical equations

$8\sqrt{x-5}+34=50$

get sq. root by itself

$8\sqrt{x-5}=16$

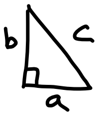
$(\sqrt{x-5})^2=2^2$

$x-5=4$

$x=9$

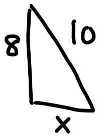
11.4 – apply the Pythagorean Theorem

for a right triangle



$a^2+b^2=c^2$

Ex: Solve for unknown



$x^2+8^2=10^2$

$x^2+64=100$

$x^2=36$

$x=6$

11.5 – apply the distance formula (no midpoint formula)

We didn't get here, so use this as extra space.

Use this extra space for any learning targets you need extra help on.