Algebra 1 Honors Final Review

Name: Key

1.) Given $f(x) = 12x + 3$ find the following:

a.) $f(-2)$

$f(-2) = 12(-2)+3$

$= -24+3$

$= \boxed{-21}$

b.) $f(x) = 29$

$12x+3=29$

$-3 \quad -3$

$\frac{12x}{12} = \frac{26}{12}$

$x = 26/12 = \boxed{13/6 = 2\frac{1}{6}}$

2.) Find the x and y intercepts. Then, use then to graph the line. $2x - 5y = -10$

x-int:

$y=0$

$2x-5(0)=-10$

$2x-0=-10$

$\frac{2x}{2} = \frac{-10}{2}$

$x=-5$

x int: (-5,0)

y-int:

$x=0$

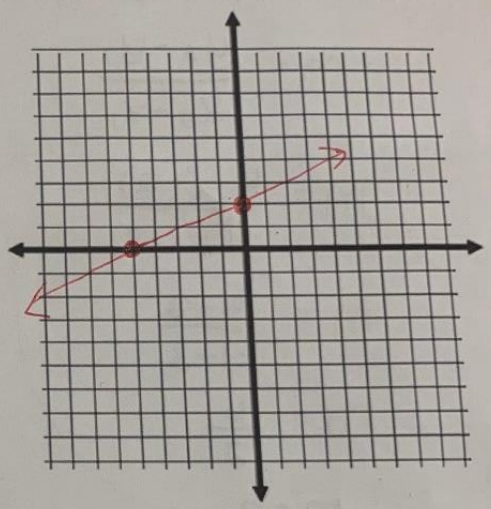
$2(0)-5y=-10$

$0-5y=-10$

$\frac{-5y}{-5} = \frac{-10}{-5}$

$y=2$

y int: (0,2)



3.) Find and state the slope and y intercept. Then, use them to graph the line. Plot at least 3 points.

$x + 2y = -4$

put in slope-int form

$y = mx+b$ (solve for y)

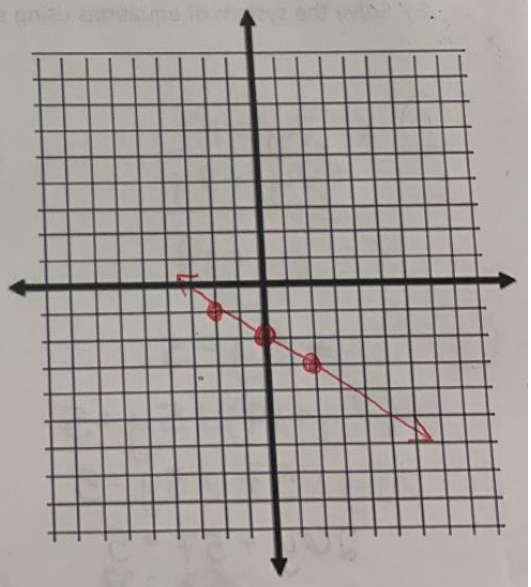
$x+2y=-4$

$-x \quad -x$

$\frac{2y}{2} = \frac{-x-4}{2}$

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

$m = -1/2 \quad b = -2$



4.) Write the slope-intercept form of the equation of the line that passes through the point $(3,4)$ and is perpendicular to the line $-x-3y=3$

find slope by putting in slope-int form $y=mx+b$

$-x-3y=3$

$+x \quad +x$

$-3y=x+3$

$\frac{-3y}{-3}=\frac{x+3}{-3}$

$y=-\frac{1}{3}x-1$

$m=-\frac{1}{3}$, so, our slope is $m=3$

$m=3$

use m, and $(3,4)$ (x, y)

$y=mx+b$

$4=3(3)+b$

$4=9+b$

$-9 \quad -9$

$-5=b$

$y=3x-5$

5.) Write the slope-intercept form of the equation that passes through the points $(-3,-2)$ and $(-1,4)$

$m=\frac{y_2-y_1}{x_2-x_1}$ $(-3,-2)$ $(-1,4)$

$m=\frac{4-(-2)}{-1-(-3)}$

$m=\frac{4+2}{-1+3}$

$m=\frac{6}{2}$

$m=3$

pick a point, and use x and y and m, solve for b

$(-3,-2)$ $m=3$

$y=mx+b$

$-2=3(-3)+b$

$-2=-9+b$

$+9 \quad +9$

$7=b$

$y=3x+7$

6.) Solve the system of equations using substitution.

$3x+5y=5$

$x-7y=19$

① $x-7y=19$

$+7y \quad +7y$

$x=7y+19$

② $3x+5y=5$

$3(7y+19)+5y=5$

$21y+57+5y=5$

$26y+57=5$

$-57 \quad -57$

$26y=-52$

$\frac{26y}{26}=\frac{-52}{26}$

$y=-2$

③ $3x+5y=5$

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

$3x-10=5$

$+10 \quad +10$

$\frac{3x}{3}=\frac{15}{3}$

$x=5$

$(5,-2)$

CHECK! (into both equations!)

$3x+5y=5$

$3(5)+5(-2)=5$

$15-10=5$

$5=5\checkmark$

$x-7y=19$

$5-7(-2)=19$

$5+14=19$

$19=19\checkmark$

$(5,-2)$

7.) Solve the system of equations using elimination.

$2x + 2y = -14$

$-2\ (x + 6y = -12)$

$2x+2y=-14$

$-2x-12y=24$

① $\frac{-10y}{-10} = \frac{10}{-10}$

$y = -1$

② $2x+2y=-14$

$2x+2(-1)=-14$

$2x-2=-14$

$+2\ \ +2$

$\frac{2x}{2} = \frac{-12}{2}$

$x=-6$

③ $(-6,-1)$

④ Check into BOTH equations!

$2x+2y=-14$

$2(-6)+2(-1)=-14$

$-12-2=-14$

$-14=-14$ ✓

$x+6y=-12$

$-6+6(-1)=-12$

$-6-6=-12$

$-12=-12$ ✓

$(-6,-1)$

Simplify each.

8.) $-4\sqrt{24} \cdot 3\sqrt{48}$

$-4\sqrt{4\cdot6} \cdot 3\sqrt{16\cdot3}$

$-4(2)\sqrt{6} \cdot 3(4)\sqrt{3}$

$-8\sqrt{6} \cdot 12\sqrt{3}$

$-96\sqrt{18} = -96\sqrt{9\cdot2}$

$= -96(3)\sqrt{2} = -288\sqrt{2}$

8.) $\sqrt{8}(2\sqrt{3} - 5\sqrt{9})$

$\sqrt{2\cdot4}\,(2\sqrt{3} - 5\cdot3)$

$2\sqrt{2}\,(2\sqrt{3} - 15)$

$4\sqrt{6} - 30\sqrt{2}$

9.) $\frac{5}{4\sqrt{2}+\sqrt{5}}$

$\frac{5}{4\sqrt{2}+\sqrt{5}} \cdot \frac{4\sqrt{2}-\sqrt{5}}{4\sqrt{2}-\sqrt{5}} = \frac{5(4\sqrt{2}-\sqrt{5})}{(4\sqrt{2}+\sqrt{5})(4\sqrt{2}-\sqrt{5})}$

$\frac{20\sqrt{2}-5\sqrt{5}}{16\sqrt{4}-4\sqrt{10}+4\sqrt{10}-\sqrt{25}} = \frac{20\sqrt{2}-5\sqrt{5}}{16(2)-5}$

$\frac{20\sqrt{2}-5\sqrt{5}}{32-5} = \frac{20\sqrt{2}-5\sqrt{5}}{27}$

10.) $\frac{2\sqrt{4}}{5\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{2\sqrt{20}}{5\sqrt{25}} = \frac{2\sqrt{4\cdot5}}{5\cdot5}$

$= \frac{2(2)\sqrt{5}}{25}$

$= \frac{4\sqrt{5}}{25}$

Factor each completely.

11.) $(21n^3 - 6n^2) - (14n + 4)$

$3n^2(7n-2) - 2(7n-2)$

$(3n^2-2)(7n-2)$

12.) $3b^2 + 5b - 8$

$-8\cdot3 = -24$ use 8 and -3

$(3b^2-3b)+(8b-8)$

$3b(b-1)+8(b-1)$

$(3b+8)(b-1)$

Solve each.

13.) $40x^2 + 6 = 206$

$-6 \quad -6$

$\frac{40x^2}{40} = \frac{200}{40}$

$x^2 = 5$

$x = \pm\sqrt{5}$

14.) $3r^2 + 7 = 82$

$-7 \quad -7$

$\frac{3r^2}{3} = \frac{75}{3}$

$r^2 = 25$

$r = \pm\sqrt{25}$

$r = \pm 5$

15.) Solve the quadratic by completing the square. $x^2 - 12x + 35 = 0$

$x^2 - 12x + 35 = 0$

$-35 \quad -35$

$x^2 - 12x = -35$

$\left(\frac{b}{2}\right)^2 = \left(\frac{-12}{2}\right)^2 = (-6)^2 = 36$

$x^2 - 12x + 36 = -35 + 36$

$(x-6)(x-6) = 1$

$(x-6)^2 = 1$

$x - 6 = \pm\sqrt{1}$

$x - 6 = \pm 1$

$+6 \quad +6$

$x = \pm 1 + 6$

$x = 1 + 6$ → $x = 7$

$x = -1 + 6$ → $x = 5$

16.) Graph the quadratic. State/label all pertinent info. $-2x^2 + 16x - 33$

- opens down ↓
- aos: $x = \frac{-b}{2a} = \frac{-16}{2(-2)} = \frac{-16}{-4} = 4$

  $x = 4$
- vertex (x, y) → $(4, -1)$
- $y = -2(4)^2 + 16(4) - 33$

  $= -2(16) + 64 - 33 = -32 + 64 - 33$

  $= 32 - 33 = -1$
- points

x	y
2	-9
3	-3

$x = 2$: $y = -2(2)^2 + 16(2) - 33$; $y = -2(4) + 32 - 33$; $y = -8 + 32 - 33$; $y = 24 - 33 = -9$

$x = 3$: $y = -2(3)^2 + 16(3) - 33$; $y = -2(9) + 48 - 33$; $y = -18 + 48 - 33$; $y = 30 - 33 = -3$