MATH 1010
EXAM 1 REVIEW

1. $4x-[8-(2x-3)]$
$=4x-(8-2x+3)$
$=4x-8+2x-3$
$=\boxed{6x-11}$

2. $-5x+4=-16$
$\quad -4 \quad -4$
$\frac{-5x}{-5} = \frac{-20}{-5}$
$\boxed{x=4}$

3. $4(x-2)=-2(4-2x)$
$4x-8=-8+4x$
$-4x+8 \quad +8-4x$
$0=0$
identity
$\mathbb{R}$

4. $3x+9=3(2x-6)$
$3x+9=6x-18$
$-3x+18 \quad -3x+18$
$\frac{27}{3}=\frac{3x}{3}$
$x=3$
conditional
$\{3\}$

5. $8k+13=2(4k-6)$
$8k+13=8k-12$
$-8k \quad -8k$
$13=-12$
contradiction
$\emptyset$ or $\{\}$

6. $(2,5)$; $2x-y=1$
$2(2)-5 \stackrel{?}{=} 1$
$4-5 \stackrel{?}{=} 1$
$-1 \neq 1$
not a solution

7. $\{(2,-5), (4,3), (6,-2), (7,-5)\}$

Domain: $\{2,4,6,7\}$
Range: $\{-5,-2,3\}$

Function. No member of the domain corresponds to more than one element of the range.

8. $f(-3)$ $\quad f(x) = x^2 - 2x + 5$

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

$f(-3) = 9 + 6 + 5$

$\boxed{f(-3) = 20}$

9. $h(x+2)$ $\quad h(x) = 4x + 7$

$h(x+2) = 4(x+2) + 7$

$h(x+2) = 4x + 8 + 7$

$\boxed{h(x+2) = 4x + 15}$

10. $f(1)$ ← what is y when $x = 1$?

$\boxed{f(1) = 1}$

11. All values of x that produce $f(x) = 0$

What is x when $y = 0$?

$\boxed{x = 0 \text{ & } x = 2}$

12. Domain: $\{x \mid -1 \leq x \leq 3\}$ or $[-1, 3]$

13. Range: $\{y \mid -9 \leq y \leq 3\}$ or $[-9, 3]$

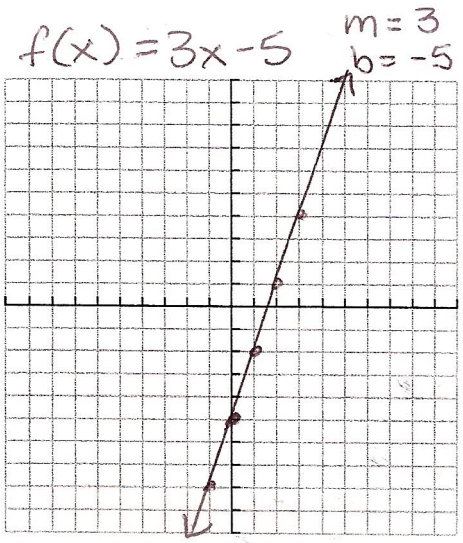
14. Domain of $f(x) = \frac{2}{x-7}$ ← can't divide by 0, so $x - 7 \neq 0$

$x - 7 \neq 0$

$x \neq 7$

$\boxed{\{x \mid x \neq 7\}}$

15. $f(x) = 3x - 5$



16. $y = 3x - 2$

slope = 3
y-int: (0, -2)

17. (2, -6) & (-3, 4)

$m = \frac{4-(-6)}{-3-2} = \frac{10}{-5} = -2$

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

18. (4, -7) & (5, -7)

$m = \frac{-7-(-7)}{5-4} = \frac{0}{1} = 0$

19. (9, -8) & (9, 1)

$m = \frac{1-(-8)}{9-9} = \frac{9}{0}$ undefined

20. $m = 3/4$ $b = (0, -2)$

$y = 3/4\,x - 2$

21. $C(x) = .1x + 30$ x = # of minutes used

$m = .1 \Rightarrow$ pay 10¢ per minute

$b = 30 \Rightarrow$ flat rate of \$30/mo

Pay \$30/mo plus 10¢ per minute

22. $2x - 5y = -10$

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

$2x = -10$

$x = -5$

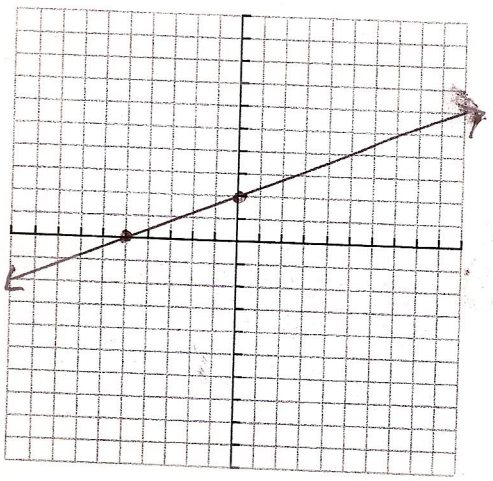
$(-5, 0)$

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

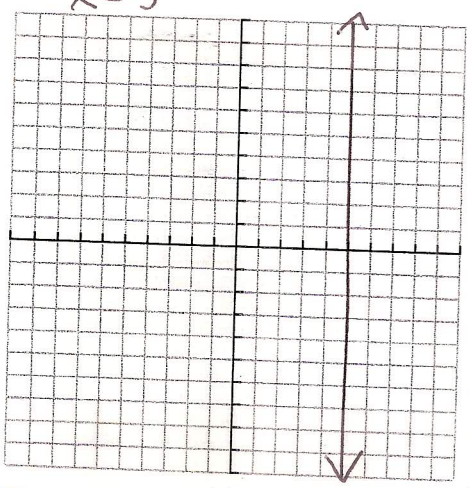
$-5y = -10$

$y = 2$

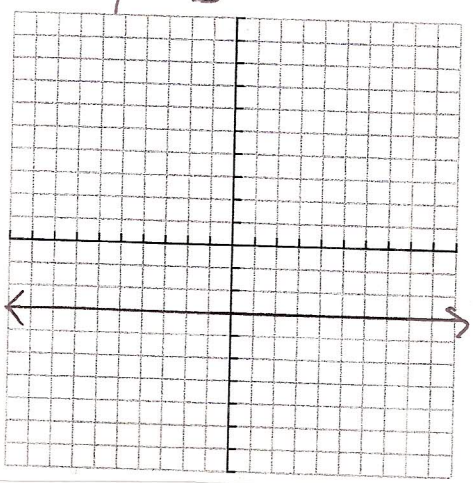
$(0, 2)$



23. $x = 5$



24. $y = -3$



25. $m = 1/3$; $(4, -2)$

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

$y - (-2) = 1/3(x - 4)$

$y + 2 = 1/3(x - 4)$

26. $(2,3)$ $(-2,1)$

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

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

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

$y - 3 = \frac{1}{2}x - 1$

$\boxed{y = \frac{1}{2}x + 2}$

27. Through $(0,-2)$ Parallel to $4x - 2y = 6$

parallel $\Rightarrow$ same slope $\quad m = -A/B = -4/-2 = 2$

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

$y - (-2) = 2(x - 0)$

$y + 2 = 2x$

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

or realize that $(0,-2)$ is a y-intercept, so $b = -2$ in $y = mx + b$

28. Through $(0,5)$ perpendicular to $x + 3y = 9$

perpendicular $\Rightarrow$ slopes are negative reciprocals.

slope of $x + 3y = 9$: $m = -A/B = -1/3$

slope of line perpendicular to $x + 3y = 9$: $m = 3$

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

$y - 5 = 3(x - 0)$

$y - 5 = 3x$

$y = 3x + 5$

or realize that $(0,5)$ is a y-intercept, so $b = 5$ in $y = mx + b$.

29. $4x - 2y = 6$

$3x + y = 7$

$y = -3x + 7$

$4x - 2(-3x + 7) = 6$

$4x + 6x - 14 = 6$

$10x - 14 = 6$

$10x = 20$

$x = 2$

$y = -3(2) + 7 = 1$

$\boxed{(2,1)}$

30. $(3x-5y=9)(-5)$
$(5x-3y=-1)(3)$
$-15x+25y=-45$
$15x-9y=-3$
$16y=-48$
$y=-3$

$3x-5(-3)=9$
$3x+15=9$
$3x=-6$
$x=-2$

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

31. $(2x-3y=12)3$
$-6x+9y=-36$

$6x-9y=36$
$-6x+9y=-36$
$0=0$

$\boxed{\text{dependent}}$

32. $(5y-4x=6)(-2)$
$10y-8x=16$

$-10y+8x=-12$
$10y-8x=16$
$0=4$

$\boxed{\text{inconsistent}}$

33. wands: 2 galleons
cauldrons: 3.5 galleons
sell 36 products
make 102 galleons

w = # of wands sold
c = # of cauldrons sold

$(w+c=36)(-2)$
$2w+3.5c=102$
$-2w-2c=-72$
$1.5c=30$
$\frac{1.5c}{1.5}=\frac{30}{1.5}$
$c=20$
$w=16$

$\boxed{\text{They sold 16 joke wands}}$

34. $1.20/lb
$1.50/lb
mix: 30 lb @ $1.38/lb

c = lbs of cheap candy
e = lbs of expensive candy

$$(-1.2)(c + e = 30)$$
$$1.2c + 1.5e = (1.38)(30)$$
$$-1.2c - 1.2e = -36$$
$$\frac{.3e}{.3} = \frac{5.4}{.3}$$
$$e = 18$$
$$c = 12$$

She should use 12 lb of the cheaper candy

35.

	d	r	t
downstream	40	r+5	t
upstream	15	r-5	t

r = speed in still water

$$40 = (r+5)t$$
$$15 = (r-5)t$$
$$t = \frac{40}{r+5} \qquad t = \frac{15}{r-5}$$
$$\frac{40}{r+5} = \frac{15}{r-5}$$
$$40(r-5) = 15(r+5)$$
$$40r - 200 = 15r + 75$$
$$-15r + 200 \quad -15r + 200$$
$$\frac{25r}{25} = \frac{275}{25}$$
$$r = 11$$

11 mph in still water

36. $2x-3y+z=5$
$x+3y+8z=22$
$3x-y+2z=12$

$2x-3y+z=5$
$x+3y+8z=22$
$3x+9z=27$

$x+3y+8z=22$
$3(3x-y+2z=12)$

$x+3y+8z=22$
$9x-3y+6z=36$
$10x+14z=58$

$(10)(3x+9z=27)$
$(-3)(10x+14z=58)$
$30x+90z=270$
$-30x-42z=-174$
$48z=96$
$\frac{48z}{48}=\frac{96}{48}$
$z=2$

$3x+9(2)=27$
$3x+18=27$
$3x=9$
$x=3$

$2(3)-3y+2=5$
$-3y+8=5$
$-3y=-3$
$y=-1$

$\boxed{(3,-1,2)}$

37. $4x+y+z=17$
$x-3y+2z=-8$
$5x-2y+3z=5$

$3(4x+y+z=17)$
$x-3y+2z=-8$

$12x+3y+3z=51$
$x-3y+2z=-8$
$13x+5z=43$

$2(4x+y+z=17)$
$5x-2y+3z=5$

$8x+2y+2z=34$
$5x-2y+3z=5$
$13x+5z=39$

$(-1)(13x+5z=43)$
$13x+5z=39$
$-13x-5z=-43$
$0=-4$

$\boxed{\text{inconsistent}}$