Math 41 **name**_____

Prerequisite Worksheet / *(old Math 21Final Exam)*

1. Solve the equation for *x*: $3(x-4)+2=9-2(x-3)$

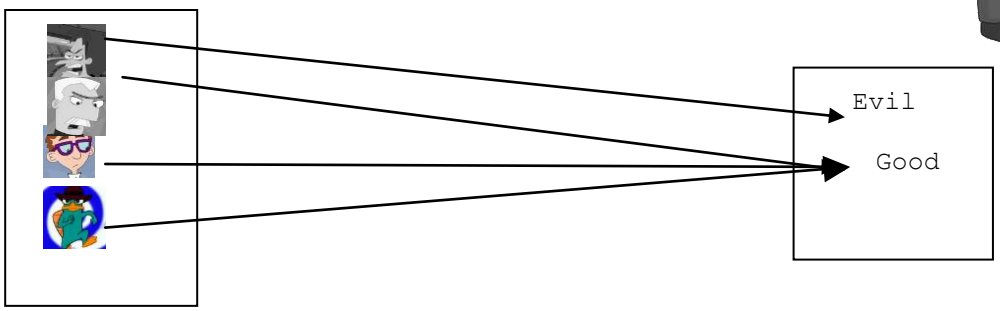
2. Find an equation of the line though the point $(0,5)$ and perpendicular to $y=-\frac{1}{2}x-6$.

3. Find an equation of the line parallel to the *y*-axis and passing through the point $\left(\frac{1}{2},-\frac{5}{3}\right)$.

4. The enrollment of very small very liberal arts college in Quahog is increasing at a constant rate. The enrollment was 300 in the year 2000, and had increased to 400 by the year 2010. Find the linear equation giving the population ***P*** in terms of the year ***t***, where $t=0$ corresponds to the year 2000.

5. Does the following relation or equation represent a function?

a)



*Yes or No, **if not** explain.*_____

---

b) $y^2=4-x^2$

*Yes or No, **if not** explain.*_____

---

c) $y=4-x^2$

*Yes or No, **if not** explain.*_____

6. Evaluate the function for each of the indicated values. $f(x) = 2x - 5$

a. $f(t)$

---

b. $f(3)$

---

c. $f(t+3)$

---

d. $f(t) + f(3)$

7. ***Describe*** the transformation(s) of the graph of $f(x) = x^2$, that will yield the graph of the function, $g(x) = -(x+2)^2 - 1$.

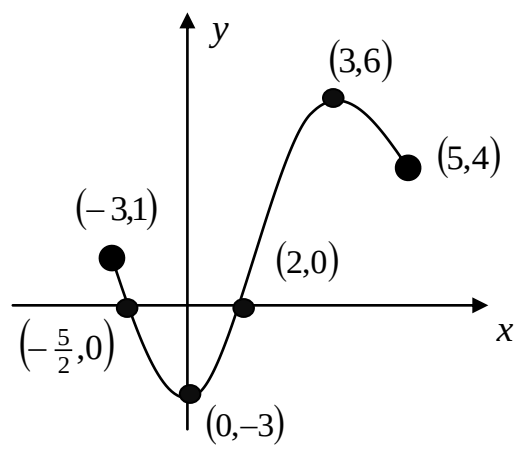
8. Use the graph of the function to determine each of the following:

a. the domain:

b. the range:

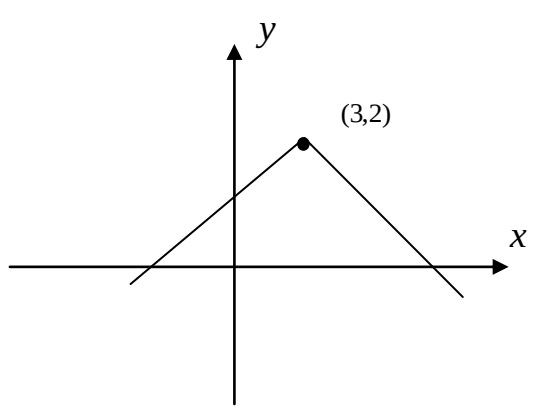
c. $f(3) =$

d. the value(s) of x such that $f(x) = 0$



9. Use the graph of $f(x) = |x|$ to write an equation for the function $y = g(x)$ whose graph is shown:

$g(x) =$



10. Perform the operations and simplify: $\left(-3x^{-2}y^{3}\right)^{-2}\cdot\left(\dfrac{2x^{-3}}{5y^{4}}\right)^{0}$

11. Perform the operations and simplify: $(3x^2-5)(3x^2+5)$

12. Perform the operations and simplify: $(3x^2-5)^2$

13. Factor the expression completely: $8x^3-y^3$

14. Factor the expression completely: $6x^2-11x-10$

15. Solve the equation by factoring: $x^3+3x^2-4x-12=0$

16. Perform the operations and/or simplify: $\dfrac{4}{x+2}+\dfrac{x}{(x-2)(x+2)}$

17. Perform the operations and/or simplify: $\dfrac{x^2-1}{2x-6}\div\dfrac{x^2+x}{x^2-x-6}$

18. Solve the equation for *x*, if possible. $\dfrac{2x}{x-2}=3+\dfrac{x}{x-2}$

19. Use the rules of rational exponents to simplify or evaluate:

a. $x^2\sqrt{x}$

b. $\left(\dfrac{1}{8}\right)^{-\frac{2}{3}}$

20. Perform the operations and/or simplify: $5\sqrt{2x}-x\sqrt{20x}+3\sqrt{5x^3}$

21. Perform the operations and/or simplify: $\left(4\sqrt{x}-y\right)\left(3\sqrt{x}+5y\right)$

22. Solve the equation for *x*, if possible. $\sqrt{x+3}-1=x$

23. Solve the equation for *x*, using the quadratic formula. $x^2-2x-1=0$

24. Solve the equation for *x*, by the method of your choice. $(2x-1)^2=8$

25. Solve the equation for *x*, by the method of your choice. $x(2x-3)=-1$

Have a nice summer!