

**Math Diagnostic****Name: KEY***Calculate the following:*

1.  $2^3 = 8$

2.  $\frac{1}{2} \div \frac{1}{3} = 3/2$

3.  $\frac{1}{2} + \frac{1}{3} = 5/6$

4.  $9^{\frac{1}{2}} = 1/3$

5.  $|-8| = 8$

6.  $-8 \bullet -4 = 32$

7.  $\frac{98^{17}}{98^{16}} = 98$

8.  $2:3 = 4:6$

9.  $2(2x+3) = 4x+6$

10.  $8 - 2 \bullet 4 = 0$

11.  $20\% \text{ of } 50 = 10$

12.  $4! = 24$

13.  $\log_4 16 = 2$

*Solve the following. Please show all work.*14. Rewrite 3,400,000 in scientific notation:  
 $3.4 \cdot 10^6$ 15. List 2 factors of 8 and 2 multiples of 8.  
Factors: 1, 2, 4, 8  
Multiples: 8, 16, 24, 32, 64...16. Solve for x:  $9 - 5x \leq 1$ 

$9 - 5x - 9 \leq 1 - 9$

$-5x \leq -8$

$\frac{-5x}{-5} \geq \frac{-8}{-5}$

$x \geq \frac{8}{5}$

17. Solve for x:

$\frac{2x+7}{5} = 13$

$5\left(\frac{2x+7}{5}\right) = 13(5)$

$2x+7 = 65$

$2x+7-7 = 65-7$

$2x = 58$

$x = 29$

18. Solve for x:

$x^2 + 12x = -20$

$x^2 + 12x + 20 = 0$

$(x+10)(x+2) = 0$

$x = -10, -2$

19. Consider the equation  $y = -2x + 3$

a. If  $x = 5$ , what does  $y$  equal?

$$y = -2(5) + 3 = -10 + 3 = -7$$

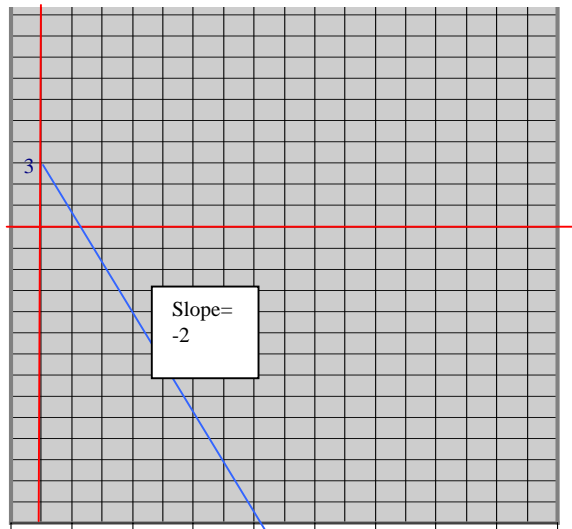
b. If  $y = 1$ , what does  $x$  equal?

$$y = -2x + 3$$

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

$$x = 1$$

c. Sketch the graph in the space provided below.



$$5x + 2y = 19$$

$$2x - y = 4$$

$$5x + 2y = 19$$

$$y = 2x - 4$$

$$2(2x - y) = 4(2)$$

$$5x + 2(2x - 4) = 19$$

$$5x + 4x - 8 = 19 \quad 5x + 2y = 19$$

$$9x = 19 + 8 = 27 \quad 4x - 2y = 8$$

$$x = 3 \quad 9x = 27$$

$$y = 2(3 - 4) = 2$$

20. Solve for  $x$  and  $y$ :

21. Consider two equations

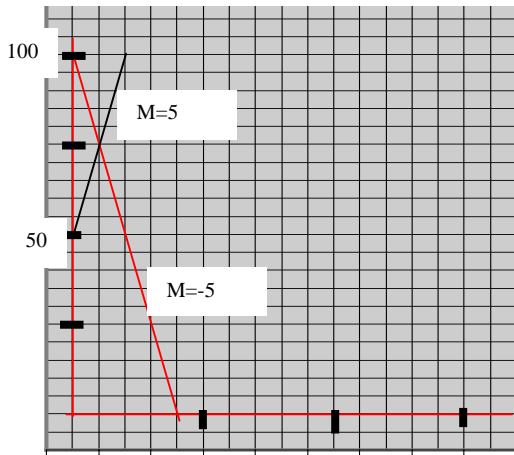
$$Q = 100 - 5P$$

$$Q = 50 + 5P$$

a. Solve for  $Q$  and  $P$ .

$$2Q = 150 \quad Q = 75, P = 5$$

b. Graph the two equations.

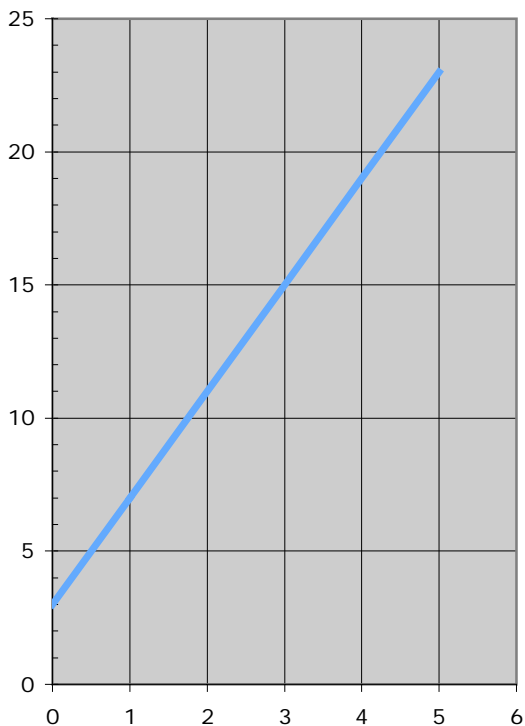


22. The first equation is a demand curve with P representing price in dollars and Q representing quantity in tons. Describe in words what the 5 in the equation means.

*For every \$1 drop in price, demand for the product (the amount people are willing to buy) goes up 5 tons.*

23. Consider the following set of numbers: 0,1,1,2,4,5,8
- What is the mean?  $21/7=3$
  - What is the median? 2
  - What is the mode? 1

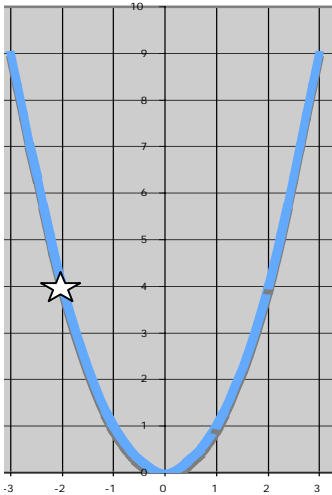
24. Use the graph below to answer the following questions:



- What is the y-intercept of the line?  
3
- What is the slope of the line?  
4
- Write the equation for the line in y-intercept form.  
 $y=4x+3$

25. On a particular day an airport currency exchange stand offers these terms for changing dollars into euros: You pay a fixed \$2 exchange fee and get 0.81 euro for each dollar. Write down the equation that tells you how many euros (E) you get for a given number of dollars (D).

$$E = \text{Rate} * (\text{\$ - fee} - D) = .81D - 1.62$$



26. Use the graph below to answer the following questions:

- a. What are the coordinates of the star?

$$(-2, 4)$$

- b. What is the equation of the line?

$$y = x^2$$

27. The population of a country is currently 20 million and is growing at 10% per decade.

- a. How large will the population be after 30 years? You can express this as an equation if you don't have time to complete the computation.

$$(1.1)^{30} 20 \approx 26.6 \text{ million}$$

- b. How long will it take the country's population to double, given its current growth rate of 10%? (Hint: You can write this as an unsimplified log.)

$$40,000,000 = 20,000,000(1.1)^x$$

$$2 = 1.1^x$$

$$x = \text{Log}_{1.1} 2 \approx 7.275 \text{ decades} = 72.75 \text{ years}$$