

## MATH 980 Sample Final Exam

1.) Solve the following equations.

a.)  $3x - 4 = -2x + 11$

b.)  $5 + 2|2x - 1| = 27$

c.)  $\log_2 x = 3$

d.)  $\frac{1}{2}x + 2 = \frac{1}{3}x$

2.) Graph  $2x + y = 4$

3.) Graph  $x = -3$

4.) Graph the function  $f(x) = 2^x$

5.) Graph the function  $f(x) = \log_2(x)$

6.) Write the equation of the line with a slope of  $-3$  that passes through the point  $(-11, 4)$ . Give your answer in slope-intercept form,  $y = mx + b$ .

7.) The difference of five times a number and twelve is three. Find the number.

8.) Solve the following system using the substitution method. Show clear work and write your answer as an ordered pair.

$$-3x + 2y = -7$$

$$2x + y = 7$$

9.) Solve  $9pr + n = 3t$  for  $r$ .

10.) What number is 2.5% of 96?

11.) Solve the following inequalities. Graph the solution on a number line, and give interval notation for the answer.

a.)  $-8 \leq 3x - 5 < 13$

b.)  $5 - x > 4$  or  $2x - 4 \geq 2$

12.) Find the slope of the line that passes through the points  $(4, -7)$  and  $(-1, 3)$ .

13.) A city had a population of 6000 people in 2016 and 8400 people in 2020. Find the rate of change, in people per year, of the city's population change.

14.) Graph the inequality  $y > \frac{1}{2}x - 3$ .

- 15.) Andres buys a used car for \$8500. The car depreciates at a rate of 9% per year. What will the value of the car be in 6 years? Round to the nearest cent. Use the formula  $V = P(1 - r)^t$ .
- 16.) Solve the equation  $5^{3x+1} = \frac{1}{25}$ .
- 17.) Given the function  $f(x) = 2x^2 - 5x - 3$ , calculate  $f(-3)$ .
- 18.) The sum of two consecutive odd integers is 464. Find the integers.
- 19.) The admission fee for a concert is \$6 for children, and \$10 for adults. If 162 tickets were sold, and the admission fees collected totaled \$1412, how many children and how many adults were admitted?
- 20.) Simplify the following expressions completely.
- a.)  $x^6x^7$
  - b.)  $(y^3)^6$
  - c.)  $z^0$
- 21.) Rewrite the equation  $b^a = c$  in logarithmic form.

## Solutions to MATH 980 Sample Final Exam

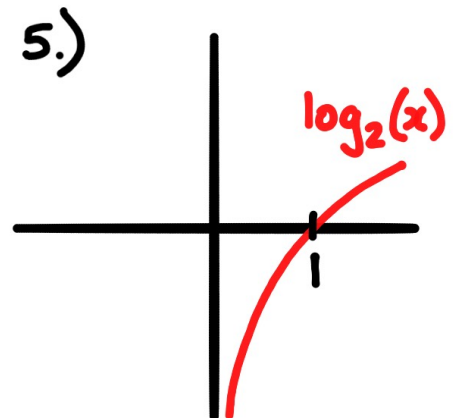
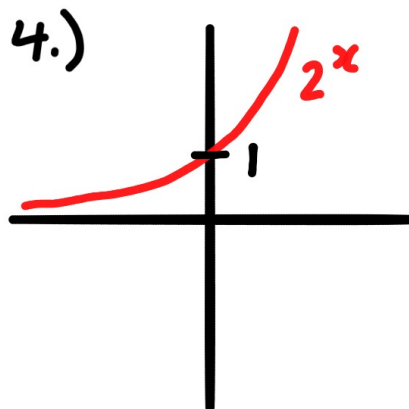
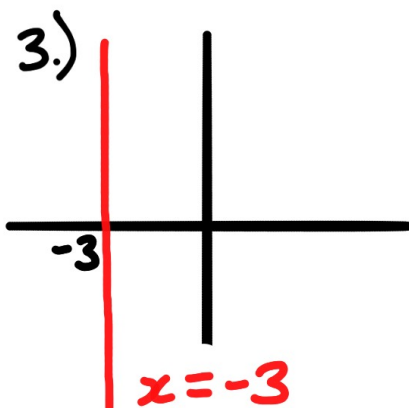
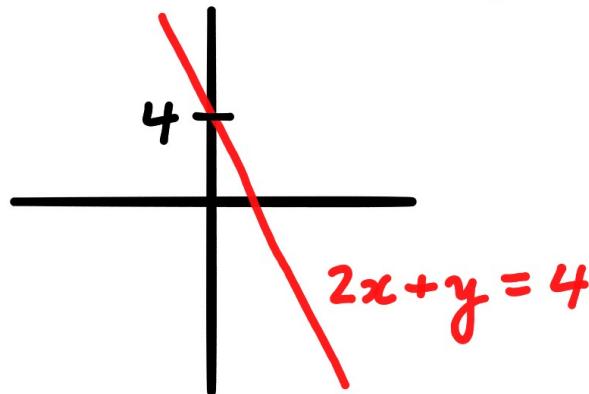
1.) a.)  $5x = 15$ , so  $x = 3$ .

b.)  $2|2x-1| = 22$ , so  $|2x-1| = 11$ . Thus, either  $2x-1=11$  or  $2x-1=-11$ .  
If  $2x-1=11$ , then  $2x=12$  and  $x=6$ .  
If  $2x-1=-11$ , then  $2x=-10$  and  $x=-5$ .

c.)  $x = 2^3 = 8$

d.)  $\frac{3}{6}x + 2 = \frac{2}{6}x$  so  $\frac{1}{6}x = -2$ . Thus,  $x = -12$ .

2.)  $y = -2x + 4$ . Line of slope  $-2$ ,  $y$ -intercept is  $4$ .



6.)  $y = -3x + b$ . If  $x = -11$  and  $y = 4$ ,  
then  $4 = 33 + b$ , so  $b = -29$ , and  
thus,  $y = -3x - 29$ .

7.)  $5x - 12 = 3$ , so  $5x = 15$  and  $x = 3$ .

8.)  $2x + y = 7 \Rightarrow y = 7 - 2x$ .

$$-3x + 2y = -7 \Rightarrow -3x + 2(7 - 2x) = -7$$

$$\Rightarrow -3x + 14 - 4x = -7$$

$$\Rightarrow -7x = -21$$

$$\Rightarrow x = 3.$$

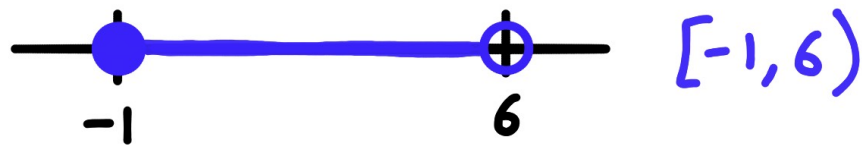
$$2x + y = 7 \Rightarrow 2(3) + y = 7 \Rightarrow y = 1.$$

So  $(x, y) = (3, 1)$ .

9.)  $9pr = 3t - n$ , so  $r = \frac{3t - n}{9p}$ .

$$10.) \frac{25}{1000} \cdot 96 = \frac{25}{4(250)} \cdot 4(24) = \frac{1}{100} 24 = 2.4$$

11.) a.)  $-3 \leq 3x < 18$  so  $-1 \leq x < 6$ .

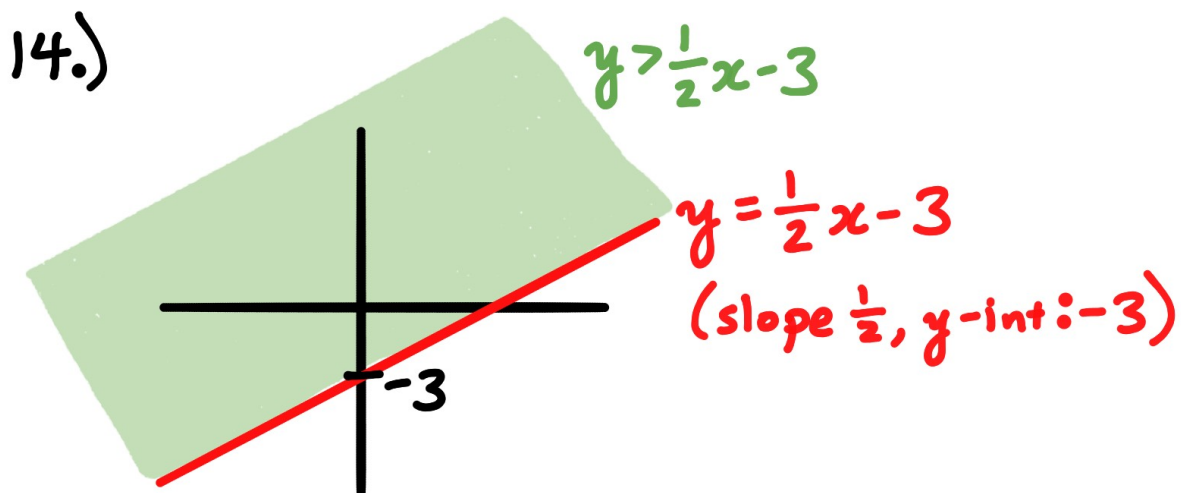


b.)  $5 - 4 > x$  or  $2x \geq 6$  is equivalent to  $1 > x$  or  $x \geq 3$ .



12.) slope =  $\frac{\text{rise}}{\text{run}} = \frac{3 - (-7)}{-1 - 4} = \frac{10}{-5} = -2$

13.)  $\frac{8,400 - 6,000}{2020 - 2016} = \frac{2,400}{4} = 600$  people-per-year



15.)  $8,500(1 - 0.09)^6 \approx \$4,826.89$

$$16.) 5^{3x+1} = 5^{-2} \text{ so } 3x+1 = -2.$$

$$\text{Hence, } 3x = -3, \text{ so } x = -1.$$

$$17.) f(-3) = 2(-3)^2 - 5(-3) - 3$$

$$= 2(9) + 15 - 3$$

$$= 18 + 12$$

$$= 30$$

$$18.) (x) + (x+2) = 464. \text{ Thus, } 2x+2 = 464$$

$$\text{so } 2x = 462 \text{ and } x = \frac{462}{2} = 231.$$

so  $(x) = 231$  and  $(x+2) = 233$  are the consecutive odd integers.

$$19.) 6c + 10a = 1,412 \text{ and } c + a = 162.$$

$$\text{So } c = 162 - a \Rightarrow 6(162 - a) + 10a = 1,412.$$

$$\Rightarrow 972 + 4a = 1,412$$

$$\Rightarrow 4a = 440$$

$$\Rightarrow a = 110$$

$$c + a = 162 \Rightarrow c + 110 = 162 \Rightarrow c = 52$$

110 adults and 52 children.

$$20.) \text{ a.) } x^6 x^7 = x^{6+7} = x^{13}$$

$$\text{ b.) } (y^3)^6 = y^{3 \cdot 6} = y^{18}$$

$$\text{ c.) } z^0 = 1$$

$$21.) \log_b(c) = a.$$