Math 100 Exam 1 Review Problems

These problems are intended to help you prepare for the test. Test problems will look similar to, but not the same as, some of the problems below.

This list of problems is not all inclusive and does not represent every possible type of problem. It is suggested that you review lectures, classwork problems, and homework problems in addition to this review.

Due on the day of the exam.

(1) Evaluate the following (w/o a calculator). Simplify if necessary.

(a) $5 - |6 - 2 \times 4|$

(b) $\frac{8-(4-5)}{5-|-3|+4\div 2}$

(c) $\frac{1}{6} - \frac{3}{4}$

(d) $\frac{2}{3} \div \frac{4}{5}$

(2) Evaluate the following (w/o a calculator). Simplify if necessary.

(a) $2^3 + |4 - 2 \times 3|$

(b) $(12 + 3) \div \sqrt{25} - 1$

(c) $\frac{2}{3} - \frac{19}{21}$

(d) $\frac{1}{5} \div \frac{7}{10}$

(3) Evaluate the following (w/o a calculator). Simplify if necessary.

(a) -1^4

(b) 3^{-3}

(c) $\sqrt{\frac{4}{9}}$

(d) $\sqrt[3]{-27}$

(4) (a) Write $45,000$ in scientific notation.

(b) Convert 7.6×10^{-4} out of scientific notation.

(5) Simplify the following expressions. (Remember: simplified expressions have positive exponents)

(a) $\left(x^{-4}\right)^8$

(b) $\left(-2x^4y^5\right)^3$

(c) $\left(\frac{-2x^3y^4}{x^5y^{-2}}\right)^2$

(d) $(-5x^3y)(-3x^7y^{12})$

(6) Evaluate the expression using the given values of the variable(s). Simplify your answers if needed.

(a) $5x - y$, for $x = 6$ and $y = 7$

(b) $5 + 2\,(x - 5)^2$, for $x = 9$

(c) $\dfrac{6x + 5y}{2 + 2y}$, $x = -4$ and $y = 6$

(7) Solve the following linear equations.

(a) $-7x + 3 = 17$

(b) $5t - (3t - 4) = 12$

(c) $\frac{7y+9}{6} = 5$

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

(8) Solve the following linear equations.

(a) $7x - 6 = 8$

(b) $6(x - 1) = 5x - 9$

(c) $5x - (3x - 4) = 12$

(d) $5 - \frac{x}{3} = \frac{x}{2}$

(9) Solve for the specified variable:

(a) $3x + 2y = 6$ for y

(b) $A = \frac{1}{2}bh$ for h

(c) $C = \frac{1}{3}f(r + z)$ for r

(d) $2 = \frac{t}{f-w}$ for f

(10) Solve the following problems.

(a) Sheila lends her friend Peter \$4000. The loan is for 5 years with a **simple interest** rate of 5% per year. When Peter settles his loan at the end of the 5 years, how much interest does he have to pay? How much money, in total, must he pay Sheila?

(b) Professor MG is shopping for a new gaming console. An online website lists the console for 20% off the original price of \$250. Her local store is currently advertising a 15% off sale for the same console, but their original price is \$220. Determine which is the better deal.

(11) Solve the following problems.

(a) At Whole Foods, a rotisserie chicken costs \$9. At Costco, a rotisserie chicken costs \$5, but there is a \$60 yearly membership fee. How many rotisserie chickens would you have to buy in one year so that the total price you spend is the same at Whole Foods as it is at Costco (assuming that this is the only item that you buy)?

(b) Nancy is looking to rent a moving truck for 4 days. The company she is interested in charges \$0.25 per mile driven and a standard fee of \$60 per day. If Nancy's budget is \$300, how many miles can she drive in the truck?

(12) Solve the following problems.

(a) Jaylin is shopping for new wireless headphones. She finds headphones she likes on sale for 20% off the regular price. If the sale price is \$176, determine the regular price of the headphones.

(b) Jeffrey and Roberto start at the same point and bicycle in **opposite directions**. Jeffrey's speed is 15 miles per hour and Roberto's speed is 20 miles per hour. In how many hours will the two be 140 miles apart?

(13) Solve the following inequalities. **Write your answer in interval notation.**

(a) $x + 6 \leq 20$

(b) $-3(x - 6) > 2x - 2$

(c) $-21 \leq -3(2x - 1) < 27$

(d) $3x + 4 \geq 4$ and $3x - 7 \leq -1$

(14) Solve the following inequalities. **Write your answer in interval notation.**

(a) $-2 + 9x + 4 \geq 8x - 10$

(b) $-4(x - 2) > 2x - 4$

(c) $-1 \leq \frac{-3x+4}{2} < 8$

(d) $|2 - x| > 4$

(15) Graph the equation

$$y = 2|x - 1|$$

by plotting points on the cartesian plane using $x = -3, -2, -1, 0, 1, 2, 3$.

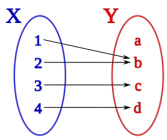
(16) Graph the equation

$$y = 2|x| - 1$$

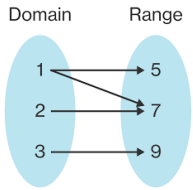
by plotting points on the cartesian plane using $x = -3, -2, -1, 0, 1, 2, 3$.

(17) Two of the following are functions and two are not. Determine which two are functions and explain why the other two are not.

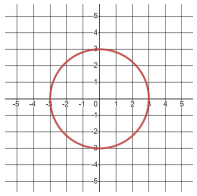
(a)



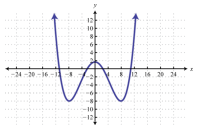
(b)



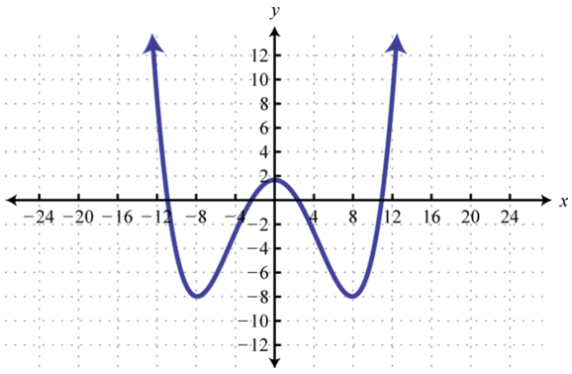
(c)



(d)



(18) Consider the following graph of $f(x)$



(a) Is this a function?

(b) What is the domain?

(c) What is the range?

(d) What is $f(8)$?

(e) For which x value(s) does $f(x) = 6$?

(19) Find an equation (it can be in any form) of the line that satisfies the given properties.

(a) Find an equation of the line that passes through the points $(9, 4)$ and $(3, 7)$

(b) Find an equation of the line with slope $-\dfrac{1}{4}$ that passes through the point $(4, 1)$

(c) Find an equation of the line perpendicular to $y = -3x - 12$ and passes through the point $(-6, 7)$

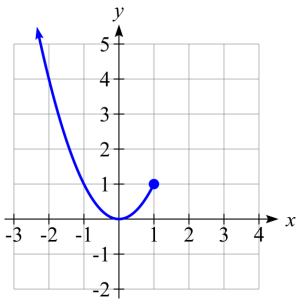
(20) Graph the following lines. Label which ones are which.

(a) $f(x) = 2x - 1$

(b) $x = 7$

(c) $2x - 5y = -10$

(21) Consider the following graph of $f(x)$



(a) Is this a function?

(b) What is the domain?

(c) What is the range?

(d) What is $f(1)$?

(e) For which x value does $f(x) = 4$

(22) For each of the following, find an equation (it can be in any form) of the line that satisfies the given properties.

(a) The line that passes through the points $(-1, 3)$ and $(2, 9)$

(b) The line with slope $\dfrac{1}{2}$ that passes through the point $(-2, 1)$

(c) The line perpendicular to $y = \frac{3}{5}x + 5$ and passes through the point $(-3, 1)$

(d) The line parallel to $y = -\frac{2}{3}x + 1$ that passes through the point $(0, 6)$

(23) Graph the following lines. Label which ones are which.

(a) $f(x) = -2x + 3$

(b) $y = 3$

(c) $x = -2$

(d) $-3x + 4y = 8$