

College of the Redwoods  
Mathematics Department  
Math 105 — Elementary Algebra

Exam #1  
Review Questions

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## Essay Questions

**Instructions:** Place the solution to each exercise on a separate sheet of paper.

EXERCISE 1. Follow the order of operations to simplify each of the following expressions as much as possible. In order to receive full credit, first copy the problem onto your examination paper, then proceed step-by-step, simplifying according to the rules on order of operations, connecting consecutive calculations with equals signs. Please keep your equal signs aligned in a column as demonstrated in your text and in class.

$$\begin{array}{ll} \text{(a)} -3 - 3(-3 - 2(-3 - 2)) & \text{(b)} -2 - 3(-3 - 4)^2 - 4(5 - 8)^3 \\ \text{(c)} -2x - 2(-2x - 2(-2x - 2(-2x - 2))) & \text{(d)} -3x - 2[-2(x - 3) - (4 - 5x)] \end{array}$$

EXERCISE 2. Use a calculator to approximate each of the following expressions. Please report all digits that appear in the approximation on your calculator screen.

$$\begin{array}{ll} \text{(a)} |-23.7 - 3.85(4.45 - 8.92)^2| & \text{(b)} \sqrt{(1.23)^2 + (3.45)^2 + (4.96)^2} \\ \text{(c)} \frac{|-3.8 - 2.4(1.2 - 3.4)^2|}{\sqrt{(1.2)^2 + (3.4)^2}} & \text{(d)} \frac{-1.92 - 3.85(1.34 - 4.76)^2}{|1.92 - 3.8(4.94 - 3.45)^3|} \end{array}$$

EXERCISE 3. Each of the following questions pertain to the area or perimeter of a geometric figure. Attach the appropriate units to each of your answers. In preparing for the examination, memorize the formulae required to answer each of these questions.

- Find the area and perimeter of a square that has a side measuring 4.5 cm.
- Find the area and perimeter of a rectangle having length 9.75 m and width 3.77 m.
- Find the area of a parallelogram having base measuring 3.25 in and height 2.34 in.
- Find the area of a triangle having base measuring 4.44 yd and height 3.25 yd.
- Find the area of a trapezoid having bases measuring 2.25 m and 3.95 m, with height measuring 2.75 m.
- Find the area and circumference of a circle having diameter measuring 4.44 cm.

EXERCISE 4. Solve each of the following equations for  $x$ . In each case, proceed in a step-by-step manner, aligning your equal signs in a column, as demonstrated in class and in your text.

$$\begin{array}{ll} \text{(a)} -4x = 12 & \text{(b)} x - 8 = 9 \\ \text{(c)} 2x + 3 = -9 & \text{(d)} 3 - 4x = 12 \\ \text{(e)} 3x + 4 = 5 - x & \text{(f)} 2x - 7 = 4x + 6 \end{array}$$

EXERCISE 5. In each of the following exercises, begin by simplifying each side of the equation as much as possible, then solve the resulting equations for  $x$ . In each case, proceed in a step-by-step manner, aligning your equal signs in a column, as demonstrated in class and in your text.

$$\begin{array}{ll} \text{(a)} 4x - (2 - x) = 3x - 2(4 - x) & \text{(b)} 3(2 - 3x) - 4(x + 1) = 5(3 - x) \\ \text{(c)} 2x - 2[2x - 2(2x - 2)] = 12 & \text{(d)} 3x - 3[2(3 - x) - 4(x + 1)] = 11 \end{array}$$

EXERCISE 6. In each of the following exercises, begin by clearing both sides of fractions by multiplying both sides of the equation by a common denominator. Solve the resulting equations for  $x$ . In each case, proceed in a step-by-step manner, aligning your equal signs in a column, as demonstrated in class and in your text.

$$\begin{array}{ll} \text{(a)} \frac{1}{2}x - \frac{1}{3} = \frac{1}{4} & \text{(b)} \frac{2}{5} - \frac{3}{4}x = \frac{1}{2} \\ \text{(c)} \frac{1}{2}x - \frac{1}{3} = \frac{1}{4} - \frac{2}{3}x & \text{(d)} \frac{1}{8} - \frac{1}{3}x = \frac{1}{2}x - \frac{1}{12} \\ \text{(e)} x - \frac{x+1}{2} = 8 & \text{(f)} \frac{x+1}{3} - \frac{2x-1}{5} = 1 \end{array}$$

EXERCISE 7. In each of the following exercises, begin by clearing both sides of decimals by multiplying both sides of the equation by an appropriate power of ten. Solve the resulting equations for  $x$ . In each case,

proceed in a step-by-step manner, aligning your equal signs in a column, as demonstrated in class and in your text.

(a)  $0.2x - 0.5 = 1.2$

(b)  $0.32 - 0.25x = 1.23$

(c)  $0.3x - 5.2 = 0.4 + 1.6x$

(d)  $-3.24x + 1.25 = 5.5x + 0.125$

(e)  $0.3(x - 1) - 0.5(x + 4) = 1$

(f)  $3.25 - 1.5(x - 3) = 5.25(4 - x)$

EXERCISE 8. Solve each of the following equations for the indicated variable. Again, show your work step-by-step, aligning equal signs in a column.

(a)  $ax + b = c$  for  $a$

(b)  $F = \frac{5}{9}(C + 32)$  for  $C$

(c)  $F = \frac{GMm}{r^2}$  for  $G$

(d)  $L = \frac{t}{m + M}$  for  $M$

EXERCISE 9. Solve each of the following inequalities for  $x$ . Sketch the solution set on a number line, then use both set-builder and interval notation to describe the solution set.

(a)  $2x + 3 < 5$

(b)  $3 - 4x \geq 5$

(c)  $2x - 3 \leq 4 - x$

(d)  $3x - 2(4 - x) > 5(2 - 3x)$

(e)  $x - \frac{2x + 1}{3} < 4$

(f)  $\frac{x + 2}{3} - \frac{x + 4}{5} \geq 2$

**Instructions:** For each of the following word problems, you must provide each of the following steps.

- Tell your reader what each variable you use represents.
- Set up an equation modeling the problem statement.
- Solve the equation.
- Answer the question with a sentence or two.
- Look back. Does your answer make sense? Why?

EXERCISE 10. Suppose that the population of Fortuna is increasing by 2% each year. If the current population of Fortuna is 11,125, what was the population at the same time last year?

EXERCISE 11. The sum of three consecutive integers is 396. Find the integers.

EXERCISE 12. The sum of four consecutive even integers is 108. Find the integers.

EXERCISE 13. The perimeter of a rectangle is 218 feet. If the length of the rectangle is four feet longer than twice its width, find the dimensions of the rectangle.

EXERCISE 14. The three angles of a triangle have degree measure that are consecutive even integers. Find the measure of each angle of the triangle.

EXERCISE 15. A wire measuring 17 inches in length is cut in three pieces. The second piece is one inch longer than the first piece. The third piece is twice as long as the first piece. Find the length of each piece of the wire.

EXERCISE 16. Ella's first three exam scores are 82, 88, and 90. What must she score on her fourth exam so that her average score on all four exams is 89?

EXERCISE 17. Two angles are said to be *supplementary* if their sum is  $180^\circ$ . Suppose that we have two supplementary angles so that the second angle is 4 times larger than the first angle. Find the angles.