Math 50 Final Exam Sample Problems

Note: These review exercises are intended as general practice for Mt. SAC Math 50 students. Please consult with your Math 50 professor to find out if there are additional topics and/or types of problems that might be on your particular Math 50 Final Exam.

I. True/False
- A. $\left|7-4\right|=\left|3-6\right|$
- B. The sum of two negative numbers is a positive number.
- C. The median of 192, 235, 225, 206 and 187 is 209.
- D. The point (-32, 17) is located in QIII.
- E. The ordered pair (-1, 6) represents a solution to 2y – 3x = -9.
- F. An equation in the form $\frac{a}{b}=\frac{c}{d}$ is called a ratio.
- G. The following is a monomial: $-3x^2yz^5$.
- H. The degree of $22x^4-5x^{10}$ is 14.
- I. The following number is written in scientific notation: 13.2×10^{17}
- J. $\frac{13}{0}=0$

II. A. Simplify the following numerical expressions:
1. $-4(-6)\div3(2)$
2. $(-5+3)^2\sqrt{36}$
3. $-2+3\left[\left(54\div(-9)\right)\div(-3)\right]$
4. $-2\left|6-8\right|$
5. $\dfrac{4^2-5^2}{-4-(-2)}$
6. $72\div2\cdot3+4\cdot2^3-3^2$
7. $\dfrac{5}{8}\div\left(-\dfrac{1}{2}-\dfrac{3}{4}\right)^2$
8. $40.1-6.9\div4.6(1.4)^2+\sqrt{0.36}$

B. Translate to a numerical expression and simplify
1. Negative two added to the sum of -18 and 11
2. The difference between 4 and -8
3. Twelve less than the difference between 8 and -5
4. The sum of 15 and -3, divided by the product of 4 and -3

C. 1. Convert to Standard Form: 5.2×10^6

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III. Algebraic Expressions
  A. Simplify the following algebraic expressions:
  1. $19x\left(3x^2 - 5x + 8\right)$
  2. $-0.1x\left(2.1x^3\right)^2$
  3. $(2.7x + 4) - (3.2x - 8)$
  4. $\dfrac{2x}{7}\left(\dfrac{-14y}{3}\right)\left(2\dfrac{1}{3}\right)$
  5. $\dfrac{2x^2 y^4}{5} \div \dfrac{8x^3 y}{25}$
  6. $\dfrac{-2t}{7} - \dfrac{16}{21}$
  7. $\frac{2}{3}x - 4 - \frac{1}{2} + \frac{1}{4}x$
  8. $\dfrac{x-8}{5x} + \dfrac{3x-1}{5x}$
  9. $9.5(.2x - .01) - 4.33$
  10. $\left(\frac{1}{2}x - 4\right) - \left(\frac{2}{3}x + \frac{1}{4}\right)$
  11. $(2x + 1)(3x - 4)$
  12. $\left(-\dfrac{5}{8}x^2\right)\left(-\dfrac{4}{7}x^3\right)$
  13. $(2x - 3)^2$
  14. $\dfrac{2}{3n^2} - \dfrac{7}{9n}$
  15. $\left(4x^3 - 9x - 17\right) - \left(18x^3 + 6x^2 - 12\right)$
  16. $-3x^2\left(2x^3 - 4x + 3\right)$
  17. $(1.3x^4 + 0.3x^2 - 4x) \div (-0.5x)$

  B. Translate to an algebraic expression using x as the variable
    1. five less than twice a number
    2. the product of negative seven and a number
    3. the sum of eight and half a number
    4. the difference of a number and 8
    5. the quotient of three times a number and 17
    6. seven times a number, subtracted from 2 times the number

  C. Evaluate each algebraic expression
    1. $x(x - y)$ when $x = 2$ and $y = -3$
    2. $\dfrac{x^2}{x + 2y}$ when $x = 5$ and $y = 4$

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IV. A. Write the Prime Factorization of 240

   B. Is 51 prime or composite?

   C. Is 91 divisible by 7?

   D. Greatest Common Factor
      1. Find the GCF of 24, 40 and 64
      2. Find the GCF of $2x^2y$, $6x^3y^2$ and $20xz^2$

   E. Least Common Multiple
      1. Find the LCM of 16, 24 and 40.
      2. Find the LCM of $16x^3$ and $24x^2$
      3. Find the LCM of $18xy^2$ and $16y^3z$

   F. Factor out the GCF
      1. $20x^5 - 24x^3$
      2. $12a^3 + 20a^2 - 32a$

V. Equations
   A. Solve the following equations:
      1. 5x + (-2x) - 3 = 12
      2. $\dfrac{x}{4} = \dfrac{8}{9}$
      3. 8x + 3x = 9(x - 3.2)
      4. $\dfrac{1}{8} + x = \dfrac{5}{6}x - \dfrac{2}{3}$
      5. $\dfrac{5}{6}(x - 8) = \dfrac{1}{5}x - \dfrac{1}{3}$
      6. $1.5(x + 8) = 3.2 + 0.7x$
      7. $5(2x - 1) = 7(x + 3)$
      8. $2[7x - (x + 5)] = 8x + 7$

   B. Translate the equations and solve:
      1. Five more than the product of 5 and a number is 80.
      2. Four times a number decreased by 8 is 24.
      3. Seven times a number increased by 2 is 11 decreased by twice the number.
      4. The product of 7 and a number is – 42.
      5. The quotient of a number and 2, increased by 5 is 16.
      6. Fourteen less than a number is 5 times the number.
      7. The difference of a number and 7 is 42.
      8. Four times the difference of a number and seven is equal to eleven plus seven times the number.

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VI. Ratios, Proportions, Percents and Conversions
   A. Ratios
      1. On a map ¼ inch = 50 miles. How far apart in miles are two cities if they
         are 2 ½ inches apart on the map?
      2. Write as a fraction and reduce 800 stereos to 1000 houses.
      3. Write as a unit ratio 15 pizzas to 6 people.

   B. Percents
      1. Express as a percent: $\dfrac{2}{5}$
      2. Express as a decimal: $6\dfrac{1}{4}$ %
      3. Express as a decimal: $\dfrac{13}{30}$
      4. Express as a reduced fraction: 0.045
      5. 78% of 92 is what number?
      6. 2 is what percent of 160?
      7. 12% of what number is 42.4?

   C. Percent Applications – State the answer in a complete sentence.
      1. The cost of a dinner is $8.99. If you pay 8% in tax and leave a 15% tip on the cost of
         dinner only, what is the total cost of your meal?
      2. Miriam and Jose Camacho bought a house for $109,000. Their down-payment was
         22% of the selling price. What was the amount of the down-payment?
      3. Mary earns 15% of her sales in commission. If her commission was $90 what were
         her sales?
      4. In preparing a mixture of concrete, John uses 300 lbs. of gravel, 100 lbs.
        of cement and 200 lbs. of sands. What percent of the mixture is gravel?

   D. Conversions
      1. Convert 90 inches to feet
      2. Convert 7 days to minutes

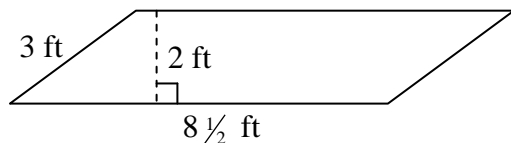VII. Applications – State the answer in a complete sentence.
   A. Alfred worked 4.5 hours on Monday, 5.75 hours on Tuesday, and 8.25 hours on
      Wednesday. His hourly pay is $5.60. How much money did he earn for his 3 days on
      the job?
   B. Four new babies weighed $7\frac{1}{2}$ lbs., $6\frac{3}{8}$ lbs., $8\frac{3}{9}$ lbs., and $8\frac{1}{2}$ lbs. at birth.
      What was their total weight?
   C. An omelet recipe calls for $\frac{1}{4}$ lbs. of cheese. You have $2\frac{7}{8}$ lbs. of cheese.
      How many omelets can be made from this cheese?
   D. You will use 220 ft of fencing to fence a rectangular plot of land. The length is
      20 more than the width. What are the dimensions of the rectangular plot?
   E.   Which is the better buy? Show your work by determining the unit price for each.
        Option A: $1.49 for a 20-oz. bag of carrots, or
        Option B: $3.29 for a 45-oz. bag of carrots
   F.   Joe's new salary is $75,000 after he receives a 6% raise. What was his old salary?

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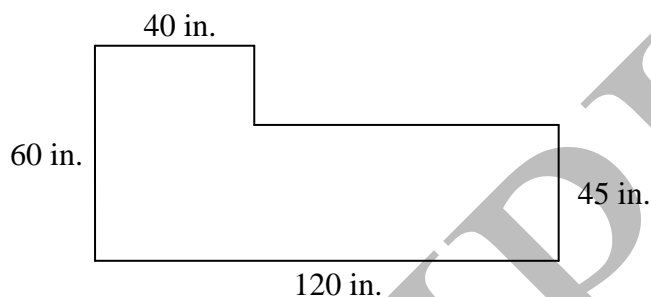
VIII. Geometry – Label all numerical answers with the appropriate unit of measurement.

    A. 1.   Find the Circumference and Area of a circle with a diameter of 6.0 m.
          Use 3.14 for π.
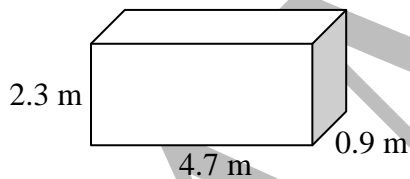
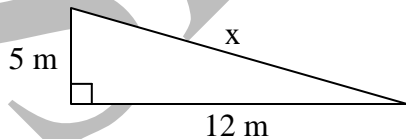2. Find the Perimeter and Area of the following parallelogram.

3 ft   2 ft
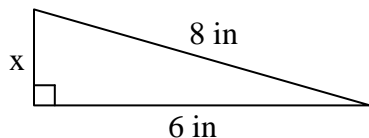
8 ½ ft

3. Find the Perimeter and Area.

40 in.

60 in.

45 in.

120 in.

4. Find the Volume.

2.3 m

4.7 m   0.9 m

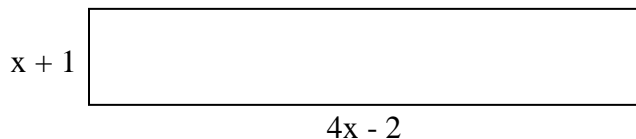5. Find the length of side "x".

x

5 m

12 m

6. Find the length of side "x". Round the answer to the nearest tenths.

8 in

x

6 in

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7. Find a simplified expression for the Perimeter and Area

x + 1

4x - 2

8. Find the Area.

2 ¾ in.

13 ⅜ in.
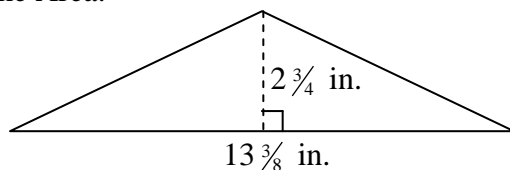
9. Find the Area. (Note: the top curve is a semicircle.)

12 cm

8 cm

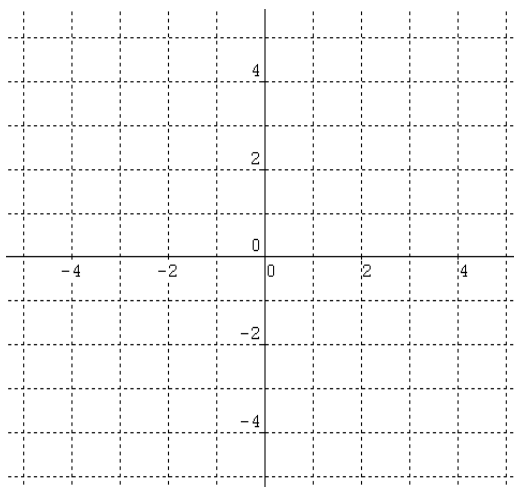10 cm   10 cm
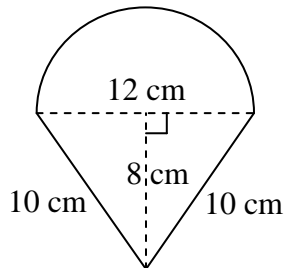
B. Rectangular Coordinate System
    1. Find the midpoint of (1, -6) and (9, 4).
    2. Find the x-intercept and the y-intercept of x – 4y = 8.
       Express the answers as ordered pairs.
    3. Find 3 solutions of each linear equation then graph.

       a. $2x - y = 4$

       b. $y = \dfrac{1}{2}x + 1$

       c. $y = -4$

       d. $x = 2$

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Solutions:

I. A. true
   B. false
   C. false
   D. false
   E. false
   F. false
   G. true
   H. false
   I. false
   J. false

II. A. 1. 16
   2. 24
   3. 4
   4. -4
   5. 4 ½
   6. 131
   7. $\frac{2}{5}$
   8. 37.76
   B. 1. -9
   2. 12
   3. 1
   4. -1
   C. 1. 5,200,000

III. A.1. $57x^3 - 95x^2 + 152x$
   2. $-0.441x^7$
   3. $-0.5x + 12$
   4. $-\frac{28}{9}xy$
   5. $\frac{5y^3}{4x}$
   6. $\frac{-6t-16}{21}$
   7. $\frac{11}{12}x - \frac{9}{2}$
   8. $\frac{4x-9}{5x}$
   9. $1.9x - 4.425$
   10. $-\frac{1}{6}x - 4\frac{1}{4}$
   11. $6x^2 - 5x - 4$
   12. $\frac{5}{14}x^5$
   13. $4x^2 - 12x + 9$
   14. $\frac{-7n+6}{9n^2}$
   15. $-14x^3 - 6x^2 - 9x - 5$
   16. $-6x^5 + 12x^3 - 9x^2$
   17. $-2.6x^3 - 0.6x + 8$

B. 1. $2x - 5$
   2. $-7x$
   3. $\frac{1}{2}x + 8$
   4. $x - 8$
   5. $\frac{3x}{17}$
   6. translate: $2x - 7x$
      simplify: $-5x$

C. 1. 10
   2. $1\frac{12}{13}$

IV. A. $2^4 \cdot 3 \cdot 5$
   B. composite
   C. yes
   D. 1. 8
   2. $2x$
   E. 1. 240
   2. $48x^3$
   3. $144xy^3z$
   F. 1. $4x^3(5x^2 - 6)$
   2. $4a(3a^2 + 5a - 8)$

V. A. 1. $x = 5$
   2. $x = 3\frac{5}{9}$
   3. $x = -14.4$
   4. $x = -4\frac{3}{4}$
   5. $x = 10$
   6. $x = -11$
   7. $x = 8\frac{2}{3}$
   8. $x = 4\frac{1}{4}$

B. 1. $5x + 5 = 80$, $x = 15$
   2. $4x - 8 = 24$, $x = 8$
   3. $7x + 2 = 11 - 2x$, $x = 1$
   4. $7x = -42$, $x = -6$
   5. $\frac{x}{2} + 5 = 16$, $x = 22$
   6. $x - 14 = 5x$, $x = -3.5$
   7. $x - 7 = 42$, $x = 49$
   8. $4(x - 7) = 11 + 7x$, $x = -13$

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VI. A. 1. The cities are 500 miles apart.

   2. $\frac{4\,stereos}{5\,houses}$

   3. $\frac{2.5\,pizzas}{1\,person}$

B. 1. 40%
  2. 0.0625
  3. $0.4\overline{3}$
  4. $\frac{9}{200}$
  5. 71.76
  6. 1.25%
  7. $353\frac{1}{3}$

C. 1. The total cost of the meal is $11.06
  2. The down-payment paid by the Camacho's was $23,980.
  3. Mary's sales were $600.
  4. The mixture is 50% gravel.

D. 1. 7.5 feet
  2. 10,080 minutes

VII. A. Alfred earned $103.60 for his 3 days on the job.

B. The total weight for the 4 babies was $30\frac{17}{24}$ pounds.

C. You can make $11\frac{1}{2}$ omelets from the cheese.

D. The rectangular plot of land is 45 feet by 65 feet.

E. Option B would be the better buy.

F. Joe's old salary was $70,754.72.

VIII. A. 1. Circumference = 18.84 m
     Area = 28.26 m^2
  2. Perimeter = 23 ft
     Area = 17 ft^2
  3. Perimeter = 360 in
     Area = 6000 in^2
  4. Volume = 9.729 m^3
  5. x = 13 m
  6. x $\approx$ 5.3 in
  7. Perimeter = $10x - 2$

     Area = $4x^2 + 2x - 2$

  8. Area = $18\frac{25}{64}$ in^2
  9. Area = 104.52 cm^2

B. 1. (5, -1)
  2. x-intercept: (8, 0)
    y-intercept: (0, -2)
  3.
   a.   b.

   c.   d.