

First Trimester Exam

8th Grade

Mathematics (Algebra—1)

December, 2007

Read every question carefully and answer the questions based on what you are asked.

Do not leave any question blank and show your work.

*You may not leave the exam early; even if you are finished, review the test until the end of
the designated time.*

Show your work on the paper and make sure you write units.

Please do not ask any unnecessary questions during the test.

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Part (I): Solve the Following Equations For “x”

A) $-5x^{-1}y - (2x)^{-1}y = \frac{-11y}{7}$

B) $\frac{2y(-6x-5xz+5)}{3z} = 5x - 2$

C) $1 + \frac{1}{x-1} = \frac{3}{x-1}$

D) $\frac{-5}{2y}x - \frac{3x}{3y} = -14(12y)^{-1}$

E) $\sqrt{b + \frac{zy}{x}} = y\sqrt{\frac{d}{x}}$

Part (II)

$$\text{A) } \frac{32^{-1}81^2x^{-1}y^{-2}z^{-6}}{16^{-2}\times 9^4x^{-4}z^{-3}y^5} =$$

$$\text{B) } -\left(\frac{3}{-2x}\right)^{-2}\left(\frac{3x^0}{-2}\right)^{-1}\left(\frac{-5x}{-1}\right)^2 =$$

$$\text{C) } -3\left(\begin{bmatrix} 3 & 0 \\ -2 & -3 \end{bmatrix} + \begin{bmatrix} -3 & -1 \\ 5 & 0 \end{bmatrix}\right) =$$

$$\text{D) } \frac{\sqrt[3]{x^3y^2}x^{-3}y^4}{\sqrt[3]{x^{-2}y^{-3}}y^5x^{-6}} =$$

$$\text{E) } \frac{\sqrt[3]{x^2}x^4}{\sqrt[5]{y^{-3}y^{-2}x^2}} =$$

Part (III)

- A) The price of an item is increased by 10% and then by another 10% and is now \$242. What was the original price?
- B) The price of an item is increased by 45%; by what percent must we reduce the price to get back to the original price?
- C) What percent of 50% of 20% of 1000 is equal to 10% of 200?
- D) Suppose you borrowed \$1000 and had to pay \$2500 after 5 years; what was the interest rate? (first find the interest)

Part (IV)

- A) In a town, 10 workers can finish a job in 50 days. Suppose after they work for 10 days, they are told that they have 20 days to complete the remainder of the job! How many workers should be added for the remaining portion of the job to be completed in 20 days?
- B) Suppose I have \$10.15 in change; I have 55 coins in quarters, dimes and nickels. If I have 12 more quarters than dimes, then how many coins of each type do I have?
- C) Sandy is 4 times as old as Robby now. In 10 years, Sandy will be 6 years older than Robby; how old is each now?
- D) A stand sells cashews for \$5/lb and honey roasted peanuts for \$2/lb. How many pounds of each type of nut should be used to make 8 lb of a mixture that sells for \$3/lb?

- E) The sum of two numbers is 140. If 5 times the smaller number is equal to 28 more than twice the larger number, then what are the two numbers?
- F) In a triangle, the ratios of the angles are 2:7:9; find the measure of the largest angle:
- G) The sum of the digits of a three-digit number is 6. The hundred's digit is twice the units digit. The tens digit equals the sum of the other two digits. What is the number/
- H) The perimeter of a rectangle is 56 meters. If the length is 10 more than twice the width, then find the length and width of the rectangle:
- I) A car leaves town "A" with a speed of 60 kph; another car leaves town "B" 30 minutes later and travels at 50 kph. If the distance between the two towns is 500 km, how long will it take before they pass each other?

Part (V-VI)

- A) Consider line “A” with equation: $2y = 4x - 2$; write the equation in standard form and slope intercept form.
- B) Find x and y intercepts and slope of the equation:
- C) Find the distance and midpoint between and y intercepts ?
- D) Use a trigonometric ratio to find the angle that the graph of this line makes with the x axes.
- E) Find the value of B such that the graph of the equation $Bx + 4y = 12$, would be perpendicular to the graph of line “A”
- F) Write the equation of a line parallel to line “A” that passes through the origin $(0,0)$:

G) What is the point of intersection between the line you found in part “E” and the one you found in part “F”

H) A student wants to model the motion of a falling object. At time $t = 0$, the velocity is zero and at time $t = 5$ seconds the velocity is 49 m/s. Write an equation that would relate time and velocity.

I) A line passing through the points $(6a^2 + 2, 3a^3)$ and $(4a^3 + 2, 5a^3)$ has a slope of $4a - 5$; what is the value of a ?

J) Solve the system of linear equations:

$$\begin{cases} \frac{-3x}{y} + 2 = \frac{2}{y} \\ 5x = -2y + 5 \end{cases}$$

- K) For what value of a does the system of linear equations below have no solution?
For which value will it have infinitely many solutions?

$$\begin{cases} 3x + 2y = -8 \\ 15x = -10y + 2a + 1 \end{cases}$$

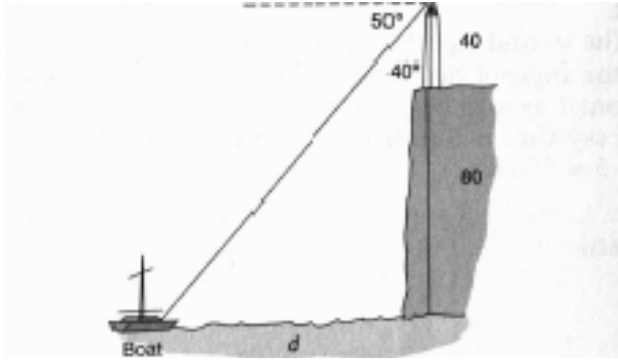
- L) A box containing 5 apples, 3 bananas and 2 oranges costs \$21, a box containing 1 apple, 3 bananas and 4 oranges costs \$15 and a box containing 3 apples, 4 bananas and 1 orange costs \$19. What is the price of each fruit?

- M) Suppose a car travels at 50 kph for 2 hours and then at 60 kph for 3 hours and finally at 30 kph for 1 hour. What is the average speed of the car?

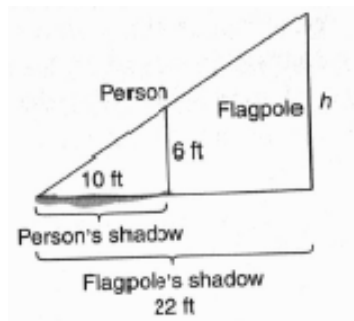
- N) Adult tickets to a football game were \$3.25 and student tickets were \$1.75. If 1350 fans paid a total of \$2700 to attend the game, how many adults attended?

Part (VII):

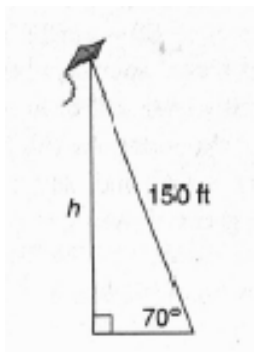
- A) Suppose an observer from the top of a lighthouse that is 40 meters tall and stands on a cliff 80 meters above the sea level notices a boat off the shore. If the angle of depression is 50 degrees (as shown) how far is the boat from the shore? (note: you may not need to use the angle of depression)



- B) At some time in the afternoon, a 6-ft person casts a shadow that is 10 ft long and a nearby flagpole casts a shadow that is 22 ft long. How tall is the flagpole? What is the angle that light rays make with the ground?



- C) A kite flying on a 150 ft string is anchored to the ground. If the kite is flying 140.1 ft above the ground, what is the angle that it makes with the ground?



- A) Suppose there is a bicycle with wheels of different sizes such that one wheel has a *radius* of 4 meters and the other has a *diameter* of 4 meters; if someone rides this bicycle around a square land and the smaller wheel turns 100 times, what is the area of the land?
- B) Suppose the area of a square is now 400 square meters. If the area is increased by 100%, by what percent will the measure of each edge (side) increase?
- C) Suppose 5 good painters can paint my house in 60 hours and 10 bad workers can paint my house in 120 hours. If I need my house to be painted in 30 hours and I can only find 2 good painters, at least how many bad painters do I need to complete the job?
- D) Suppose Ali's pool can hold 60 m^3 of water. Normally, when Ali opens the drain, the pool will be emptied in 6 hours. On a rainy day, Ali opens the drain and it takes the pool 8 hours to empty; at what rate was the rain water added to the pool?
- E) When 3 numbers are added two at a time, the sums are 29,46,and 53. What is the sum of all three numbers?
- F) A chemist has 80 ml of a solution containing 20% acid. How many ml must he remove and replace with pure acid to obtain a 40% solution of acid?
- G) If the ratio of $4x - 2y$ to $2x + 2y$ is 2:3, then what is the ratio of $x:y$?

QUESTIONS 8-F, 5-E, 3-E, AND 2-E ARE EXTRA CREDIT
QUESTIONS. IN ADDITION, 6 MORE EC QUESTIONS
ARE PROVIDED AT THE END.

READ EACH QUESTION CAREFULLY AND ASK
QUESTIONS IF YOU NEED TO.

GOOD LUCK!