

Louis M. Edwards Mathematics Super Bowl
Valencia Community College -- April 26, 2001

Practice Round

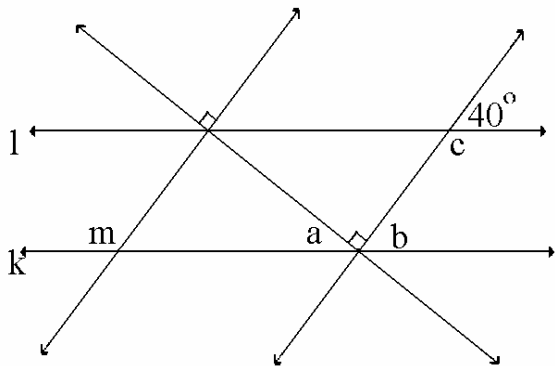
1. Simplify the complex fraction $\frac{\frac{1}{2} + \frac{1}{3}}{-\frac{1}{6} - \frac{1}{3}}$.

Answer _____

2. What is the area, in square units, of the region enclosed by the graph of $|x| + |y| = 4$?

Answer _____

3. Given the following figure with parallel lines l and k , what is the measure of angle m in degrees?



Answer _____

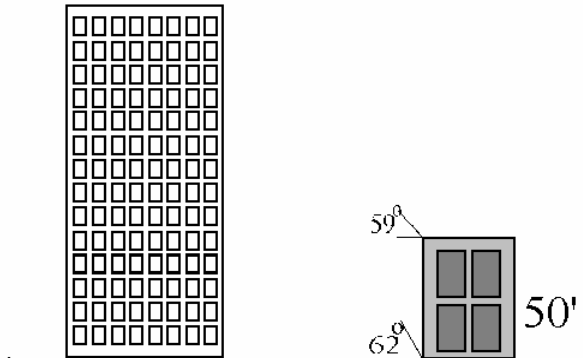
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Round One

1. A cyclist rides his bike over a route, which is $\frac{1}{3}$ uphill, $\frac{1}{3}$ level and $\frac{1}{3}$ downhill. If he covers the uphill part of the route at the rate of 16 miles per hour and the level part at the rate of 24 miles per hour, what rate in miles per hour would he have to travel the downhill part of the route in order to average 24 miles per hour for the entire route?

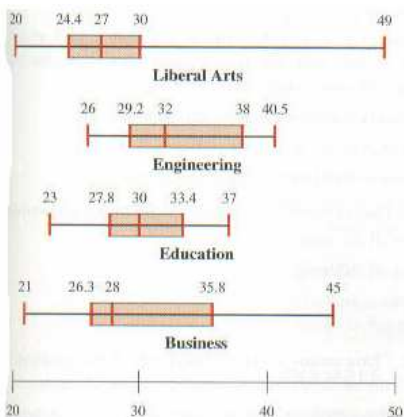
Answer _____

2. When a certain skyscraper is viewed from the top of a building 50 feet tall, the angle of elevation is 59 degrees. When viewed from the bottom of the 50-foot building, the angle of elevation is 62 degrees. What is the height of the skyscraper to the nearest foot?



Answer _____

3. A college placement office has made a comparative study of the starting salaries for graduates in various majors. The adjacent box-and-whisker plots describe the starting salaries for business, education, engineering and liberal arts majors. If a student wishes to receive \$32,000 or more for a starting salary, which major offers the best chance of achieving that?



Answer _____

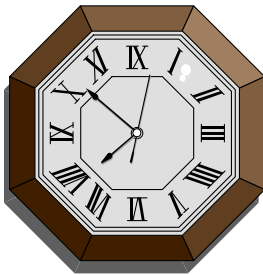
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Round Two

1. A cylindrical box of salt has a radius of 1.5 inches and a height of 5 inches. On each box, there is a 5 square inch overlap where the box is sealed. To the nearest hundred square inches, how much cardboard will be needed to make two thousand such boxes?

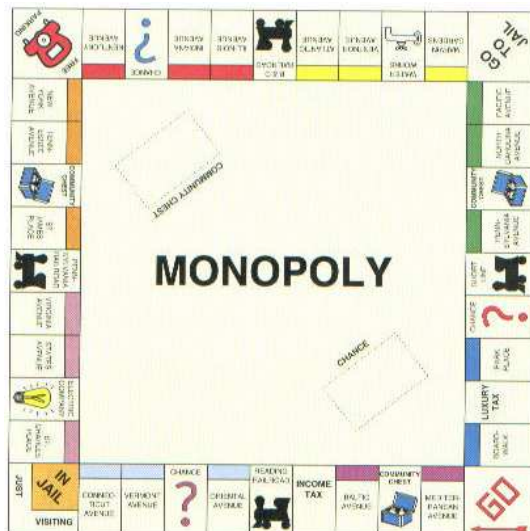
Answer _____

2. A train leaves a station at precisely on the minute, and after having traveled eight miles, the driver consults his watch and sees the hour hand is directly over the minute hand. The average speed over the eight miles is 33 mph. At what time did the train leave the station?



Answer _____

3. You are playing Monopoly. Assume that your game piece is on the Electric Company. If you land on St. James Place, Tennessee Avenue or New York Avenue, you will go bankrupt. What is the probability that you will avoid these properties on you next roll? (Remember: Monopoly uses a pair of regular cube dice rolled together.)

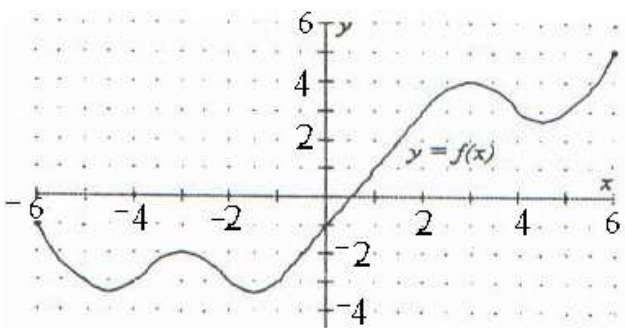


Answer _____

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Round Three

1. Given the function f graphed below with domain $[-6, 6]$ find the value of x which makes the statement $f(2x + 1) = 5$ true.



Answer _____

2. In the early part of the twentieth century, the Austrian composers Arnold Schoenberg, Alban Berg and Anton Webern created a system of music called *atonal music*, in which a note cannot be repeated in a composition until all other notes are used. In atonal music, a melody, called a *tone row*, consists of a sequence of the twelve different notes. To the nearest million, how many different tone rows are possible in this system?

Answer _____

3. A telephone company wishes to run a cable from an island 5 km off shore to a station on the main land 12 km down the shore. It costs \$10,000 per kilometer to run cable underwater and \$4,000 per kilometer to run cable under ground. What is the minimum cost (to the nearest dollar) for connecting the island to the station?

Answer _____

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Round Four

1. Identify the form of the locus of points that are equidistant from (0, 4) and (6, 0) as either a circle, ellipse, line, hyperbola or parabola.

Answer _____

2. Evaluate $\sqrt{9 + \sqrt{9 + \sqrt{9 + \sqrt{9 + \sqrt{9 + \dots}}}}}$

Answer _____

3. The following information has been obtained through observation of the alien system Werdox by the quantum telescope orbiting the earth.

- If Reskilis is inhabited by grombats, then they will also inhabit Yahoar.
- A grombat presence on both Reskilis and Yahoar would indicate that space travel capability exists.
- If no radio transmissions are present in the Werdox system then space travel capability is not possible.
- Grombats have been observed living on Reskilis.

Which of the following statements can logically be concluded?

- a.) Yahoar is in a different solar system than Reskilis.
- b.) Grombats do not have space travel capability.
- c.) Radio Transmissions are present in Werdox.
- d.) Grombats do not inhabit Yahoar.
- e.) Grombats pose a threat to human existence.

Answer _____

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Round Five

1. Suppose you buy a stock and the value increases each year for five years by 10%, 20%, 30%, 40% and 50% respectively. What constant annual percentage increase, to the nearest tenth of a percent, would give the same value after five years?

\$\$

Answer _____

2. Suppose a and r are positive values with $0 < a < r$. Given $\sin(x) = a/r$, express $\sin(2x)$ in terms of a and r .

Answer _____

3. An armored car must pick up receipts at a shopping mall and jewelry store and deliver them to a bank. For security reasons the driver must go straight from each pickup to the bank traveling the minimum distance, but should vary his route each time. How many different direct routes (traveling only east and south) can the driver take from the Mall to the Bank?



Answer: _____

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Round Six

1. Given a collection of three numbers, if the smallest is zero, the mean is $\log 4$ and the median is $\log 5$, then what is the largest? (leave your answer in the form of a single logarithm)

Answer _____

2. Let f be a polynomial function such that for all real x ,

$$f(x^2 + 1) = x^4 + 5x^2 + 3$$

For all real x , what is the value of $f(x^2 - 1)$ in terms of x ?

Answer _____

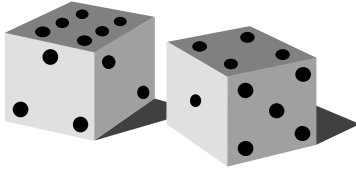
3. Waldenville is planning to build a new library. The subtasks for this project and their dependencies are listed in the following table. What is the minimum number of months required to complete this project?

Task	Tasks That Precede This Task	Time Needed for This Task (Months)
1. Get Funding	none	3
2. Choose Contractor	1	2
3. Draw Plans	1	4
4. Grade Land	1, 2, 3	1
5. Lay underground utilities, sewers, etc.	1, 2, 3, 4	1
6. Build Building	1, 2, 3, 4, 5	8
7. Install utilities in building	1, 2, 3, 4, 5, 6	2
8. Install computer network in building	1, 2, 3, 4, 5, 6	1
9. Purchase furniture	1, 2, 3, 4, 5, 6	2
10. Inspect building	1, 2, 3, 4, 5, 6, 7, 8, 9	1

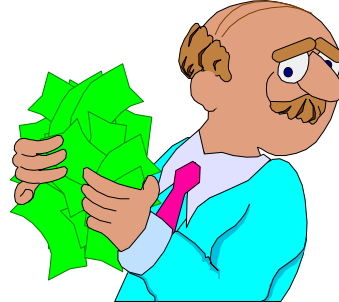
Answer _____

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Group Round



Your team has been chosen to participate in the new television game show, **“Let’s Win a Bundle”**! As part of the show if you will you get to choose your prize from the following list. Regrettably, you can’t actually



get the prizes but you can earn one point for your team for each question about them that you answer correctly. Additionally, the 1st, 2nd and 3rd teams to get all parts correct will get 3, 2 and 1 bonus points, respectively.

PRIZE ONE	A stack of one-dollar bills a mile high
PRIZE TWO	Five tons of two-dollar bills
PRIZE THREE	A trail of five-dollar bills laid end-to-end for 200 miles
PRIZE FOUR	One cubic-yard of ten-dollar bills
PRIZE FIVE	An acre carpeted with twenty-dollar bills

Additional information that you may find helpful: US currency measures 6.14” x 2.61” x 0.0043” and weighs 0.032653 ounces. An acre is 43560 square feet. Also, numeric answers will be considered correct if they are within the value of one bill of the type used in the prize.

Question ONE: What is the value of Prize One? \$ _____

Question TWO: What is the value of Prize Two? \$ _____

Question THREE: What is the value of Prize Three? \$ _____

Question FOUR: What is the value of Prize Four? \$ _____

Question FIVE: What is the value of Prize Five? \$ _____

Question SIX: If you desired to choose the prize with the greatest value, which one should you select?

Answer: _____