1. A chemist wants to make a 75% acid solution. The chemist only has 100 mL of a 60% acid solution, but has an unlimited amount of pure acid. How much pure acid should the chemist add to 100 mL of the 60% acid solution to form the 75% solution?

<div align="center">

(a) 80 mL   (b) 60 mL   (c) 166.667 mL

(d) 100 mL   (e) answer not given

</div>

2. Bob, Troy, Alex, and Eugene all decided to pitch in to purchase a new video game system. If Bob chips in the least amount of money, Troy pays twice as much as Bob, Alex puts in five dollars more than Troy, and Eugene pays three times as much as Bob, how much does Alex pay if the cost of the system was $501?

<div align="center">

(a) $62   (b) $124   (c) $129

(d) $186   (e) answer not given

</div>

3. A cannonball is launched from a cannon with its motion modeled by the equation $s = -16t^2 + 160t$, where t is the time in seconds, and s is the position of the cannonball in meters. How high is the cannonball when it reaches its maximum height?

<div align="center">

(a) 5 meters   (b) 10 meters   (c) 60 meters

(d) 100 meters   (e) answer not given

</div>

4. A dog wanders from its house 8 houses east, then 3 houses north, then 6 houses east, then 5 houses south. Approximately how many houses is the dog from its house?

<div align="center">

(a) 14 houses   (b) 22 houses   (c) 16 houses

(d) 10 houses   (e) 18 houses

</div>

5. A square is inscribed inside of a circle. If the circle has a radius of 3, find the perimeter of the square.

<div align="center">

(a) 9   (b) 12   (c) 18

(d) $12\sqrt{2}$ (e) answer not given

</div>

6. Maryann mow a lawn in 20 minutes. Regina can mow the same lawn in 18 minutes. Assuming that Maryann and Regina work at constant rates, about how long will it take them to mow the lawn if they work together?

           (a) 20 minutes   (b) 18 minutes   (c) 13 minutes

           (d) 11 minutes   (e) 9 minutes

7. Mrs. Smith has 22 students in her geometry class. If she wants to elect a class president, secretary, and treasurer, how many possible ways are there for her to do this?

           (a) 9240   (b) 10648   (c) 1540

           (d) 66   (e) answer not given

8. You are working as a display creator at Macy's. If you want to organize 8 pairs of shoes in a circular display, how many different displays could you make?

           (a) 5040   (b) 40320   (c) 8

           (d) 720   (e) 120

9. Calculate the probability that, when chosen at random, a three-digit integer starts with an odd number, and ends with either a 7, 8, or 0.

           (a) $\dfrac{1}{2}$ (b) $\dfrac{1}{3}$ (c) $\dfrac{3}{20}$

           (d) $\dfrac{3}{10}$ (e) answer not given

10. Joanne is standing at the bottom of a canyon, and can see the top of a tall building whose base is 500 feet away. If Joanne's angle of elevation to the top of the building is 78 degrees, how tall is the building?

           (a) 106.278 feet   (b) 489.074 feet   (c) 2352.315 feet

           (d) 511.171 feet   (e) 2835.641 feet

11. There are 7 gaggles in a geggle, 3 geggles in a google, and 4 googles equals 5 giggles. How many giggles are equivalent to 420 gaggles?

          (a) 5   (b) 25   (c) 84

          (d) 125   (e) 2100

12. Joe invests $4,000 into an account that earns 3.50% interest compounded continuously. How much money will be in the account after 4 years?

          (a) $4601.10   (b) $4590.09   (c) $4600.16

          (d) $16220.80   (e) $20220.80

13. The population of a small town is 5,000 people and is increasing at the rate of 8.6% per year. When will the population reach 8,000?

          (a) 2 to 3 years   (b) 3 to 4 years   (c) 4 to 5 years

          (d) 5 to 6 years   (e) 6 to 7 years

14. The half-life of a radioactive element is 14 days. If 20 grams are present initially, how long it will take for the element to have 1.25 grams remaining?

          (a) 18 days   (b) 28 days   (c) 42 days

          (d) 56 days   (e) answer not given

15. A train leaves Kansas City heading for St. Louis at Noon on Saturday. The train travels at a constant rate of 60 miles per hour. One hour later, a train leaves St. Louis heading for Kansas City travelling at a constant rate of 50 miles per hour. If the distance from Kansas City to St Louis is 250 miles, and neither stops to take a break, at what time will their paths intersect?

          (a) 2:24 PM   (b) 2:34 PM   (c) 2:44 PM

          (d) 2:54 PM   (e) 3:04 PM

16. George rides his bike for 17 miles at a rate of x miles per hour. He then drives his car for 53 miles at a rate of x + 43 miles per hour. If his trip took a total of 100 minutes, find the rate at which George rode his bike.

          (a) 16.449 mph   (b) 20.449 mph   (c) 24.449 mph

          (d) 28.449 mph   (e) 32.449 mph

17. Suppose three numbers, x, y, and z are multiplied together to a form a product of 100. If y is one more than twice x, and z is five less than three times y, find y.

(a) 2   (b) 3   (c) 4

(d) 5   (e) 6

18. Mr. Jones and Mr. Smith live in a state where there is no tax on food. They each go to a Mexican restaurant to purchase dinner for their families. Mr. Jones buys 8 tacos and 9 burritos and spends $20.52. Mr. Smith buys 14 tacos and 11 burritos and spends $27.74. Determine how much one taco costs.

(a) $0.63   (b) $1.72   (c) $0.73

(d) $1.62   (e) answer not given

19. The Jayhawks and Wildcats play a basketball game this upcoming March. The Jayhawks score 7 three pointers, x two pointers, and 18 free throws (worth one point each). The Wildcats score 13 three pointers, 18 two pointers, and 7 free throws (worth one point each). If the Jayhawks win the game by 7 points, determine how many two pointers they scored.

(a) 18   (b) 19   (c) 20

(d) 21   (e) answer not given

20. Suppose that the temperature on Tuesday was one degree more than the temperature on Monday. Wednesday's temperature was one degree more than the sum of Monday's and Tuesday's temperature. If the temperature on Tuesday was 19 degrees, find the difference between the temperature on Wednesday and the temperature on Monday.

(a) 18 degrees   (b) 19 degrees   (c) 20 degrees

(d) 21 degrees   (e) answer not given

21. Jordan leaves her house at 1:07 PM walking due east at a rate of 3 miles per hour. Five minutes later, Alyssa (Jordan's sister) leaves the same house walking due north at a rate of 4 miles per hour. Rounded to the nearest tenth, find the distance between the girls at 1:33 PM.

(a) 1.8 miles   (b) 1.9 miles   (c) 2.0 miles

(d) 2.1 miles   (e) 2.2 miles

22. Stacy is taking a college calculus class. Her grade is based off homework (20%), tests (60%), and a final exam (20%). Stacy's homework average is 84%, and her test average is 77%. If Stacy wants to get a B (at least 80% -- grades are not rounded) in the class, what is the minimum score that she needs on her final exam?

      (a) 83%   (b) 84%   (c) 85%

      (d) 86%   (e) answer not given

23. Mario, Brandon, and Derrick are all basketball players. Suppose Mario is an 84% free throw shooter, Brandon is an 81% free throw shooter, and Derrick is a 56% free throw shooter. Each man plays on the same team, and each person shoots two free throws in a particular game. Find the probability that the men make at most 5 out of the 6 free throws.

      (a) 15%   (b) 16%   (c) 84%

      (d) 85%   (e) answer not given

24. When playing with a standard deck of cards, find the probability that you draw a card that's either red or a face card.

      (a) $\dfrac{1}{2}$ (b) $\dfrac{17}{26}$ (c) $\dfrac{19}{26}$

      (d) $\dfrac{21}{26}$ (e) answer not given

25. When playing with a standard deck of cards, find the probability that you draw a red face card.

      (a) $\dfrac{1}{2}$ (b) $\dfrac{17}{26}$ (c) $\dfrac{19}{26}$

      (d) $\dfrac{21}{26}$ (e) answer not given

26. A tire of a moving bicycle has radius 14 inches. If the tire is making 210 revolutions per minute, find the bicycle's speed in miles per hour.

      (a) 17.5 mph   (b) 18.5 mph   (c) 19.5 mph

      (d) 20.5 mph   (e) 21.5 mph

27. A $500 computer has its price increased by 20%, by what percent will the price have to be decreased to return the price back to $500?

        (a) 15%   (b) 16.667%   (c) 20%

        (d) 23%   (e) 25%

28. The volume of an enclosed gas at a constant pressure varies directly as the absolute temperature. If pressure of a 3.46-L sample of neon gas 302 degrees Kelvin is 0.926 atm, what would the volume be at a temperature of 338 degrees Kelvin, if the pressure remains the same?

        (a) 3.87 L   (b) 3.77 L   (c) 3.67 L

        (d) 3.09 L   (e) 3.19 L

29. Among all the rectangles whose perimeters are 400 ft, find the dimensions of the one with maximum area. (All answers are in feet)

        (a) 200 by 200   (b) 100 by 100   (c) 400 by 400

        (d) 25 by 175   (e) 80 by 120

30. The angle of depression is 19 degrees from a point 7256 ft above sea level on the north rim of the Grand Canyon level to a point 6159 ft above sea level on the south rim. How wide is the canyon at that point?

        (a) 331.87 feet   (b) 357.15 feet   (c) 377.72 feet

        (d) 3369.49 feet   (e) 3185.92 feet