Multiple Choice: Select the letter of the most appropriate answer (rounding when appropriate) and shade in the corresponding region on the answer sheet.

1) A house for sale has a $9,000$ ft^2 yard. Convert this to square yards (1 yd $= 3$ ft).
   A) 3000 yd^2 **B)** 1000 yd^2 **C)** 81000 yd^2 **D)** 27000 yd^2

2) The sales tax on a computer purchase happens to be \$83. The sales tax rate is 9.2%. How much was the pre-tax cost of the computer?
   A) \$1002.17   **B)** \$802.27   **C)** \$902.17   **D)** \$912.17

3) There are 200 marbles in a bag. There are 32 red marbles. The rest are blue and yellow. There are five times as many blue marbles as there are yellow. How many yellow marbles are there?
   A) 32 marbles   **B)** 168 marbles   **C)** 140 marbles   **D)** 28 marbles

4) Suppose R varies directly with the square of S and inversely with T. When $S = 3$ and $T = 7$, $R = 2$. Find the value of R when $S = 4$ and $T = 10$.
   A) $\dfrac{15}{28}$ **B)** $\dfrac{28}{15}$ **C)** $\dfrac{112}{45}$ **D)** $\dfrac{45}{112}$

5) An airliner can fly $1,200$ miles in 3 hours. A new airliner is 20% faster. How long will it take the new airliner to fly $1,200$ miles?
   A) 2 hours   **B)** 2.5 hours   **C)** 2.4 hours   **D)** 2.6 hours

6) A new and growing university finds a trend in its enrollment: the student body increases by 300 students every two years. In 2015, the university had 6543 students. Assuming the trend continues, in how many years will the university have 8193 students?
   A) 11 years   **B)** 5.5 years   **C)** 8 years   **D)** 5 years

7) At a speed of 60 mph, a race car can stop in 100 ft. As speed is increased, stopping distance increases by 2.9% per miles per hour. Assuming this, what is the stopping distance at 100 mph? Round to the nearest foot.
   A) 314 feet   **B)** 114 feet   **C)** 214 feet   **D)** 216 feet

8) A lot in the shape of the right triangle has a hypotenuse that is 49 meters longer than the length of the shorter leg. The longer leg is 91 meters. How long is the shorter leg?
   A) 50 m   **B)** 60 m   **C)** 70 m   **D)** 80 m

9) How many liters of an 80% acetic acid solution must be mixed with 30 liters of a 50% solution to get a 70% solution?
   A) 10 liters   **B)** 50 liters   **C)** 60 liters   **D)** 80 liters

10) The Lazy River has a current of 2 miles per hour. A motorboat can travel 15 miles down the river in the same amount of time it takes to travel 9 miles up the river. What is the speed of the boat in still water?
   A) 8 mph   **B)** 12 mph   **C)** 11 mph   **D)** 9 mph

Pittsburg State University
Team Member #2　　　　**Algebra Word Problems - Team Event**　　　　**2016 Math Relays**

Multiple Choice: Select the letter of the most appropriate answer (rounding when appropriate) and shade in the corresponding region on the answer sheet.

11) If you were to receive a 10% pay cut, but then get a 40% raise, your new salary would be what percent of your original salary?
　　A) 30%　　　　　　　**B)** 130%　　　　　　　**C)** 126%　　　　　　　**D)** 26%

12) Tetyana has 43 coins (nickles and dimes) worth $3.40. How many dimes does she have?
　　A) 23　　　　　　　　**B)** 20　　　　　　　　**C)** 18　　　　　　　　**D)** 25

13) There are 204 trees in an orchard. There are three times as many apple trees as pear trees. There are twice as many orange trees as there are pear trees. How many orange trees are there?
　　A) 30　　　　　　　　**B)** 68　　　　　　　　**C)** 102　　　　　　　**D)** 70

14) Suppose X and Y vary directly. When $X = 3$, $Y = 8$. Find the value of Y when $X = 11$.
　　A) $\dfrac{3}{88}$　　　　　　**B)** $\dfrac{88}{3}$　　　　　　**C)** $\dfrac{3}{8}$　　　　　　**D)** $\dfrac{8}{3}$

15) It's 300 miles from City A to City B. Driving from City A to City B, Rita's average speed was 60 miles per hour. Returning to City A, it was raining, and Rita's average speed was 30 mph. What was the average speed for the round trip?
　　A) 40 mph　　　　　　**B)** 45 mph　　　　　　**C)** 50 mph　　　　　　**D)** 55 mph

16) A car dealership found that the number of cars it sells in a year is decreasing by about 4.8% every year. In year 2015, the car dealership sold 900 cars. Assuming the trend continues, estimate how many cars the car dealership will sell in year 2027.
　　A) 542 cars　　　　　**B)** 422 cars　　　　　**C)** 499 cars　　　　　**D)** 382 cars

17) A rental car company has a base charge of $50, plus $78 for each day of car rental. The total cost for Jean's rental car comes to $440. How many days did Jean rent the car?
　　A) 3 days　　　　　　**B)** 4 days　　　　　　**C)** 6 days　　　　　　**D)** 5 days

18) In a right triangle, the hypotenuse is 25 inches, and the length of one leg is 17 inches longer than the other. Find the length of the shorter leg.
　　A) 10 in　　　　　　　**B)** 5 in　　　　　　　**C)** 6 in　　　　　　　**D)** 7 in

19) A room in the shape of a square has a diagonal length of 246 ft. Find it's area.
　　A) 30258 ft^2　　　　**B)** 60516 ft^2　　　　**C)** 492 ft^2　　　　　**D)** 100 ft^2

20) On the first part of her trip, Natalie road her bike 16 miles, and on the second part of her trip she road her bike 42 miles. Her average speed during the second part of the trip was 6 miles per hour faster than her average speed on the first part of the trip. Find her average speed for the second part of the trip if the total time for the trip was 5 hours.
　　A) 14 mph　　　　　　**B)** 11.6 mph　　　　　**C)** 10 mph　　　　　　**D)** 8 mph

Pittsburg State University
Team Member #3   **Algebra Word Problems - Team Event**   **2016 Math Relays**

Multiple Choice: Select the letter of the most appropriate answer (rounding when appropriate) and shade in the corresponding region on the answer sheet.

21) A rectangular box has a volume of 2 m^3. Convert this to cubic centimeters (1 m $= 100$ cm).
   A) 2000000 cm^3 **B)** 200 cm^3 **C)** 2000 cm^3 **D)** 20000 cm^3

22) In 2014, a company saw a 3.3% decease in its expenses. In 2015, the company saw a 9.5% decrease in its expenses. By what percent did expenses decrease over the two years 2014 and 2015?
   A) 12.8%   **B)** 12.49%   **C)** 2.8%   **D)** 14.28%

23) Tickets to a movie are available in two types: \$12 adult and \$5 child. Suppose 200 tickets are sold, making \$1840 in revenue. How many adult tickets were sold?
   A) 120 tickets   **B)** 80 tickets   **C)** 90 tickets   **D)** 110 tickets

24) Suppose a varies directly with the cube of b. When $a = 2$, $b = 3$, find the value of a when $b = 5$.
   A) $\dfrac{9}{10}$ **B)** $\dfrac{250}{27}$ **C)** $\dfrac{27}{250}$ **D)** $\dfrac{10}{9}$

25) Jerry can shuck 500 oysters per hour. How many oysters can he shuck in 3 minutes?
   A) 20 oysters   **B)** 167 oysters   **C)** 25 oysters   **D)** 1500 oysters

26) At a fish farm it's found that if a salmon is raised at a constant temperature of 60°F, then it's average weight is 15 lbs after 5 weeks. If the temperature is kept at 65°F, then it's average weight is 19 lbs after 5 weeks. Assume that temperature and weight are linearly related. At what temperature should a salmon be raised to weight about 23 lbs after 5 weeks?
   A) 68°F   **B)** 75°F   **C)** 80°F   **D)** 70°F

27) Each day, Jenny ate 20% of the jellybeans that were in her jar at the beginning of that day. At the end of the second day, 32 remained. How many jellybeans were in the jar originally?
   A) 50 jellybeans   **B)** 60 jellybeans   **C)** 35 jellybeans   **D)** 70 jellybeans

28) Suppose two gallons of a 60% alcohol solution are mixed with 6 gallons of a 90% alcohol solution. What is the strength of the resulting solution?
   A) 80%   **B)** 82.5%   **C)** 85%   **D)** 75%

29) Rita's rectangular garden has an area of 4984 square feet and perimeter of 290 feet. Its length is shorter than its width. Find it's length.
   A) 92 ft   **B)** 112 ft   **C)** 56 ft   **D)** 89 ft

30) A rectangular sheet of cardboard of dimensions 20 cm by 15 cm has 4 small squares (of side length 3 cm) removed from the corners. The four sides are folded up to make a rectangular box (with no top). Find the volume of the resulting rectangular box.
   A) 300 cm^3 **B)** 364 cm^3 **C)** 900 cm^3 **D)** 378 cm^3

Pittsburg State University
Team Member #4   **Algebra Word Problems - Team Event**   **2016 Math Relays**

Multiple Choice: Select the letter of the most appropriate answer (rounding when appropriate) and shade in the corresponding region on the answer sheet.

31) The price of gasoline increased by 30% by the end November, but then decreased by 10% in December. The price of gas at the end of December is what percent of the price of gas at the beginning of November?
A) 117%   **B)** 17%   **C)** 120%   **D)** 20%

32) A lemonade stand sells cups of lemonade ($0.50 each) and cookies ($2.30 each). Revenue in a day was $160. Suppose 50 cookies were sold. How many cups of lemonade were sold?
A) 60 cups   **B)** 70 cups   **C)** 90 cups   **D)** 80 cups

33) Suppose the square of C varies inversely with D. When $C = 4$, $D = 5$. Find the value of C when $D = 2$. Assume $C \geq 0$.
A) $\dfrac{1}{2\sqrt{10}}$ **B)** $2\sqrt{10}$ **C)** 40   **D)** $\dfrac{1}{40}$

34) Working alone, Jim takes 2 hours to mow the yard. His roommate, James, takes 3 hours to mow the yard. How long will it take them to mow the yard when they work together?
A) 1.5 hours   **B)** 0.5 hours   **C)** 1 hour   **D)** 1.2 hours

35) A missile is ascending straight up at constant velocity. The altitude is measured to be 2000 ft at 7 seconds after launch, and 30256 ft at 15 seconds after launch. How fast is the rocket ascending?
A) 3532 ft/sec   **B)** 3458 ft/sec   **C)** 3258 ft/sec   **D)** 3232 ft/sec

36) A freshly poured cup of coffee has a temperature of 189 degrees Fahrenheit. The temperature of the coffee in the cup decreases by 3.0% per minute. A cup of coffee is measured to be 120 degrees Fahrenheit. How long since the cup of coffee was poured? Answer rounded to the nearest minute.
A) 25 minutes   **B)** 10 minutes   **C)** 15 minutes   **D)** 20 minutes

37) The length of a rectangular room is 6 feet longer than four times the width. If the room's perimeter is 102 feet, what is the length of the rectangular room?
A) 42 ft   **B)** 9 ft   **C)** 40 ft   **D)** 20 ft

38) How many liters of a 90% alcohol solution must be mixed with 60 liters of a 20% solution to get a 50% solution?
A) 45 liters   **B)** 50 liters   **C)** 55 liters   **D)** 60 liters

39) A steamboat can travel at an average speed of 11 miles per hour in still water. Traveling with the current the steamboat can travel 77 miles down the river in the same amount of time it takes to travel 44 miles upstream against the current. Find the speed of the current.
A) 5 mph   **B)** 4 mph   **C)** 1.5 mph   **D)** 3 mph

40) A book has pages that are 8 inches by 10 inches. The printed matter on a page of the book must cover 48 square inches. All margins (top, bottom, left, right) are to be the same width. How wide should each margin be?
A) 2.5 inches   **B)** 2 inches   **C)** 1 inch   **D)** 1.5 inches