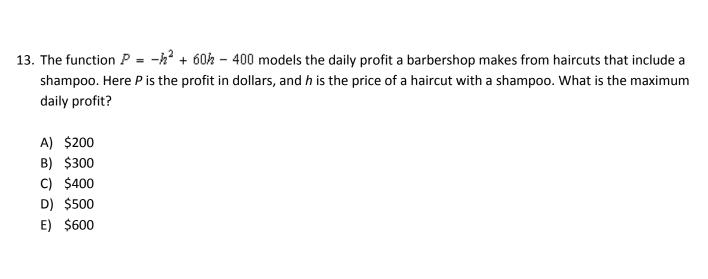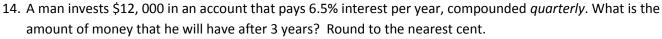1. A carpenter is building a rectangular fence to go around a playground. He only has enough money for 340 feet of fencing. He knows that one side of his rectangle will be 70 feet. What will the other sides of the rectangle be if one side is 70 feet?

   A) 100 ft
   B) 150 ft
   C) 185 ft
   D) 270 ft
   E) Answer Not Given

2. You can buy a skateboard for $60 from a friend and rent the safety equipment for $1.50 per hour, or you can rent all items you need for $5.50 per hour. For how many hours must you use the skateboard to justify buying your friend's skateboard?

   A) 13 hours
   B) 14 hours
   C) 15 hours
   D) 16 hours
   E) 17 hours

3. The width of a rectangle is 3 in. less than its length. The perimeter of the rectangle is 26 in. What is the width of the rectangle?

   A) 3 inches
   B) 4 inches
   C) 5 inches
   D) 6 inches
   E) 7 inches

4. The sum of three consecutive integers is 72. Find the 3 integers.

   A) 23, 24, 25
   B) 24, 25, 26
   C) 25, 26, 27
   D) 26, 27, 28
   E) Answer Not Given

5. The sum of four consecutive EVEN integers is 228. Find the 4 integers.

   A) 52, 53, 54, 55
   B) 53, 54, 55, 56
   C) 54, 55, 56, 57
   D) 52, 54, 56, 58
   E) 54, 56, 58, 60

6. Suppose you hike up a hill at 4 km/h. You hike back down at 6 km/h. Your hiking trip took 3 hours. How much time did it take you to hike up the hill?

   A) 1.4 hours
   B) 1.5 hours
   C) 1.6 hours
   D) 1.7 hours
   E) 1.8 hours

7. You can use the number of chirps n a cricket makes in one minute to estimate the outside temperature F in degrees Fahrenheit. The formula that relates temperature to cricket chrips is given by $F = \frac{n}{4} + 37$.
   How many chirps per minute can you expect if the temperature is 60° F?

   A) 52 chirps
   B) 72 chirps
   C) 92 chirps
   D) 112 chirps
   E) 132 chirps

8. A farmer looks in a barn and sees 142 legs. The barn contains only cows and chickens. If there a total of 46 animals, how many of the animals are cows?

   A) 21 cows
   B) 22 cows
   C) 23 cows
   D) 24 cows
   E) 25 cows

9. A landscaping company placed two orders with a nursery. The first order was for 13 bushes and 4 trees, and totaled $487. The second order was for 6 bushes and 2 trees, and totaled $232. The bills do not list the per-item price. What were the costs of one bush?

   A) $23
   B) $29
   C) $35
   D) $41
   E) $47

10. A 35% acid solution was mixed with a 14% acid solution to produce a 20% acid solution. How much 35% solution and how much 14% solution were mixed to produce 70L of the 20% solution?

   A) 20 liters of 35% and 50 liters of 14%
   B) 30 liters of 35% and 40 liters of 14%
   C) 40 liters of 35% and 50 liters of 14%
   D) 50 liters of 35% and 20 liters of 14%
   E) Answer Not Given

11. Your computer supply store sells two types of inkjet printers. The first, type A, costs $137 and you make a $55 profit on each one. The second, type B, costs $100 and you make a $40 profit on each one. You can order no more than 95 printers this month, and you need to make at least $4400 profit on them. What is the minimum cost?

   A) $10,840
   B) $10,960
   C) $11,100
   D) $12,200
   E) $13,400

12. A farming cooperative mixes two bags of cattle feed. Brand X generates $22 profit per bag and contains 2 units of nutrient A and 4 units of nutrient B. Brand Y generates $20 profit per bag to produce and contains 2 units of nutrient A and 6 units of nutrient B. You have 16 units available for nutrient A and 36 units for nutrient B. What is the maximum profit?

   A) $172
   B) $176
   C) $180
   D) $184
   E) $188

13. The function $P = -h^2 + 60h - 400$ models the daily profit a barbershop makes from haircuts that include a shampoo. Here P is the profit in dollars, and h is the price of a haircut with a shampoo. What is the maximum daily profit?

A) $200
B) $300
C) $400
D) $500
E) $600

14. A man invests $12, 000 in an account that pays 6.5% interest per year, compounded *quarterly*. What is the amount of money that he will have after 3 years? Round to the nearest cent.

A) $14,272.91
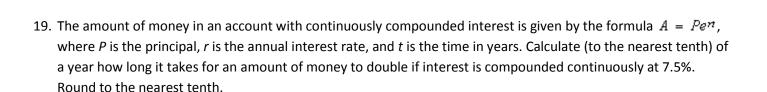B) $14,369.28
C) $14,466.81
D) $14,560.89
E) $14,698.18

15. If you start a bank account with $10,000 and your bank compounds the interest *semi-annually* at an interest rate of 7%, how much money do you have at the years end? (Assume that you do not add or withdraw any money from the account.) Round to the nearest cent.

A) $10,712.25
B) $10,812.25
C) $10,912.25
D) $11,012.25
E) $11,112.25

16. Suppose you invest $900 at an annual interest rate of 6.8% compounded *continuously*. How much will you have in the account after 7.5 years? Round to the nearest cent.

A) $1,494.76
B) $1,495.76
C) $1,496.76
D) $1,497.76
E) $1,498.76

17. The sales of lawn mowers t years after a particular model is introduced is given by the function
$y = 5500 \ln(9t + 4)$, where y is the number of mowers sold. How many mowers will be sold 3 years after a model is introduced?

   A) 17,887 mowers
   B) 18,387 mowers
   C) 18,887 mowers
   D) 19,387 mowers
   E) 19,887 mowers

18. The number of bacteria present in a culture after t minutes is given as B = $1000e^{kt}$. There are 5202 bacteria present after 7 minutes. Find k to the nearest hundredth.

   A) k = 0.06
   B) k = 0.12
   C) k = 0.18
   D) k = 0.24
   E) k = 0.29

19. The amount of money in an account with continuously compounded interest is given by the formula $A = Pe^{rt}$, where P is the principal, r is the annual interest rate, and t is the time in years. Calculate (to the nearest tenth) of a year how long it takes for an amount of money to double if interest is compounded continuously at 7.5%. Round to the nearest tenth.

   A) 5.2 years
   B) 6.2 years
   C) 7.2 years
   D) 8.2 years
   E) 9.2 years

20. A birdhouse is shaped as a regular hexagonal pyramid. The base of the pyramid has sides of 6 inches and the height of the birdhouse is 12 in. You are making the birdhouse out of sheets of   plywood. What is the minimum amount of plywood you will need to build the birdhouse?

   A) 309 square inches
   B) 319 square inches
   C) 329 square inches
   D) 339 square inches
   E) 349 square inches

21. The roof of a tower in a castle if shaped like a cone. The height of the roof is 30 ft and the radius of the base is 15 ft. To the nearest square foot, find the area of the roofing material needed to cover the roof.

   A) 1,481 square feet
   B) 1,491 square feet
   C) 1,501 square feet
   D) 1,541 square feet
   E) 1,581 square feet

22. Your parents just put a new swimming pool in your backyard. The tiles have all been installed and   now it is time to fill the pool with water. The base of the pool is a rectangle 24 feet by 36 feet. The depth across the entire pool (there is no shallow end) is 6 feet. To fill the pool with water costs $0.027 per cubic foot. How much will it cost to fill the pool to the brim?

   A) $138.97
   B) $139.97
   C) $140.97
   D) $141.97
   E) $142.97

23. A building in the shape of a pyramid is 853 feet tall with a square base that is 149 feet on each side. What is the volume of the building to the nearest cubic foot?

   A) 5,312,484 cubic feet
   B) 6,312,484 cubic feet
   C) 7,312,484 cubic feet
   D) 8,312,484 cubic feet
   E) 9,312,484 cubic feet

24. The pyramid from question #23 is replaced with a building in the shape of a prism with the same square base as the pyramid. About how tall would this building have to be to have the same volume as the pyramid?

   A) 274 feet
   B) 284 feet
   C) 294 feet
   D) 304 feet
   E) 314 feet

25. Your mom bought 3 new plants and 3 cylindrical pots to put them in. Each pot is 10 inches tall and the distance around each circular base is 12 inches. In order to pot the plants, she needs to figure out how much potting soil is needed. The soil costs $4.00 for a 100 in^3 bag. How many bags will she need to buy to fill all 3 pots? How much will it cost? (She is filling the pots completely full)

    A) 2 bags, $8.00
    B) 3 bags, $12.00
    C) 4 bags, $16.00
    D) 5 bags, $20.00
    E) 6 bags, $24.00

26. The lateral areas of two similar pyramids are 8 ft^2 and 18 ft^2. The volume of the smaller pyramid is 32 ft^3.   Find the volume of the larger pyramid.

    A) 108 cubic feet
    B) 110 cubic feet
    C) 112 cubic feet
    D) 114 cubic feet
    E) 116 cubic feet

27. The surface area of a cube is 216 in^2. Find the length of a base edge.

    A) 4 inches
    B) 5 inches
    C) 6 inches
    D) 7 inches
    E) 8 inches

28. A covered water tank on your grandparent's farm has a cylindrical shape. It has a circumference of 28.27' and a height of 18'. It is time to repaint the tank. If one gallon of paint covers 150 square feet, how many gallons of paint will need to be purchased in order to paint the water tank?

    A) 2 gallons
    B) 3 gallons
    C) 4 gallons
    D) 5 gallons
    E) 6 gallons

29. You are building a replica of one of the great pyramids in Egypt. The actual Pyramid measures 756 ft on each side of the base and is 481 ft tall. If you are making your replica 1/100 of the size of the real pyramid, how much cardboard will you need?

    A)   84.5 square feet
    B)   86.5 square feet
    C)   88.5 square feet
    D)   90.5 square feet
    E)   92.5 square feet

30. You are building a float for the Homecoming parade. The theme this year involves a giant ice cream cone. You will be decorating a cone that is 13 ft tall, and has a diameter of 8 ft. The ice cream on top is represented by half of a sphere with a diameter of 8 ft. In order to decorate the float, you need to cover the ice cream & the cone with paper. How many square feet of paper will you need?

    A)   265.5 square feet
    B)   267.5 square feet
    C)   269.5 square feet
    D)   271.5 square feet
    E)   273.5 square feet

KCATM WORD PROBLEMS 9-10 ANSWER KEY 2014

1. A
2. C
3. C
4. A
5. E
6. E
7. C
8. E
9. A
10. A
11. B
12. B
13. D
14. D
15. A
16. E
17. C
18. D
19. E
20. C
21. E
22. B
23. B
24. B
25. C
26. A
27. C
28. C
29. E
30. D