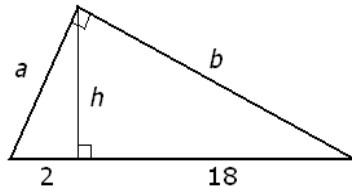
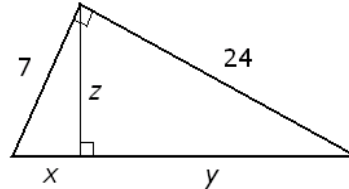


Review Problems

- Expand $(x + y)^5$
 - Find the coefficient of a^4b^{13} in the expanded form of $(a + b)^{17}$.
- Find the exact value of a , b , and h , based on the picture below.
 - Find the exact value of x , y , and z , based on the picture below.

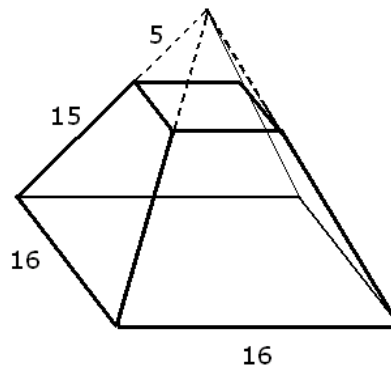


a)



b)

- Find the volume of the truncated pyramid shown on the picture below.



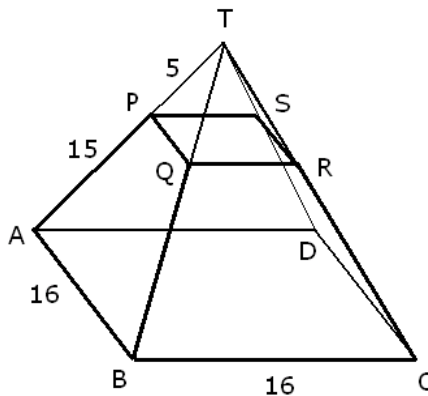
- Teams A and B are the finalists in a championship. In every game, one team must win. (In other words, a tie is not an option.). In every game, the probability of Team A winning is 70%. Find the probability for each of the following events.
 - Team B winning a game.
 - Teams A and B play three games in a row, and team A wins all three games.
 - Teams A and B play three games in a row, and team B wins all three games.
 - Teams A and B play three games in a row, and team A wins the first two games, B wins the third game.
 - Teams A and B play three games in a row, and team A wins exactly two games.
- Compute the volume of a cylinder with a base of radius 4 cm and height of 21 cm.
- We want to buy a car for \$5800. The dealership has a financing plan of a down payment of \$300 and 8% APR for 36 months. Compute the monthly payment under this plan.
- We want to buy a car for \$6400. The dealership has a financing plan of a down payment of \$400 and 48 monthly payments of \$142.29. What APR does the dealership charge?

8. We throw a coin six times in a row. If the number of heads is exactly three, we win \$10. Otherwise, we pay \$5. Find the expected value for this game.
9. Find the present value of \$2000, five years from now. Assume a compound annual interest rate of 6%, compounded continuously.
10. We keep rolling a die until we roll the number 6.
 - a) Find the probability of getting 6 for the first roll.
 - b) Find the probability of getting 6 for the second roll only.
 - c) Find the probability of getting 6 for the third roll only.
11. We pull two cards out of $\{1, 2, 3, 4, 5, 6, 7\}$, with replacement. Find the probability of each of the following events
 - a) We pull two consecutive numbers.
 - b) The product of the two numbers pulled is odd.
 - c) The product of the two numbers pulled is even.
12. We pull two cards out of $\{1, 2, 3, 4, 5, 6, 7\}$, without replacement. Find the probability of each of the following events
 - a) We pull two consecutive numbers.
 - b) The product of the two numbers pulled is odd.
 - c) The product of the two numbers pulled is even.
13. We have 10 marbles in a bag: 8 red and 2 green. We randomly pull two marbles, with replacement. If none of the marbles pulled is a green, we pay \$5. Otherwise, we receive \$10 for one green marble pulled and \$30 for two green marbles pulled. Find the expected value for this game.
14. We have 10 marbles in a bag: 8 red and 2 green. We randomly pull two marbles, without replacement. If none of the marbles pulled is a green, we pay \$5. Otherwise, we receive \$10 for one green marble pulled and \$30 for two green marbles pulled. Find the expected value for this game.
15. A healthy 40 year old man wants to buy a life insurance policy for a year. The policy is priced at \$ 200 and will pay \$ 30 000 if he dies during the year covered. Statistical data shows that out of 1000 healthy 40 years old males, 3 dies on average.
 - a) What is the expected value of the life insurance policy for this customer?
 - b) What is the expected value of the life insurance policy for the insurance company?

Review Problems - Answers

- 1.) a) $x^5 + 5x^4y + 10x^3y^2 + 10x^2y^3 + 5xy^4 + y^5$ b) $\binom{17}{4} = 2380$
- 2.) a) $a = \sqrt{40}$ $b = \sqrt{360}$ $h = 6$ b) $x = \frac{49}{25}$ $y = \frac{576}{25}$ $z = \frac{168}{25}$
- 3.) $336\sqrt{17} \cong 1385.36349$ 4.) a) 0.3 b) 0.343 c) 0.027 d) 0.147 e) 0.441
- 5.) $336\pi \text{ cm}^3 \cong 1055.575 \text{ cm}^3$ 6.) \$172.35 7.) 6.5% 8.) -\$0.3125 9.) \$1481.64
- 10.) a) $\frac{1}{6}$ b) $\frac{5}{36}$ c) $\frac{25}{216}$ 11.) a) $\frac{12}{49}$ b) $\frac{16}{49}$ c) $\frac{33}{49}$
- 12.) a) $\frac{2}{7}$ b) $\frac{2}{7}$ c) $\frac{5}{7}$ 13.) 1.2 14.) 1.111 111 111 111 1
- 15.) a) -\$110 b) \$110

Solution for 3: Consider the picture below.



Triangles ABT and PQT are similar. From that we can compute $PQ = 4$. Let V_1 be the volume of pyramid $ABCDT$ and V_2 be the volume of pyramid $PQRST$. The volume we are to compute is $V = V_1 - V_2$.

$$h_1 = \sqrt{20^2 - 8^2} = \sqrt{336} = 4\sqrt{21} \quad H_1 = \sqrt{336 - 8^2} = \sqrt{272} = 4\sqrt{17}$$

We could repeat this computation for pyramid $PQRST$ but we also can use similar triangles (how?) to find h_2 and H_2 .

$$h_2 = \sqrt{21} \quad H_2 = \sqrt{17}$$

$$V = V_1 - V_2 = \frac{1}{3}(16)^2 \sqrt{272} - \frac{1}{3}(4)^2 \sqrt{17} \cong 1385.36349$$