

2000 Hoover High School Mathematics Tournament
7th Grade Ciphering

1.1 Simplify:

$$\frac{5^2 - \left(9 \div \frac{1}{3} \times \frac{1}{27}\right)^5}{8 \times 4 \div 3^2 - (7 + 6)}$$

Answer: -216/85.

1.2 Allen Iverson scored 32, 18, 31, 49, and 28 points in his first five games. How many points must Iverson score in his sixth game to average 34 points per game?

Answer: 46.

1.3 If the ratio of the areas of two circles is 16:9, then what is the ratio of their circumferences, large to small?

Answer: 4:3.

1.4 Evaluate:

$$\sqrt[5]{\frac{2^1 \cdot 2^2 \cdot 2^3 \cdot 2^4 \cdot 2^5}{3^1 \cdot 3^2 \cdot 3^3 \cdot 3^4 \cdot 3^5}}$$

Answer: 8/27.

1.5 A coin is flipped twice. Find the probability that heads show on the coin both times.

Answer: 1/4.

2.1 Compute in base 10: $(101_2)(10101_2)(1010101_2)$.

Answer: 8925

2.2 The "square average" of a group of numbers is the average of their squares. What is the square average of the first six positive integers?

Answer: 91/6.

2.3 At a recent sale, Polo shirts were marked half off their already 30% off price. If the final price was \$21.00, the what was the original price?

Answer: \$60.00.

2.4 If two of the sides of a right triangle have lengths 8 and 10, then what is the largest possible value for the length of the third side?

Answer: $2\sqrt{41}$.

2.5 What is the area of a circle whose circumference is 18?

Answer: $81/\pi$.

3.1 Alan is 4/5 as old as Bob was ten years ago. In four years, Bob will be twice as old as Alan will be. How old is Bob?

Answer: 20.

3.2 Find the tenth term of the sequence: 1, 5, 9, 13, ...

Answer: 37.

3.3 What is the volume of a right circular cylinder of height 8 and base radius 2?

Answer: 32π .

3.4 What percent of 120 is 72% of 180?

Answer: 108%.

3.5 Baris took a certain number of pictures while visiting Egypt, twice as many while in Italy, and three-fourths as many while in France. If he took a total of 60 pictures, then how many pictures did he take in France?

Answer: 12.

4.1 A card is selected at random from a standard 52 card deck. Find the probability that it is red or a club.

Answer: $3/4$.

4.2 Evaluate:

$$\sqrt{\frac{25 \cdot 256}{16 \cdot 625}}$$

Answer: $4/5$.

4.3 Find the area of a triangle with sides 5, 5, and 6.

Answer: 12.

4.4 What number is halfway between $-7/19$ and $15/13$?

Answer: $97/247$

4.5 If $a \otimes b = a^2b + ab^2$, then compute $\frac{57 \otimes 73}{73 \otimes 57}$.

Answer: 1.

ALT1 Compute the average of the first 20 positive whole numbers.

Answer: $21/2$.

ALT2 $ABCD$ is a square of side 4. If E is the midpoint of \overline{AC} , then what is the area of triangle ABE ?

Answer: 4.

ALT3 Two sides of a triangle are 9 and 13. What is the longest possible value for the third side given that it is a whole number?

Answer: 21.