PIMS Elementary Grades Math Competition NAME: _____
29 May 2004
Sprint Round - Grade Seven Division SCHOOL: _____

1. Find: $1+2+4+8+\cdots+1024 =$ _____ 1

2. If $\sqrt{x+5}=8$, what is the value of x ? _____ 2

3. Find: $\dfrac{\frac{13}{33}-\frac{1}{11}}{\frac{16}{33}}\times\dfrac{16}{23} =$ _____ 3

4. What is the remainder when $1\times2\times3\times\cdots\times10\times11-3^2$ is divided by 7 ? _____ 4

5. What is the product of all the prime factors of 630 ? _____ 5

6. If $7\times X+13=2004$, what is $14\times X+13$? _____ 6

7. Find the value of: $(77\times7)+(11\times7)+(22\times7) =$ _____ 7

8. What is the sum of all prime factors of 330 ? _____ 8

9. $\dfrac{x}{y}=2.5$ and $\dfrac{x+y}{x-y}=2\dfrac{8}{z}$. What is the value of z ? _____ 9

10. On a planet far away, the year is 600 days long, and weeks are still 7 days long with the same names for each day of the week as on planet Earth. On one year, New Year's day was on Sunday. On what day of the week was the next New Year's day ? _____ 10

11. What is the sum of the first 2004 terms of the sequence 0,1,2,0,1,2,0,1,2,... ? _____ 11

12. There are eleven teams in a basketball tournament. Each team must play all other teams exactly twice. How many games need to be played in this tournament ? _____ 12

13. Find the number y such that $3\times y\times3=1+5-9+13-17+21-25+29$ _____ 13

14. What is $\sqrt{1500^2+2000^2}$? (Hint: $3^2+4^2=25$). _____ 14

15. a, b, and c, the lengths of the sides of the triangle ABC, are whole numbers. We know that $a=7$ and that $b=11$. What is the maximum possible value of c ? _____ 15

16. Joe runs at a rate of 5 *meters/sec.* Jane runs at a rate of 8 *meters/sec.* If Joe and Jane have a race and Jane starts 160 meters from the finish line, how far ahead of Jane should Joe start (in meters) so they both reach the finish line at the same time ? _____ 16

17. Find the value of the expression: $\sqrt{17^2-15^2}-(\sqrt{17^2}-\sqrt{15^2})=$ _____ 17

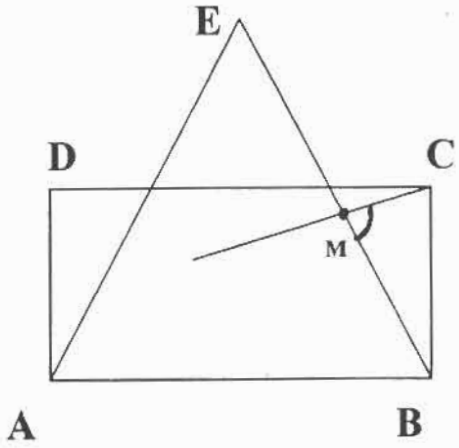
18. Jam contains 37.5% sugar. The rest is fruit. What is the ratio of sugar to fruit in the jam ? (Express your answer as a common fraction). _____ 18

19. Calculate: $19+78+80+21+82+17=$ _____ 19

20. Given that: $a\times a=a,\quad b\times b=b,\quad a+a\neq a,\quad b+b=b,$ what is $(5a+5b)\times(5a-5b)$? _____ 20

21. A farmer has only chickens and cows. If you count the legs of the chickens (two legs each) and the legs of the cows (four legs each), there are a total of 720 legs altogether. Also, there are 4 times as many cows as there are chickens. How many cows are there on the farm ? _____ 21

22. ABCD is a rectangle. AB=2×BC. The triangle ABE is equilateral. The point M is the midpoint of the side BE. Find the angle ∠CMB (in degrees).



_____ 22

23. Define a new operation "&". For X, Y any two numbers, $X\ \&\ Y=\dfrac{X}{X+Y}$.

Suppose that $X\ \&\ Y=\dfrac{1}{3}$. Find the value of $Y\ \&\ X$. _____ 23

24. What is the smallest positive whole number whose square is divisible by every whole number from 1 to 10 ? _____ 24

25. Mary rolls three fair dice. The total sum of the three rolls is 15. What is the probability that one of the rolls is a 3 ? (Give your answer as a common fraction). _____ 25