1. Find x if $3\log_2 x + 2\log_2 {}^1/_x = 4$.

2. Find the ratio of the volume of a cube to the volume of an inscribed sphere.

3. Find x if $x > 0$ and $x^2 + (x+1)^2 + (x+2)^2 = (x+3)^2 + (x+4)^2$.

4. The coefficient of $x^3 y^3$ in $(2x - 3y)^6$ is

5. The sum of all real numbers x for which $|\,x+3\,| = |2x-9|$ is

6. From a group of 3 juniors and 6 seniors, a committee consisting of 1 junior and 2 seniors is to be formed. How many different committees are possible?

7. If the altitude of an equilateral triangle is 5, then its area is

8. If $3x^2 + bx + 2 = 0$ has equal roots, then b^2 must be

9. In a free throw contest, a player wins a dime for each shot made and loses a quarter for each shot missed. If he takes 100 shots and ends up winning 20 cents, how many shots did he make?

10. The first three numbers in an arithmetic progression are $x-1$, $x+6$, and $3x+1$. What is x?

11. If $f(x) = 4^{2x+1}$, then $f(x+1)-f(x)$ is equal to

(a) 4

(b) 64

(c) f(x)

(d) 3f(x)

(e) 15f(x)

12. How many positive integer factors does 360 have?

13. What is the probability of getting at least one tail in 6 tosses of a fair coin?

14. Find x so that the point $(x,0)$ is equidistant from the points $(0,-2)$ and $(6,4)$.

15. Find $\sin 2x$ if x is an acute angle and $\tan x = {}^1/_2$.

16. Find the radius of a right circular cylinder if its volume is 100 and its lateral surface area is 100.

17. One group of 10 numbers has an average of 24.6. Another group of 15 numbers has an average of 34. What is the average of both groups of numbers taken together?

18. Find the sum of the numerical coefficients of $(2x+3y)^8$.

19. Find the sum of all positive two-digit integers.

20. Find positive integers a, b, and c satisfying $a < b < c$ and $a + ab + abc = 47$.

21. Express $\sum_{n=1}^{20}(1/n - [1/(n+1)])$ as a single fraction.

22. Numbers are written in base 3 using the digits 0, 1, and 2. When written in base 3, the decimal number 11,000 is

23. Given that $f(\log_2 x) = x^3 + x^2 + 1$, f(3) equals

24. At a club meeting of a 50-member club with everyone present, every member shakes hands with every other member. How many handshakes take place?

25. Find the area of a triangle whose vertices are located at the points (0,0), (5, 1) and (3,4).