

Problem Set for Wed. Nov. 25, 2015

These are Part C type questions from the 70's and early 80's. Please find time this week to look these over. Seeing the solutions next week will be much more useful if you have at least tried these questions.

Jmc 1977

22. A cylindrical gasoline storage tank, lying on its side, has an inside diameter of 4 feet and an inside length of 16 feet. If the depth of the gasoline is 3 feet, then the area, in square feet, on the top surface of the gasoline in the tank is
- (A) $32\sqrt{3}$ (B) $32\sqrt{5}$ (C) $16\sqrt{3}$ (D) $16\sqrt{5}$
(E) none of these

Jmc 1981

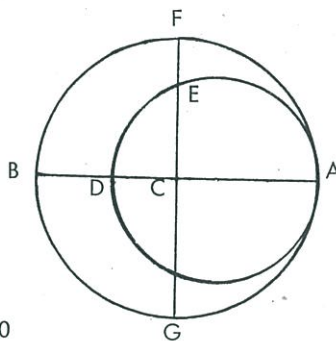
24. If $90! = (90)(89)(88) \dots (2)(1)$, then the exponent of the highest power of 2 which will divide $90!$ is
- (A) 86 (B) 45 (C) 90 (D) 75 (E) 85

Jmc 1976

18. If a and b are the x and y intercepts of a line which passes through the point $(2, 1)$, then
- (A) $a(b - 1) = 2b$ (B) $a = 2b$ (C) $b = 2a$
(D) $b(a - 1) = 2b$ (E) none of these

Jmc 1974

29. In the diagram, the two circles are tangent at A . If C is the centre of the larger circle, $BA \perp CF$, $EF = 5$, and $BD = 9$, then the diameter of the smaller circle is



- (A) 16 (B) 25
(C) 41 (D) 45 (E) 50

Jmc 1981

26. A line through the point $(-2, 6)$ forms with the axes a triangle with area 25. One value for the x -intercept of this line is
- (A) $\frac{5}{8}$ (B) $\frac{3}{5}$ (C) $-\frac{5}{3}$ (D) $-\frac{3}{5}$ (E) -10

JMC 1975

26. The fraction $\frac{x-18}{x^2-x-6}$ was obtained by adding the

fractions $\frac{P}{x+2}$ and $\frac{Q}{x-3}$, where P and Q are

constants. Then $P - Q$ is equal to

- (A) 31 (B) -7 (C) 7 (D) -1
(E) 1

PASCAL 1982

25. If all integers from 1 to 1 000 000 are printed, the number of times the numeral 5 will appear is

- (A) 100 000 (B) 500 000 (C) 600 000 (D) 1 000 000
(E) 2 000 000

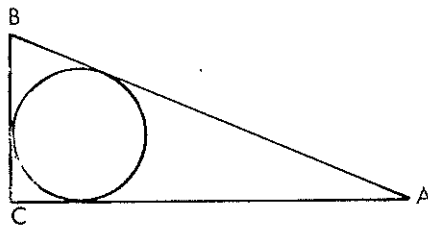
JMC 1976

26. If x is the sum of all possible three-digit numbers which can be formed using the digits 2, 3, 4, 5, 6, with no repeated digits, then

- (A) $x < 15000$ (B) $15000 \leq x < 21000$
(C) $21000 \leq x < 25000$ (D) $25000 < x \leq 29000$
(E) $x > 29000$

JMC 1976

23. BCA is a triangle having sides 20, 21, and 29. The diameter of the circle inscribed in the triangle is



- (A) 12 (B) 7 (C) 11 (D) 6 (E) none of these

JMC 1981

30. If k is an integer and the numbers $1+k$, $1+2k$, and $1+8k$ are divisible by 3, 5, and 7, respectively, then the smallest positive value of k lies in the interval

- (A) 0 to 20 (B) 21 to 40 (C) 41 to 60 (D) 61 to 80
(E) none of these

JMC 1979

27. The sum of the first sixty terms of the series

$$\frac{1}{(2)(3)} + \frac{1}{(3)(4)} + \frac{1}{(4)(5)} + \dots + \frac{1}{(n+1)(n+2)} + \dots$$

is $\frac{a}{b}$, where a and b are relatively prime integers. Then $a+b$ is

- (A) 3782 (B) 184 (C) 92 (D) 46 (E) none of these