1995 HKCEE MATHS Paper II

1 Round off the number 0.044449 to 3 significant figures.

A. 0.04
B. 0.044
C. 0.045
D. 0.0444
E. 0.0445

2 If $\frac{x+y}{xy}=1$, then $y=$

A. $\frac{1-x}{x}$
B. $\frac{x-1}{x}$
C. $\frac{x}{1-x}$
D. $\frac{x}{x-1}$
E. $\frac{1-x}{1+x}$

3 If $f(x)=x^{99}+99x+k$ is divisible by $x+1$, then $k=$

A. -100
B. -98
C. 98
D. 100
E. 198

4 Simplify $\left(\frac{a^6}{b^{12}}\right)^{-\frac{2}{3}}$

A. $\frac{b^8}{a^4}$
B. $\frac{b^{18}}{a^9}$
C. $\frac{a^4}{b^8}$
D. $\frac{a^9}{b^{18}}$
E. $\frac{1}{a^4b^{12}}$

5 $\frac{1}{2+\sqrt{6}}-\frac{1}{2-\sqrt{6}}=$

A. $-\sqrt{6}$
B. $-\frac{\sqrt{6}}{2}$
C. 0
D. $\frac{\sqrt{6}}{2}$
E. $\sqrt{6}$

6 The L.C.M. of x^3-x and x^4-1 is

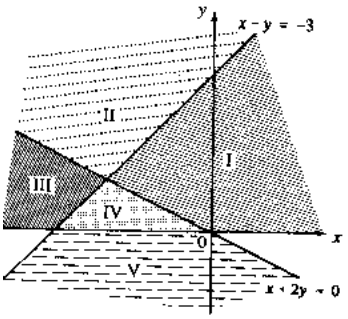
A. $x-1$
B. $(x-1)(x+1)$
C. $x(x-1)(x+1)(x^2+1)$
D. $(x-1)(x+1)(x^2+1)(x^2+x+1)$
E. $x(x-1)^2(x+1)^2(x^2+1)$

7 Solve the simultaneous equations: $\begin{cases}4x-\frac{y}{3}=6\\2x+\frac{y}{6}=-1\end{cases}$

A. $x=-\frac{1}{2}, y=-12$
B. $x=-\frac{1}{2}, y=12$
C. $x=\frac{1}{2}, y=-12$
D. $x=\frac{1}{2}, y=12$
E. $x=\frac{5}{24}, y=-\frac{7}{2}$

8 Which of the following shaded regions represents the solution of $\begin{cases}y\ge 0\\x-y\ge -3\\x+2y\le 0\end{cases}$

A. I
B. II
C. III
D. IV
E. V



9 Find the values of x which satisfy both $-x<4$ and $\frac{2x-16}{3}>-2$

A. $-4<x<5$

B. $x<-4$ D. $x<5$

C. $x>-4$ E. $x>5$

10 If $3x^2+6x+1\equiv 3(x+b)^2+c$, then c =

A. -8

B. -2 D. $\frac{1}{3}$

C. 0 E. 1

11 x and y are two variables. The table below shows some values of x and their corresponding values of y.

x	2	3	6	12
y	36	16	4	1

Which of the following may be a relation between x and y ?

A. $x\propto\sqrt{y}$

B. $x\propto y$ D. $x\propto\frac{1}{y}$

C. $x\propto\frac{1}{\sqrt{y}}$ E. $x\propto\frac{1}{y^2}$

12 If $125^x=25^y$ and x, y are non-zero, find $x:y$.

A. 1 : 25

B. 1 : 5 D. 3 : 2

C. 2 : 3 E. 5 : 1

13 Find the interest on $\$P$ at $r\%$ p.a. for n years, compounded half-yearly.

A. $\$P(1+2r\%)^n-\$P$

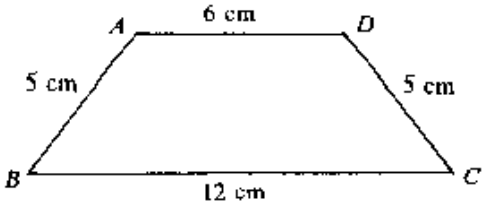
B. $\$P(1+r\%)^n-\$P$

C. $\$P(1+r\%)^{2n}-\$P$

D. $\$P\left(1+\frac{r}{2}\%\right)^n-\$P$

E. $\$P\left(1+\frac{r}{2}\%\right)^{2n}-\$P$

14 In the figure, *ABCD* is a trapezium. Find its area.

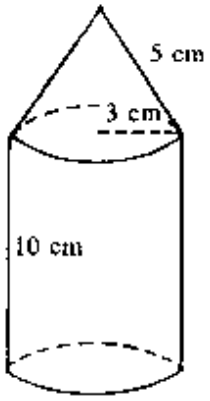


A. 36cm^2

B. 45cm^2 D. 72cm^2

C. 48cm^2 E. 90cm^2

15 In the figure, the solid consists of a cylinder and a right circular cone with a common base which is a circle of radius 3cm. The height of the cylinder is 10cm and the slant height of the cone is 5cm. Find the total surface area of the solid.



A. $75\pi\text{ cm}^2$

B. $84\pi\text{ cm}^2$

C. $93\pi\text{ cm}^2$

D. $105\pi\text{ cm}^2$

E. $114\pi\text{ cm}^2$

16 $\frac{\cos^2\theta}{1+\sin\theta}-1=$

A. $-\sin\theta$

B. $\sin\theta$ D. $-\frac{\sin\theta(1-\sin\theta)}{1+\sin\theta}$

C. $\sin\theta-2$ E. $\frac{\sin\theta(1-\sin\theta)}{1+\sin\theta}$

17 If $0 < x < 2\pi$, solve $\sin x = \frac{1}{3}$ correct to 3 significant figures.

A. 0.327 or 2.81

B. 0.327 or 3.47 D.0.340 or 3.48

C. 0.340 or 2.80 E. 0.340 or 5.94

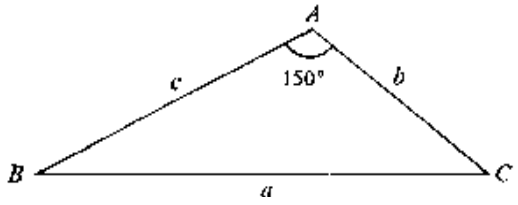
18 The greatest value of $\frac{1}{2^{1-\sin x}}$ is

A. $\frac{1}{2}$

B. $\frac{1}{4}$ D. 2

C. 1 E. 4

19 According to the figure, which of the following must be true?



A. $a^2 = b^2 + c^2 - \sqrt{3}bc$

B. $a^2 = b^2 + c^2 - bc$

C. $a^2 = b^2 + c^2 + \frac{\sqrt{3}}{2}bc$

D. $a^2 = b^2 + c^2 + bc$

E. $a^2 = b^2 + c^2 + \sqrt{3}bc$

20 In the figure, the bearing of *B* from *A* is

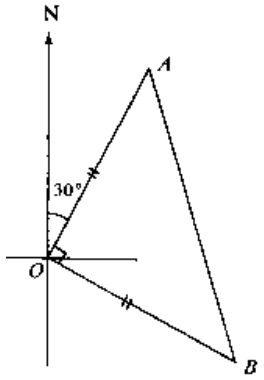
A. 015°

B. 045°

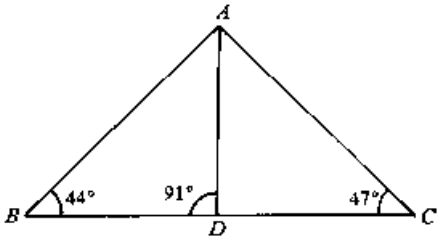
C. 075°

D. 165°

E. 345°



21 In the figure, *BDC* is a straight line. Arrange *AD*, *BD* and *DC* in ascending order of magnitude.



A. $AD < BD < DC$

B. $AD < DC < BD$

C. $DC < AD < BD$

D. $DC < BD < AD$

E. $BD < AD < DC$

22 In the figure, *ABCD* is a semicircle. $\angle CAD$ =

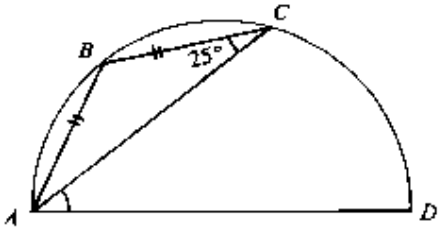
A. 25°

B. 40°

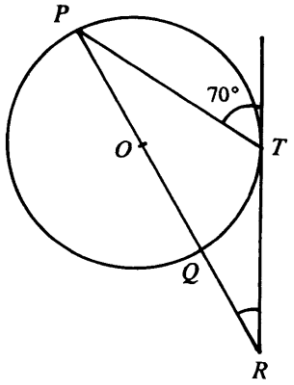
C. 45°

D. 50°

E. 65°

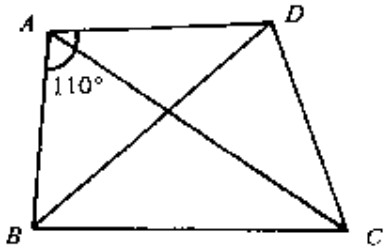


23 In the figure, O is the center of the circle, $POQR$ is a straight line. TR is the tangent to the circle at T. $\angle PRT =$



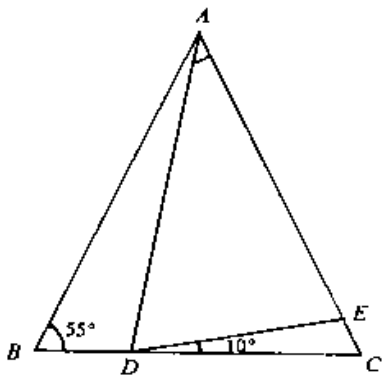
A. 20°
B. 35°
C. 45°
D. 50°
E. 70°

24 In the figure, $ABCD$ is a cyclic quadrilateral. If $\angle DAB = 110°$ and $BC = BD$, find $\angle DAC$.



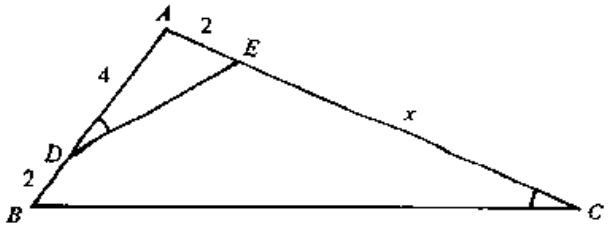
A. 20°
B. 35°
C. 40°
D. 55°
E. 70°

25 In the figure, $AB = AC$ and $AD = AE$. $\angle DAC =$



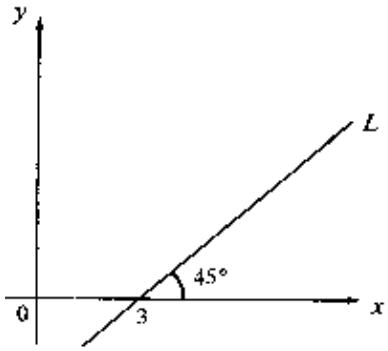
A. 45°
B. 50°
C. 55°
D. 60°
E. 65°

26 In the figure, $\angle ADE = \angle ACB$. Find x.



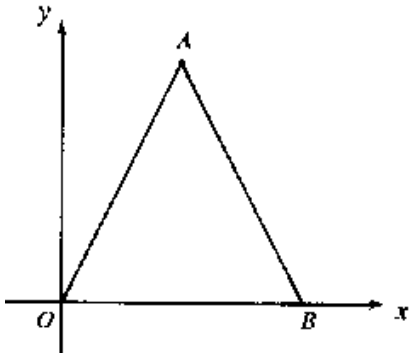
A. 4
B. 8
C. 10
D. 12
E. 16

27 In the figure, the equation of the straight line L is



A. $x - 3 = 0$
B. $x - y - 3 = 0$
C. $x - y + 3 = 0$
D. $x + y - 3 = 0$
E. $x + y + 3 = 0$

28 In the figure, $OA = AB$. If the slope of AB is m, find the slope of OA.



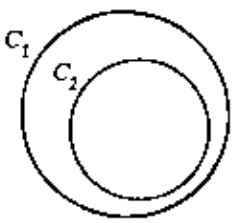
A. -1
B. $\frac{1}{m}$
C. $-\frac{1}{m}$
D. m
E. $-m$

29 The table below shows the centers and radii of two circles C_1 and C_2.

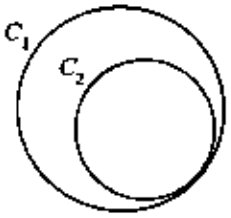
	Center	Radius
C_1	$(2,2)$	3
C_2	$(5,-2)$	2

Which of the following may represent the relative positions of C_1 and C_2 ?

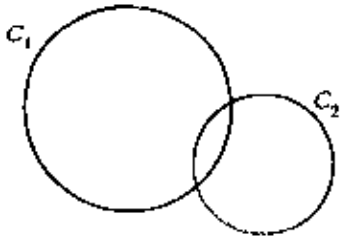
A.



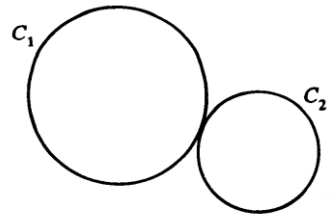
B.



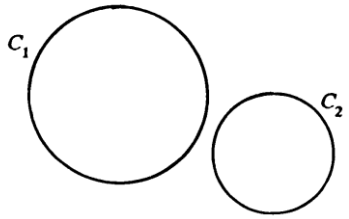
C.



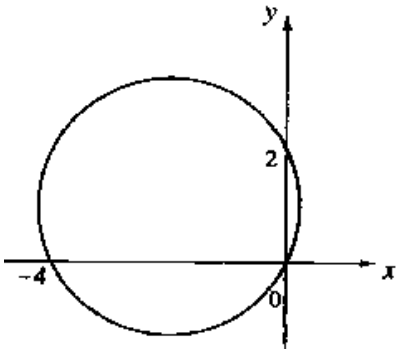
D.



E.



30 In the figure, the equation of the circle is



A. $x^2 + y^2 - 5 = 0$

B. $x^2 + y^2 - 2x + y = 0$

C. $x^2 + y^2 + 2x - y = 0$

D. $x^2 + y^2 - 4x + 2y = 0$

E. $x^2 + y^2 + 4x - 2y = 0$

31 In a shooting game, the probability that A will hit a target is $\frac{3}{5}$ and the probability that B will hit it is $\frac{2}{3}$. If each fires once, what is the probability that they will both miss the target?

A. $\frac{1}{3}$

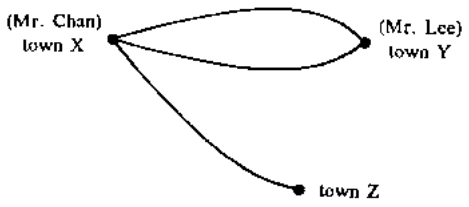
B. $\frac{1}{4}$

C. $\frac{2}{5}$

D. $\frac{2}{15}$

E. $\frac{11}{15}$

32 The figure shows that Mr. Chan has 3 ways to leave town X and Mr. Lee has 2 ways to leave town Y. Mr. Chan and Mr. Lee leave town X and town Y respectively at the same time. If they select their ways randomly, find the probability that they will meet on their way.



A. $\frac{1}{2}$

B. $\frac{1}{3}$ D. $\frac{1}{6}$

C. $\frac{2}{3}$ E. $\frac{5}{6}$

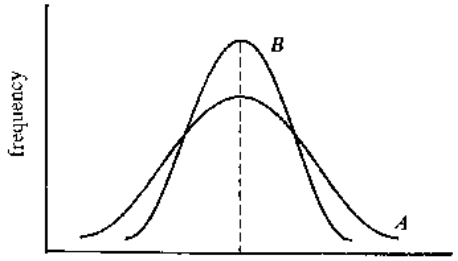
33 The mean of a set of 9 numbers is 12. If the mean of the first 5 numbers is 8, the mean of the other four numbers is

A. 4

B. 10 D. 17

C. 16 E. 25

34 The figure shows the frequency curves of two symmetric distributions *A* and *B*. Which of the following is/are true?



I. The mean of *A* = the mean of *B*.

II. The inter-quartile range of *A* > the inter-quartile range of *B*.

III. The standard deviation of *A* > the standard deviation of *B*.

A. I only.

B. I and II only

C. I and III only

D. II and III only

E. I, II and III

35 If $f(x)=\frac{x}{1-x}$, then $f\left(\frac{1}{x}\right)f(-x)=$

A. $-\frac{1}{2}$

B. -1 D. $\frac{x}{1-x^2}$

C. $-\frac{1-x}{1+x}$ E. $\frac{x}{x^2-1}$

36 Factorize $2a^{n+1}-7a^n-30a^{n-1}$.

A. $(a^n-6)(2a+5)$

B. $a^n(a+6)(2a-5)$

C. $a^n(a-6)(2a+5)$

D. $a^{n-1}(a+6)(2a-5)$

E. $a^{n-1}(a-6)(2a+5)$

37 Simplify $\frac{\left(\frac{y}{x}-1\right)\left(1-\frac{x}{y}\right)}{\frac{x}{y}-\frac{y}{x}}$.

A. $\frac{x-y}{x+y}$

B. $-\frac{x-y}{x+y}$ D. $-\frac{x+y}{x-y}$

C. $\frac{x+y}{x-y}$ E. -1

38 If $5^a=2^b=10^c$ and *a*, *b*, *c* are non-zero, then $\frac{c}{a}+\frac{c}{b}=$

A. $\frac{7}{10}$

B. 1 D. $\log 7$

C. 7 E. $\frac{1}{\log 2}+\frac{1}{\log 5}$

39 If α, β are the roots of the equation $x^2-4x-3=0$, then $\alpha^2+\alpha\beta+\beta^2=$

A. -13

B. 5 D. 16

C. 13 E. 19

40 Find the range of values of k such that the equation $x^2 + (k-2)x + 1 = 0$ has real roots.

A. $k = 4$

B. $0 < k < 4$

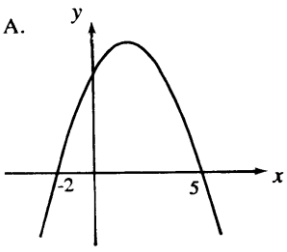
C. $0 \le k \le 4$

D. $k < 0$ or $k > 4$

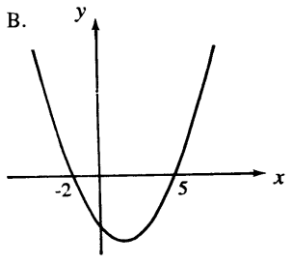
E. $k \le 0$ or $k \ge 4$

41 Which of the following may represent the graph of $y = -x^2 + 3x + 10$.

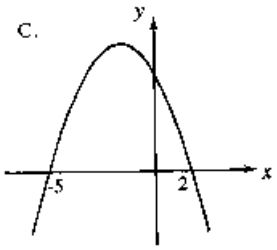
A.



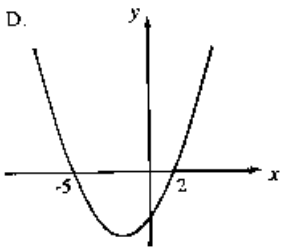
B.



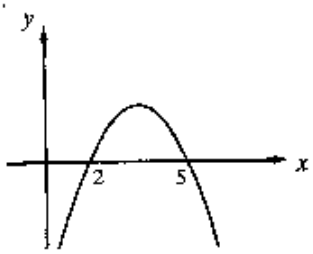
C.



D.



E.



42 In an A.S., the sum of the first 2 terms is 3 and the sum of the first 3 terms is 2. The common difference is

A. $-\frac{5}{3}$

B. -1

C. 1

D. $\frac{5}{3}$

E. $\frac{7}{3}$

43 If the geometric mean of two positive numbers a and b is 10, then $\log a + \log b =$

A. $\frac{1}{2}$

B. 1

C. 2

D. 10

E. 100

44 The marked price of a toy is \$120 and the percentage profit is 60%. If the toy is sold at a discount of 20%, the profit is

A. \$14.40

B. \$21.00

C. \$24.00

D. \$33.60

E. \$48.00

45 In the figure, O is the center of the circle. Find the area of the major segment ABC.

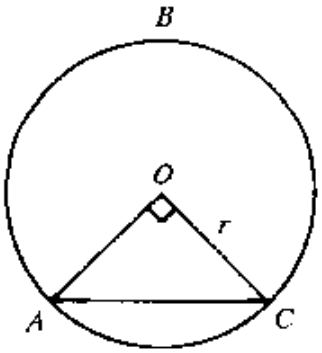
A. $\frac{\pi}{4}r^2$

B. $\frac{3\pi}{4}r^2$

C. $\left(\frac{\pi}{4} - \frac{1}{2}\right)r^2$

D. $\left(\frac{3\pi}{4} - \frac{1}{2}\right)r^2$

E. $\left(\frac{3\pi}{4} + \frac{1}{2}\right)r^2$



46 In the figure, C_1 and C_2 are two circles. If
area of region I : area of region II : area of region III
= 2 : 1 : 3,
then radius of C_1 : radius C_2 =

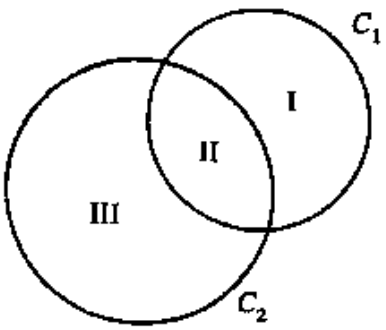
A. 9 : 16

B. 2 : 3

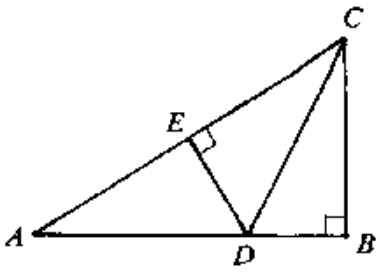
C. 3 : 4

D. $\sqrt{2}$: $\sqrt{3}$

E. $\sqrt{3}$: 2

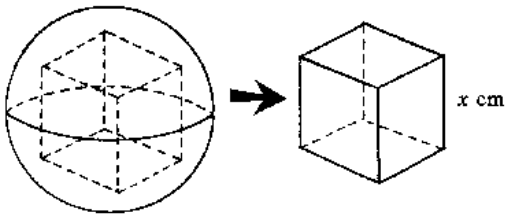


47 In the figure, $DE=DB$, $AC=13$ and $BC=5$. Area of ΔADE : Area of ΔACB =



A. 64 : 169
B. 5 : 13
C. 4 : 9
D. 8 : 13
E. 2 : 3

48 In the figure, a solid wooden sphere of radius 3cm is to be cut into a cube of side x cm. Find the largest possible value of x.

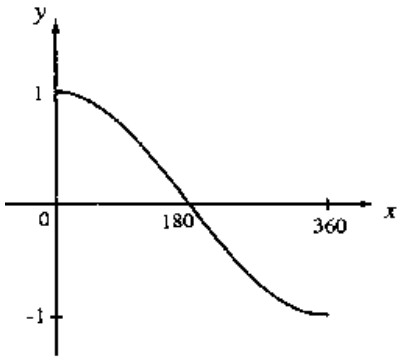


A. $3\sqrt{2}$
B. $2\sqrt{3}$
C. 3
D. $\frac{3}{2}\sqrt{2}$
E. $\sqrt{3}$

49 If $0° \le x \le 360°$, the number of points of intersection of the graphs $y = \sin x$ and $y = \tan x$ is

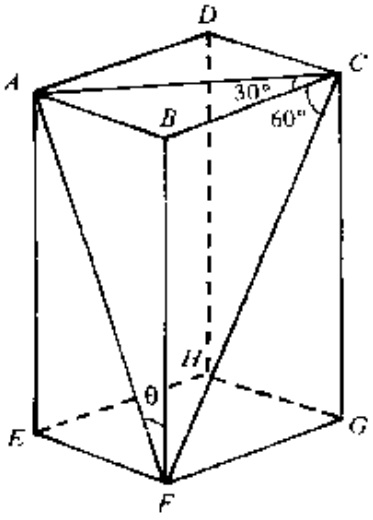
A. 1
B. 2
C. 3
D. 4
E. 5

50 The figure shows the graph of the function



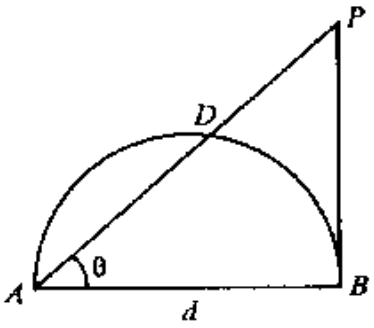
A. $y = \cos\frac{x°}{2}$
B. $y = \frac{1}{2}\cos x°$
C. $y = \cos x°$
D. $y = 2\cos x°$
E. $y = \cos 2x°$

51 In the figure, $ABCDEFGH$ is a cuboid. $\tan\theta$ =



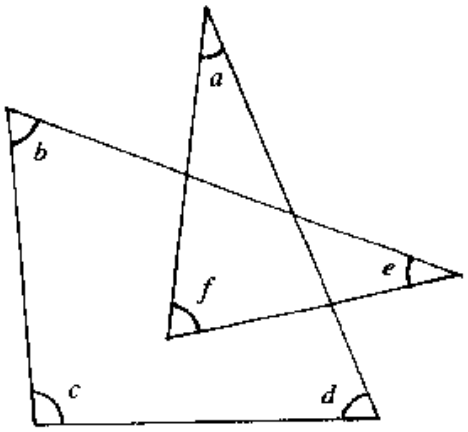
A. $\frac{1}{3}$
B. $\frac{1}{\sqrt{3}}$
C. 1
D. $\sqrt{3}$
E. 3

52 In the figure, PB touches the semicircle ADB at B. PD =



A. $\frac{d}{2\cos\theta}$
B. $d\sin\theta\tan\theta$
C. $\frac{d}{\sin\theta\tan\theta}$
D. $\frac{d\cos\theta}{\tan\theta}$
E. $\frac{d\tan\theta}{\cos\theta}$

53 In the figure, $a + b + c + d + e + f =$



A. $270°$

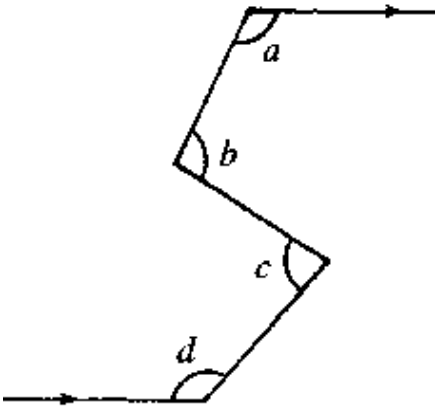
B. $360°$

C. $450°$

D. $540°$

E. $720°$

54 According to the figure, which of the following must be true?



A. $a+b=c+d$

B. $a+d=b+c$

C. $a+b+c+d=360°$

D. $a+b+c+d=540°$

E. $2a+2b-c-d=720°$

END OF PAPER