**MATH**

**PAPERMAKER10**

**LEVEL-I**

Q1. The angle subtend at the centre of a circle of radius 3 metres by an arc of length 1 metre is equal to

(a) 20°

(b) 60°

(c) 1/3 radian

(d) 3 radians

L1Difficulty1

Qtag Mathematics

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Q2. If for real values of x, Cos = x +

(a) is acute angle

(b) is right angle

(c) is obtuse angle

(d) No value of is possible

L1Difficulty1

Qtag Mathematics

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Q3. The incorrect statement is

(a) Sin = –

(b) Cos = 1

(c) Sec =

(d) tan = 20

L1Difficulty1

Qtag Mathematics

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Q4. Which one of the following is possible.

(a) tan = 45

(b) Cos =

(c) Sin =

(d) Sec =

L1Difficulty1

Qtag Mathematics

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Q5. If sec = m and tan = n then is

(a) 2

(b) 2m

(c) 2n

(d) mn

L1Difficulty1

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Q6. Which of following relations is correct?

(a) Sin 1 < Sin 1°

(b) Sin 1 > Sin 1°

(c) Sin 1 = Sin 1°

(d) Sin 1 = Sin 1°

L1Difficulty1

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Q7. tan 1.tan 2.tan3 ..................... tan 89

(a) 1

(b) 0

(c)

(d)

L1Difficulty1

Qtag Mathematics

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Q8. If Sin = 2 then Sin2 + Cosec2 is

(a) 1

(b) 4

(c) 2

(d) None

L1Difficulty1

Qtag Mathematics

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Q9. If Sin + Cos = 1, then Sin .Cos is

(a) 0

(b) 1

(c) 2

(d)

L1Difficulty1

Qtag Mathematics

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Q10. If 5 tan = 4, then is

(a) 0

(b) 1

(c)

(d) 6

L1Difficulty1

Qtag Mathematics

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**Solutions**

S1.Ans.(c)

Sol.

Given that radius (r) = 3m and arc (d = 1m)

Angle =

S2.Ans.(d)

Sol.

x + 2

Cos 0 not possible.

S3.Ans.(c)

Sol.

sec 1 hence (c) is correct.

S4.Ans.(a)

Sol.

tan = 45 is possible because tan is [0, )

S5.Ans.(a)

Sol.

=

=

=

= [ sec2 – tan2

= 2sec = 2.

S6.Ans.(b)

Sol.

The true relation is Sin 1 > Sin 1°. Since value of Sin is increasing

S7.Ans.a)

Sol.

tan 1.tan 2 .................... tan (90 – 46)

tan (90 – 47) ............. tan (90 – 1)

= 1

S8.Ans.(c)

Sol.

(Sin + Cosec )2 = 4

Sin2 + Cosec2 + 2.Sin. = 4

Sin2 + Cosec2 = 2

S9.Ans.(a)

Sol.

(Sin + Cos)2 = 1

1 + 2 Sin.Cos = 1

S10.Ans.(c)

Sol.

tan =

Sin = , Cos =

 =

**LEVEL-II**

Q1. If tan = – then Sin is

(a) – but not

(b) – or

(c) but not –

(d) None

L3Difficulty3

Qtag Mathematics

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Q2. If Sin = and tan = 1, then lies in which quadrant.

(a) first

(b) second

(c) third

(d) fourth

L3Difficulty3

Qtag Mathematics

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Q3. If + = , then

(a) tan2x =

(b) + =

(c) tan2x =

(d)

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q4. If Sin x + Sin y = 3 (Cos y – Cos x), then the value of is

(a) 1

(b) –1

(c) 0

(d) None

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q5. If cos2 + sin + 1 = 0 lies in quadrant.

(a)

(b)

(c)

(d)

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q6. If sin x = then the value of tan x is

(a)

(b)

(c)

(d) None

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q7. If < a < , then is

(a) 1 + cot a

(b) –1 – cot a

(c) 1 – cot a

(d) –1 + cot a

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q8. If sin x + cosec x = 2, then sinn x + cosecnx is

(a) 2

(b) 2n–1

(c) 2n

(d) 2n–2

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q9. If cos6 a + sin6 a + K sin2 2a = 1, then K =

(a)

(b)

(c)

(d) 2

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q10. If A + C = B then tan A tan B tan C =

(a) tan A tan B + tan C

(b) tan B – tan C – tan A

(c) tan A + tan C – tan B

(d) – (tan A tan B + tan C)

L3Difficulty3

Qtag Mathematics

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**Solutions**

S1.Ans.(b)

Sol.

Cosec2 = 1 + Cot2 = 1 + =

Sin = tan = (ii) or (iv) quadrant.

S2.Ans.(c)

Sol.

Sin is (–)ive in IIIrd and IVth quadrant

tan is (+)vies IIIrd and Ist quadrant.

S3.Ans.(b)

Sol.

 + =

(5 Sin2 x – 2)2 = 0

Sin2 x = , Cos2 x =

S4.Ans.(b)

Sol.

sin x + sin y = 3 (cos y – cos x)

sin x + 3 cos x = 3 cos y – sin y

r cos (x – ) = r cos (y + )

where r = , tan =

x – = ± (y + )

x = –y

x + y = 2

 = –1

S5.Ans.(d)

Sol.

(sin + 1) (sin + 2) = 0

sin = –1

 =

 =

S6.Ans.(b)

Sol.

cos x = =

tan x =

S7.Ans.(c)

Sol.

 = =

But < a < cot a < – 1 1 + cot a < 0

Hence,

S8.Ans.(a)

Sol.

sin x + cosec x = 2 (sin x – 1)2 = 0 sin x = 1, sinn x + cosecn x = 1 + 1 = 2.

S9.Ans.(b)

Sol.

Since cos6 a + sin6 a + K sin2 2a = 1 using formula a3 + b3 = (a + b)3 – 3ab (a + b) and on solving, we get the required i.e., K = .

S10.Ans.(b)

Sol.

B = A + C tan B = tan (A + C)

 tan B =

 tan A tan B tan C = tan B + tan A – tan C

**LEVEL-III**

Q1. If x = sin 130° cos 80°, y = sin 80° cos 130°, z = 1 + xy, which one of the following is true

(a) x > 0, y > 0, z > 0

(b) x > 0, y < 0, z > 1

(c) x > 0, y < 0, 0 < z < 1

(d) x < 0, y < 0, 0 < z < 1

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q2. + (n even or odd) =

(a) 2 tann

(b) 2 cotn

(c) 0

(d) None of these

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q3. If 2 sec 2a = tan + cot , then one of the values of a + is

(a)

(b)

(c)

(d) 2

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q4. is

(a) cot 7

(b) sin 7

(c) sin 15°

(d) cos 15°

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q5. If tan (A+B) = p, tan (A – B) = q, then the value of tan 2A in terms of p and q is

(a)

(b)

(c)

(d)

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q6. If f(x) = cos2x + sec2x, then

(a) f(x) < 1

(b) f(x) = 1

(c) 1 < f(x) < 2

(d) f(x) 2

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q7. The number of distinct solutions of the equation cos2 2x + cos4x + sin4x + cos6x + sin6x = 2 in the interval is

(a) 1

(b) 5

(c) 8

(d) 6

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q8. The maximum value of the expression is

(a) 2

(b) 4

(c) 6

(d) 8

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q9. Let P = { and Q = be two sets then

(a) PQ and Q – P

(b) Q P

(c) P Q

(d) P = Q

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q10. Cos ( and cos ( = where [– pairs of which satisfy both the equation is

(a) 0

(b) 1

(c) 2

(d) 4

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

**Solutions**

S1.Ans.(b)

Sol.

x = sin 130° cos 80°, y = sin 80° cos 130° x = cos 40° cos 80°, y = sin 80° sin 40 °

So, x > 0 and y < 0 and xy < 0

Now, z = 1 + xy 0 < z < 1

S2.Ans.(c)

Sol.

The expression reduced to cotn + cotn

If n is odd, answer = C

S3.Ans.(a)

Sol.

The given equation may be written as

 = + =

S4.Ans.(a)

Sol.

We have, cot A = =

Putting A = 7 cot 7 =

S5.Ans.(c)

Sol.

2A = (A + B) + (A – B)

 tan 2A =

S6.Ans.(d)

Sol.

Sine 0, × , we have

x2 + 2

Hence, f(x) = cos2 x + 2

S7.Ans.(c)

Sol.

= 8

 cos2 2x + cos4x + sin4x + cos6x + sin6x = 2

 cos22x – 5 cos2x sin2x = 0

 tan2 2x = 1, where 2x [0, 4

Number of solutions = 8

S8.Ans.(a)

Sol.

 lies between to

maximum value is 2.

S9.Ans.(d)

Sol.

sin =

tan = + 1

set Q

tan =

P = Q

S10.Ans.(d)

Sol.

cos( =1

so that cos() =

 =

2

 can be satisfied by 4 sets of values.