Maths (Class X) 2019-20 / PRACTICE EXAM [BASIC]

1. Multiple choice Questions :— (10 × 1 = 10)

(a) $\sqrt{5}$ is —

(i) Rational (ii) Irrational (iii) Natural (iv) Whole

(b) Zeros of polynomial $x^2+7x+10$ are —

(i) 5, 2 (ii) −2, 5 (iii) −2, −5 (iv) −5, 2.

(c) On dividing $2x^2+3x+1$ by $x+2$, the remainder is —

(i) 4 (ii) 5 (iii) −2 (iv) 3

(d) Roots of quadratic eqn $2x^2-2\sqrt{2}x+1=0$ are —

(i) $\sqrt{2}, \frac{1}{\sqrt{2}}$ (ii) $\sqrt{2}, \sqrt{2}$ (iii) $\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}$ (iv) $\frac{-1}{\sqrt{2}}, \frac{-1}{\sqrt{2}}$.

(e) If in an A.P. $a=7$, $d=3$, $n=8$ then $a_n=$

(i) 27 (ii) 28 (iii) −28 (iv) 15

(f) ABC and BDE are two equilateral triangles such that D is the mid point of BC. Ratio of areas of Δ ABC and Δ BDE is —

(i) 2:1 (ii) 1:2 (iii) 4:1 (iv) 1:4

(g) 7^{th} term of the AP. 2, 4, 6, - - - -

(i) 15 (ii) 14 (iii) 10 (iv) 18.

(h) Distance between (2,3) and (4,1) is —

(i) 2 (ii) $\sqrt{2}$ (iii) $2\sqrt{2}$ (iv) $2/\sqrt{2}$

(i) If $\sin A = \frac{2}{5}$ then value of $\tan A$ →

(i) $\sqrt{21}$ (ii) $5/\sqrt{21}$ (iii) $5\sqrt{21}$ (iv) $\sqrt{12}$

(j) Area of sector of angle p (in degrees) of a circle with radius R is —

(i) $\frac{p}{180} \times \pi R^2$ (ii) $\frac{p}{180} \times 2\pi R$ (iii) $\frac{p}{270} \times \pi R$ (iv) $\frac{p}{720} \times 2\pi R^2$

② Very Short Answer type question — (10 × 1 = 1

ⓐ Find the distance between the points (0,0) and (36,

· ~~Can you find the distance between the~~

ⓑ In ΔABC. if $\sin A = \frac{3}{4}$ Calculate $\cos A$ and $\tan A$.

ⓒ How many tangents can a circle have?

ⓓ Complete the AP. —

$8, \ 6, \ 4, \ \square, \ 0, \ \square, \ \square.$

ⓔ $\dfrac{\sin 18^\circ}{\cos 72^\circ}$

ⓕ A tangent to a circle intersect it in how many points.

ⓖ Find the area of sector of angle θ of a circle whose radius is r units.

ⓗ If perimeter and the area of circle are numerically equal, then find the radius of circle.

ⓘ Find common difference of A.P. →

$-1.2, -3.2, -5.2, -7.2, ----$

ⓙ Find HCF of 96 and 404 by prime factorisation method.

③ Short Answer type questions — (6 × 2 = 12)

ⓐ Solve the pair of linear equation by the elimination method and the substitution method —

$x + y = 5$ and $2x - 3y = 4$.

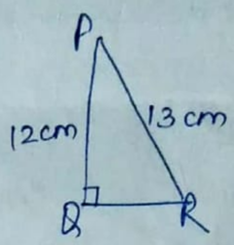
ⓑ Represent the situation in the form of quadratic equation — The ~~area~~ product of two consecutive positive integers is 306. We need to find the integers.

ⓒ Check whether -150 is a term of AP : $11, 8, 5, 2, ----$

(d) E and F are points on the side PQ and PR respectively of a ΔPQR, then for $PE = 3.9$ cm, $EQ = 3$ cm, $PF = 3.6$ cm and $FR = 2.4$ cm, state whether $EF \parallel QR$.

(e) Determine if the points $(1, 5)$, $(2, 3)$ and $(-2, -11)$ are collinear.

(f) In fig., find $\tan P - \tan R$



SEC-C

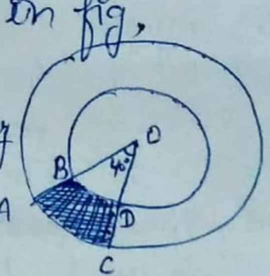
(4) Long Answer Questions — $(8 \times 3 = 24)$

(a) if $\cot\theta = \frac{7}{8}$, evaluate: $\frac{(1+\sin\theta)(1-\sin\theta)}{(1+\cos\theta)(1-\cos\theta)}$

(b) The angle of elevation of top of tower from a point on ground, which is 30 m away from the foot of tower, is 30°. Find the height of tower.

(c) Tangents PA and PB from a point P to a circle with centre O and inclined to each other at an angle of 80°, then ~~∠POA~~ find $\angle POA$.

(d) Find the area of shaded region in fig, if radii of two consentric circles with centre O are 7cm and 14cm respectively and $\angle AOC = 40°$.



(e) Use Euclid's division lemma to show that the cube of any positive integer is of the form $9m$, $9m+1$, $9m+8$.

(f) Find all the zeroes of $2x^4 - 3x^3 - 3x^2 + 6x - 2$, if you know that two of the zeros are $\sqrt{2}$ and $-\sqrt{2}$.

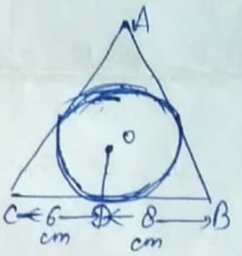
(g) The cost of 2kg of apples and 1 kg of grapes on a day was found to be ₹160. After a month, the cost of 4kg of apples and 2kg of grapes is ₹300. Represent the situation algebraically and graphically.

(h) The length of tangents drawn from an external point to a circle are equal.

5→ Sec-D (6×4=24)

(a) Draw a line segment AB of 8 cm. Taking A as centre, draw a circle of radius 4cm. Now taking B as centre draw a circle of radius 3cm. Construct tangents to each circle from the centre of the other circle.

(b) A triangle ABC is drawn to circumscribe a circle of radius 4cm such that the segment BD and DC into which BC is divided by the point of contact D are of lengths 8cm and 6cm respectively. Find the sides AB and AC

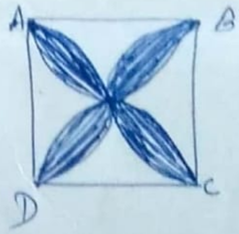


(c) $(\operatorname{cosec}A - \sin A).(\sec A - \cos A) = \frac{1}{\tan A + \cot A}$, Prove it.

(d) In a school, student thought of planting trees in and around the school to reduce air ~~pollu~~ pollution. It was decided that the number of trees, that each section of each class will plant, will be the same as the class, in which they are studying, e.g., a section of ~~each~~ class I will plant 1 tree, a section of class II will plant 2 trees and so on ~~#~~ till class XII. There are three section of each class. How many trees will be planted by the student?

(e) A boat goes 30 km upstream and 44 km downstream in 10 hours. In 13 hours, it can go 40 km upstream. Determine the speed of stream and that of the boat in still water.

(f) Find the area of the shaded region in fig. where ABCD is a square of side 10 cm and semicircles are drawn with each side of square as diameter (use $\pi = 3.14$)



(4)

Class X [Maths (Basic)] Marking Scheme

Max. Marks – 80 | Duration – 3 hrs

S.No.	Answers	Marks
1 (a)	(ii) Irrational Number	1
1 (b)	(iii) $-2, -5$	1
1 (c)	(iv) 3	1
1 (d)	(iii) $\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}$	1
1 (e)	(ii) 28	1
1 (f)	(iii) 4 : 1	1
1 (g)	(ii) 14	1
1 (h)	(iii) $2\sqrt{2}$	1
1 (i)	(ii) $5/\sqrt{21}$	1
1 (j)	(iv) $\frac{p}{720} \times 2\pi R^2$	1
2 (a)	$\sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$	1/2
	$\sqrt{(36-0)^2 + (15-0)^2}$ 39	1/2
2 (b)	$\cos A = \frac{\sqrt{7}}{4}$	1/2
	$\tan A = \frac{3}{\sqrt{7}}$	1/2
2 (c)	Circle have infinite tangents.	1

2(d)	2	1/3
	−2	1/3
	−4	1/3.
2(e)	1	1
2(f)	Intersect at only one point	1
2(g)	$\pi r^2 \cdot \frac{\theta}{360°}$	1
2(h)	perimeter of circle = Area of circle	(1/2)
	$2\pi r = \pi r^2$	
	$r = 2$ units	1/2
2(i)	$d =$ ~~ff~~ second term − first term	1/2
	$d = -3.2 + 1.2$	
	$d = -2.0$	1/2
2(j)	$96 = 2^5 \times 3$	1/2
	$404 = 2^2 \times 101$	
	H.CF $= \boxed{2^2} = \boxed{4}$	1/2
3(a)	$2x+2y=10$	
	$\underline{\overset{-}{}2x \overset{+}{-} 3y = \overset{-}{}4}$	
	$5y = 6$	
	$\boxed{y = 6/5}$	1
	$x = 5-y = 5-\frac{6}{5} = \boxed{\frac{19}{5}}$	
	and	
	$x = 5-y$	
	~~2x+2(5-y)y~~ $= 2(5-y)-3y=4$	1
	$10-2y-3y=4$	
	$y = 6/5$	

3(b) $x \times (x+1) = 306$

$\cancel{2x + x = 306}$

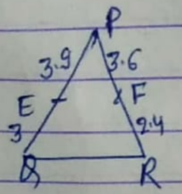
$x^2 + x - 306 = 0$ 1

$x = -18, 17.$ 1.

3(c) $T_n = a + (n-1)d$ 1

not a term of AP 1

3(d)



1

$\frac{PE}{EQ} \neq \frac{PF}{FR}$ so $EF \not\parallel QR$ 1

3(e) area of triangle $= 0$ 1

$\frac{1}{2}[(x_1)(y_2-y_3) + (x_2)(y_3-y_1) + x_3(y_1-y_2)]$

the points are not collinear 1.

3(f) By using Pythagorus theorem, $PR^2 = PQ^2 + QR^2$

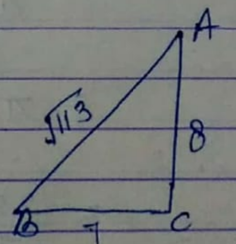
$169 = 144 + QR^2$

$QR^2 = 25$

$QR = 5$ 1

$\tan P - \tan R = \frac{-119}{60}$ 1

4(a) $\cot\theta = \frac{7}{8}$



By Pythagorus Theorem, $(AB)^2 = (AC)^2 + (BC)^2$ 1

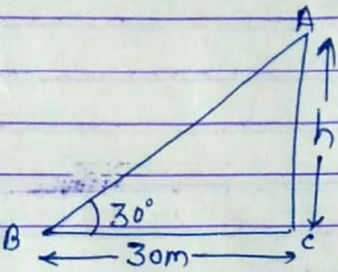
$(AB)^2 = 64 + 49 = 113$

$AB = \sqrt{113}$

$\sin\theta = \frac{8}{\sqrt{113}}$, $\cos\theta = \frac{7}{\sqrt{113}}$ 1

$$\frac{(1+\sin\theta)\ (1-\sin\theta)}{(1+\cos\theta)\ (1-\cos\theta)} = \frac{49}{64}$$ 1

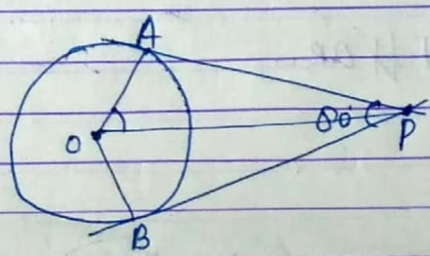
4(b)



1

$h = 10\sqrt{3}\ m$ 2

4(c)



1

firstly prove $\Delta OAP \cong \Delta OPB$.

$\angle OPA = \frac{1}{2} \angle BPA = 40^\circ$ 1

In ΔOPA

$\angle AOP + \angle OPA + \angle OAP = 180^\circ$

$\angle POA + 40 + 90 = 180^\circ$

$\angle POA = 50^\circ$ 1

4(d) Area of shaded Part = area of sector OAC − area of sector OBD 1

$$= \pi r_1^2 \cdot \frac{\theta}{360} - \pi r_2^2 \cdot \frac{\theta}{360}$$

$$= \frac{22}{7} \times \frac{\cancel{40}}{\cancel{360}_{9}} \left((14)^2 - (7)^2\right)$$

$$= \frac{22}{63}(196 - 49) = \frac{154}{3}\ cm^2$$ 2

4(e) Consider x as positive Integer and of the

$x = 3m,\ 3m+1,\ 3m+2$ — 1

when $x = 3m$
$x^3 = 9m$
when $x = 3m+1$
$x^3 = 9m+1$
when $x = 3m+2$
$x^3 = 9m+8$

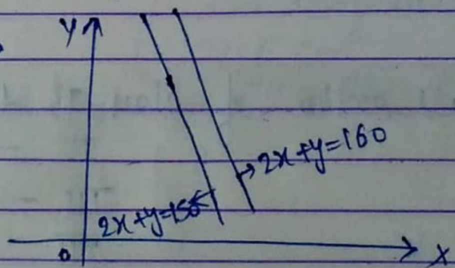
(by using $a = bq + r$ where $q \geq 0,\ 0 \leq r < b$.) — 2

4(f) $x = 1/2$ — $1\frac{1}{2}$

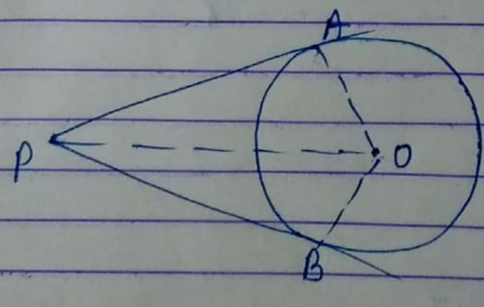
$x = 1$ — $1\frac{1}{2}$

4(g) Algebraically → $2x + y = 160$
$4x + 2y = 300$ — $1\frac{1}{2}$

Graphically → — $1\frac{1}{2}$



4(h)



1

$\Delta OPA \cong \Delta OPB$ — 1

$PQ = PR$ (CPCT) — 1

5(a) Construction of figure — 2

Steps of Construction — 2

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5(b) AC = 6 + x
AB = 8 + x. 1

Area of ΔABC = Area of ΔOAC + Area of ΔOBC + Area of ΔOAB. 2

$\sqrt{48(x^2+14x)} = (2x+12) + 28 + (2x+16)$

$x = 7$, $x = (-14)$ = neglect

AB = 15 cm
AC = 13 cm 1

5(c) LHS. SinA CosA 2
RHS. SinACosA 2
LHS = RHS.

5(d) from all section of class I trees are 3
II ——— 6
III ——— 9
XII 36

Series ⇒ 3, 6, 9, 12, - - - - - 36 1

$T_n = a + (n-1) \cdot d$
$36 = 3 + (n-1)3$
$n = 12$ 1

~~5(e)~~ $S_n = \frac{n}{2}[2a+(n-1)d]$

$S_n = 234$ 2

5(e) Time = $\frac{\text{distance}}{\text{speed}}$

$\frac{30}{x-y} + \frac{44}{x+y} = 10$, $\frac{40}{x-y} + \frac{1}{x+y}$ 2

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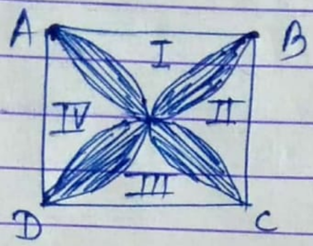
$x = 8$, $y = 3$. 2

where x is speed of boat in still water

y is speed of stream.

5(f)



Area of shaded region = Area of ABCD − Area of (I+II+III+IV).

Area of I + Area of III = Area of ABCD − Areas of two semicircles.

= 21.5 cm^2 1

Area of II + Area of IV = Area of ABCD − Areas of two semicircles.

= 21.5 cm^2 1

Now Area of shaded region = 57 cm^2 2