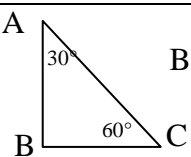


Mathematics Department
Grade 9

I - (2.5 points)

Choose the correct answer .Justify your Choice.

	Question	a	b	c
1.	$x^2 - x - 1 = 0$ has as a root:	1	$\frac{1+\sqrt{5}}{2}$	0
2.	$x^2 - x - 6$ is written as	$(x+2)(x-3)$	$(x-2)(x-3)$	$(x+3)(x-2)$
3.	$P(x) = (2m+n)x - 2n+4$ is identical to zero when	$m=0$ & $n=0$	$M=0$ or $n=0$	$m= - 1$ & $n=2$
4.	A certain price was reduced by 25% and then by 25% on the last price. The total reduction was	= 50%	>50%	< 50%
5.	 $BC = a$ so $AB =$	$a\sqrt{3}$	$2a$	$\frac{1}{2} a$

II – (2 points)

Given: $X = \sqrt{3} - \sqrt{7}$; $Y = \sqrt{10 - 2\sqrt{21}}$;
 $Z = \frac{1}{(\sqrt{7} + 2)} + \frac{1}{(\sqrt{7} - 2)}$; $T = \frac{14}{(3\sqrt{7})}$

Show that

- $X = - Y$
- $Z = T$

III – (2 points)

Given :

$$A = \frac{7}{9} + \frac{2 - 2 \times 3}{3 - 3 \times 7} ; B = \frac{-2 \times 10^{-3} \times 0.25 \times 10^6}{50 \times 10^5 \times (-0.01) \times 10^{-2}} ; C = \frac{-2 + x\sqrt{10}}{\sqrt{45} + \sqrt{8} - \sqrt{18}}$$

- Show that: $A = B$.
- Calculate C so that the table to the right is proportional.
- Deduce the value of x.

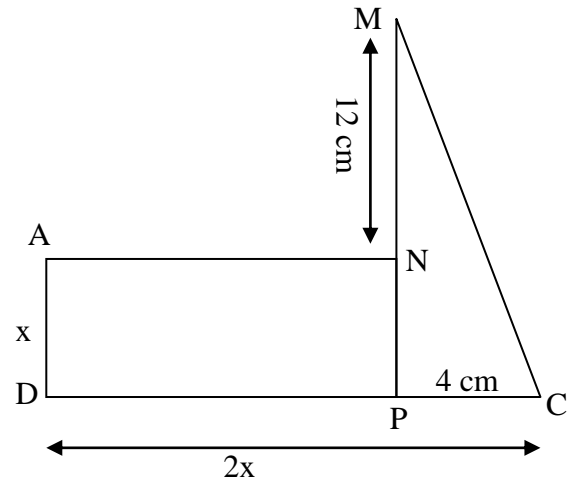
A	$\frac{1}{\sqrt{2}}$
A + B	C

VI – (4 points)

A) Let $A = 2(x+3)(x-4)$ & $B = (2x+3)^2 - (x+1)^2$

1. Show that $A = 2x^2 - 2x - 24$
2. Factorize B.
3. Solve : $A = 0$ and $B = 0$

B) Calculate x if the area of the rectangle ANPD is equal to the area of the triangle MPC.??????????



V – (4.5 points)

In an orthonormal system consider the two points A (1; 5) and B (1; 2) and the two lines (d) and (d') defined by: (d): $y = 2x + 3$ and (d'): $y = x + 1$

1. Locate A; B; (d) and (d') on the orthonormal system.
2. Verify by calculation that A belongs to the line (d) and B belongs to the line (d').
3. Find the equation of the line (AB).
4. Let J be the midpoint of [AB]. Calculate the coordinates of J.
5. (d) and (d') cut (y'y) in M and N respectively. Calculate the coordinates of M and N.
6. (d) and (d') intersect at I.
 - i. Verify that the coordinates of I are (-2; -1).
 - ii. Show that $\frac{IN}{IB} = \frac{2}{3}$
7. Find the equation of (d₁) passing through I and parallel to (OJ).

VI – (5 points)

Consider a circle (C) of center O and radius R and diameter [AB]. (D) is the tangent at B to the circle (C). M is any point on line (D). The perpendicular from the point A to (AM) cuts (D) at N.

1. Draw the figure
2. Show that $BM \times BN = 4R^2$.
3. The parallel from O to (AN) cuts [AM] in E and [BN] in F.
 - i. Show that F is the midpoint of [BN].
 - ii. Show that the two triangles AOE and AMB are similar.
 - iii. Deduce that $AE \times AM = 2R^2$.
 - iv. Show that (OM) is perpendicular to (AF).
4. Let I be the midpoint of [OM].
 - i. Show that the four points O, B, M, E belong to the same circle of center I.
 - ii. Suppose that M moves on line (D). Find the locus of point I.