Delhi Public School, Jammu

Question Bank for Half-Yearly Exam (2018-19)

Subject: Mathematics
Class: 9th

Lines and Angles

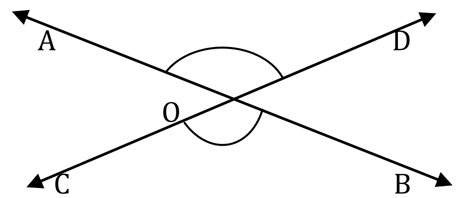
1. Prove that if two lines intersect, then the vertically opposite angles are equal.

Sol: Let lines AB and CD intersect at O.

We have to prove: $\angle AOD = \angle BOC$ and $\angle AOC = \angle BOD$

Proof:

Since, ray OA stands on line CD.



$\Rightarrow \angle AOC + \angle AOD = 180°$ ------1.

Again since, ray OC stands on line AB

$\Rightarrow \angle AOC + \angle BOC = 180°$ ------2.

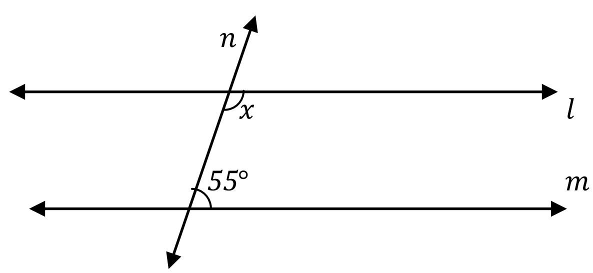
From 1st and 2nd, we have

$\angle AOC + \angle AOD = \angle AOC + \angle BOC$

$\angle AOD = \angle BOC$

Similarly, we can prove that $\angle AOC = \angle BOD$

2. Find the value of x for which the line l *and* m are parallel.

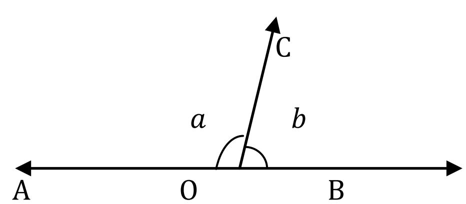


Sol: Two lines are parallel when angles on the same side of transversal are supplementary.

$x + 55° = 180°$

$\Rightarrow x = 180° - 55° = 125°$

3. In $\angle AOC$ *and* $\angle BOC$ form a linear pair. If $a - b = 20°$, find the value of a and b.



Sol: $a + b = 180°$ $(linear\ pair)$ $----1.$

$a - b = 20°$ $(given)$ $----2.$

Adding 1st and 2nd, we get

$2a = \ a = 100°$ $or\ a = 100°$

And $b = 80°$

4. If $+y = w + z$, then prove that AOB is a line.

Sol: As sum of all angles about a point is 360°

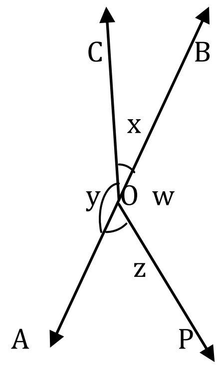
Therefore, $x + y + w + z = 360°$

$(x + y) + (w + z) = 360°$

As $x + y = w + z$

So, $2x + 2y = 360°$ $or\ x + y = 180°$

This shows that AOB is a straight line.



5. In a fig, AB∥ CD. Determine x.

Sol: Through O, draw a line l parallel to both AB and CD.

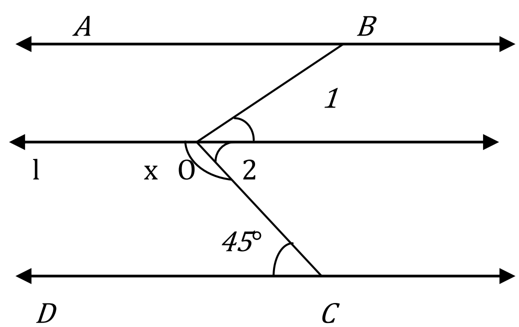
$\angle 1 = \angle AOB = 30°$ *(Alternate interior angles)*

$\angle 2 = \angle DCO = 45°$ *(Alternate interior angtles)*

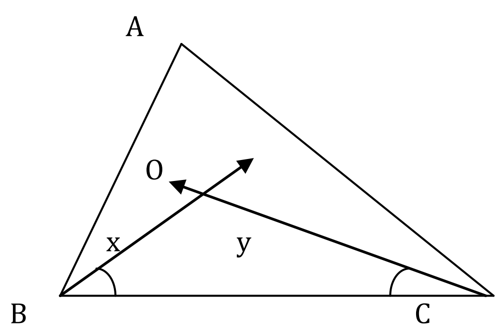
$\angle BOC = \angle 1 + \angle 2$

$\angle BOC = 30 + 40°$ $= 75°$

$So, \angle x = 360° - 75° = 285°$



6. If in ΔABC, the bisectors of $\angle B\ and\ \angle C$ intersect each other at O. Prove that $\angle BOC = 90° + \frac{1}{2}\angle A$.



sol: Let $\angle B = 2x\ and\ \angle C = 2y$

∵ OB and OC bisects $\angle B\ and\ \angle C$ respectively.

$\therefore \angle BOC = \frac{1}{2}\angle B = \frac{1}{2} \times 2x = x$

and $\angle OCB = \frac{1}{2}\angle C = \frac{1}{2} \times 2y = y$

Now, in ΔBOC, we have

$\angle BOC + \angle OBC + \angle OCB = 180°$

$\angle BOC + x + y = 180°$

or $\angle BOC = 180° - (x + y)$ -------------------1.

Now in ΔABC, we have

$\angle A + \angle B + \angle C = 180°$

$\angle A + 2x + 2y = 180°$

or $2(x + y) = 180° - \angle A$

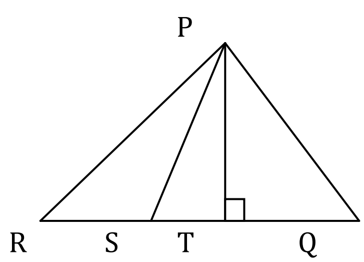
$x + y = \frac{1}{2}(180° - \angle A)$ -----------------2.

From 1st and 2nd, we have

$\angle BOC = 180° - (x + y) = 180° - \frac{1}{2}(180° - \angle A)$

$\angle BOC = 90° + \frac{1}{2}\angle A$

7. In the figure, PS is the bisector of $\angle QPR$; $PT \perp RQ$ and $Q > R$. Show that $\angle TPS = \frac{1}{2}(\angle Q - \angle R)$.



sol: Since PS is the bisector of $\angle QPR$

$\therefore \angle QPS = \angle RPS = x\ (say)$

In ΔPRT, we have

$\angle PRT + \angle PTR + \angle RPT = 180°$

$\angle PRT + 90° + \angle RPT = 180°$

$\angle PRT + \angle RPS + \angle TPS = 90°$

$\angle PRT + x + \angle TPS = 90°$ $(\angle RPS = x)$

$\angle PRT = \angle R = 90° - \angle TPS - x$ ----------------------------------1.

In ΔPQT, we have

$\angle PQT + \angle PTQ + \angle QPT = 180°$

$\angle PQT + 90° + \angle QPT = 180°$

$\angle PQT + \angle QPS - \angle TPS = 90°$

$\angle PQT + x - \angle TPS = 90°$ $\qquad\qquad (\angle QPS = x)$

$\angle PQT = \angle Q = 90° + \angle TPS - x$ $\qquad$ ---------------------------- 2.

Subtracting 1st from 2nd, we have

$\angle Q - \angle R = (90° + \angle TPS - x) - (90° - \angle TPS - x) = 2\angle TPS$

$2\angle TPS = \angle Q - \angle R$

$\angle TPS = \frac{1}{2}(\angle Q - \angle R)$

EUCLID'S GEOMETRY

Q1. If a point 'C' lies between two points 'A' and 'B' such that AC=BC then prove that AC=$\frac{1}{2}$ AB. Explain by drawing fig.

sol: Given: AC=BC

To Prove: AC=$\frac{1}{2}$ AB

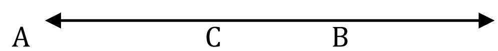
Proof:-AC=BC

Adding AC to both sides

AC+AC= BC+AC

2AC = AB

AC=$\frac{1}{2}$ AB



Q2. In a fig . If AC=BD then prove that AB= CD.

Sol: Given AC=BD

To Prove AB= CD

Proof: AC= BD

Subtracting BC on both sides, we get

AC-BC= BD-BC (by Euclid's Axiom 3)

Therefore AB=CD

Q3. Why is Axiom 5,in the list of Euclid's Axiom considered a 'universal truth'?

Ans: We know that whole number is always greater than a part.

Q4. Thales belong to the country

a) babylonia $\qquad$ b)Egypt $\qquad$ c) Greece $\qquad$ d) Rome

Ans : Greece

Q5: A pyramid is a solid figure, the base of which is

a) only a triangle $\qquad$ b) only a Square

c) only a rectangle $\qquad$ c) Any polygon

Ans: only a rectangle

Real Numbers

1. If $a = 3 + 2\sqrt{2}$, then find the value of $a^2 + \frac{1}{a^2}$

sol: $a = 3 + 2\sqrt{2}$ and $\frac{1}{a} = \frac{1}{3+2\sqrt{2}}$

$\frac{1}{a} = \frac{1}{3+2\sqrt{2}} \times \frac{3-2\sqrt{2}}{3-2\sqrt{2}} = \frac{3-2\sqrt{2}}{9-8} = 3 - 2\sqrt{2}$

$a + \frac{1}{a} = 3 + 2\sqrt{2} + 3 - 2\sqrt{2} = 6$

$\left(a + \frac{1}{a}\right)^2 = a^2 + \frac{1}{a^2} + 2$

Putting the value of $a + \frac{1}{a}$, we get

$6^2 = a^2 + \frac{1}{a^2} + 2$

$a^2 + \frac{1}{a^2} = 36 - 2 = 34$

2. Simplify: $\left[9\left(64^{1/3} + 125^{1/3}\right)^3\right]^{\frac{1}{4}}$

sol: $\left[9\left(64^{1/3} + 125^{1/3}\right)^3\right]^{\frac{1}{4}}$

$=\left[9\left((4^3)^{1/3} + (5^3)^{1/3}\right)^3\right]^{\frac{1}{4}}$

$=[9(4+5)^3]^{1/4}$

$= (9 \times 9^3)^{1/4} = (9^4)^{1/4} = 9$

3. Simplify: $\sqrt[4]{81} - 8\sqrt[3]{216} + 15\sqrt[5]{32} + \sqrt{225}$

sol:

$\sqrt[4]{81} - 8\sqrt[3]{216} + 15\sqrt[5]{32} + \sqrt{225}$

$= (3^4)^{1/4} - 8(6^3)^{1/3} + 15(2^5)^{1/5} + (15^2)^{1/2}$

$= 3 - 48 + 30 + 15 = 48 - 48 = 0$

4. Express $0.\overline{6}$ in the form of $\frac{p}{q}$, where p and q are integers and $q \neq 0$

sol:

Let $x = 0.\overline{6}$, then x=0.666..... -----1.

10x=6.666..... -----2.

subtract 1st from 2nd, we get

9x=6

$\Rightarrow$ x=6/9

x=2/3

5. Find three rational number $\frac{5}{7}$ *and* $\frac{6}{7}$.

sol:

we have $\frac{5}{7} = \frac{5\times4}{7\times4} = \frac{20}{28}$ *and* $\frac{6}{7} = \frac{6\times4}{7\times4} = \frac{24}{28}$

therefore, three rational number between $\frac{5}{7}$ *and* $\frac{6}{7}$ are $\frac{21}{28}, \frac{22}{28}$ *and* $\frac{23}{28}$

6. Rationalise; $\frac{1}{7+5\sqrt{2}}$

sol: $\frac{1}{7+5\sqrt{2}}$

$=\frac{1}{7+5\sqrt{2}} \times \frac{7-5\sqrt{2}}{7-5\sqrt{2}}$

$= \frac{7-5\sqrt{2}}{7^2-\left(5\sqrt{2}\right)^2}$

$= \frac{7-5\sqrt{2}}{49-50} = \frac{7-5\sqrt{2}}{-1}$

$= -7 + 5\sqrt{2}$

7. Simplify; $\sqrt[12]{(x^4)^{1/3}}$

sol:

$\sqrt[12]{(x^4)^{1/3}}$

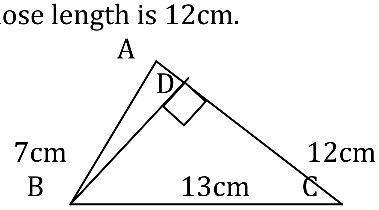
$= \left[(x^4)^{1/3}\right]^{1/12}$

$= (x)^{4\times\frac{1}{3}\times\frac{1}{12}} = x^{1/9}$

8. Is the number $(3-\sqrt{7})(3+\sqrt{7})$ rational or irrational?
sol:
Given number is;
$(3-\sqrt{7})(3+\sqrt{7})$
= $3^2-(\sqrt{7})^2$
$= 9-7 = 2$, which is rational.

Heron's Formula

1. Find the areas of trapezium whose parallel sides are 25cm and 13cm long and distance between them is 8cm.
sol: Area of trapezium= $\frac{1}{2}(sum\ of\ parallel\ side\ ) \times height$
$= \frac{1}{2} \times (25+13) \times 8$
$= 152cm^2$
2. If the area of equilateral triangle is $16\sqrt{3}cm^2$, then find the perimeter of triangle.
sol:
Area of equilateral triangle =$\frac{\sqrt{3}}{4}a^2$
= $\frac{\sqrt{3}}{4}a^2$=$16\sqrt{3}$
$\Rightarrow a^2 = 64\ or\ a = 8cm$
Perimeter of the equilateral triangle=$3a = 3 \times 8 = 24cm$
3. The perimeter of isosceles triangle is 32cm. the ratio of equal side to its base is 3: 2. Find the area of triangle.
sol:
Let each side of isosceles triangle equal to 3x cm.
base of isosceles triangle equal to 3x cm.
perimeter =3x+3x+2x=32
8x=32 or x=4 cm
sides are 3x=12cm, 3x=12cm and 2x=8cm
s=$\frac{a+b+c}{2} = \frac{12+12+8}{2} = 16cm$
Area of triangle =$\sqrt{s(s-a)(s-b)(s-c)}$
$= \sqrt{16(16-12)(16-12)(16-8)}$
$= \sqrt{16 \times 4 \times 4 \times 8} = 32\sqrt{2}cm^2$
4. The length of side of triangle are 7cm, 13cm and 12cm. Find the length of perpendicular from the opposite vertex to the side whose length is 12cm.



sol:
s=$\frac{a+b+c}{2} = \frac{7+13+12}{2} = 16cm$
Area of triangle =$\sqrt{s(s-a)(s-b)(s-c)}$
$= \sqrt{16(16-7)(16-13)(16-12)} = \sqrt{16 \times 9 \times 3 \times 4} = 24\sqrt{3}\ cm^2$
also, area of triangle ABC=$\frac{1}{2} \times AC \times BD$
$24\sqrt{3} = \frac{1}{2} \times 12 \times BD$
BD=$4\sqrt{3}cm$
5. If each side of triangle is doubled, then find the ratio of area of new triangle thus formed and the given triangle.
sol: Let a, b, c be the sides of the triangle.
s=$\frac{a+b+c}{2}$ __________1.
Area of triangle, Δ=$\sqrt{s(s-a)(s-b)(s-c)}$=A

if each side is doubled, then

s'=$\frac{2a+2b+2c}{2} = a+b+c$ ---------2.

from 1st and 2nd we get,

s'=2s

Area of new triangle, Δ' =A'=$\sqrt{s'(s'-2a)(s'-2b)(s'-2c)} = \sqrt{2s(2s-2a)(2s-2b)(2s-2c)}$

=$\sqrt{16s(s-a)(s-b)(s-c)}$ =4$\sqrt{s(s-a)(s-b)(s-c)} = 4A$

A'=4A=4:1

Topic-polynomial

Q1. If 5x-4y=15 and xy=3 find the value of $25x^2+16y^2$.

Sol. Squaring both sides

$(5x)^2+(4y)^2$-2X5X4y=225

$25x^2+16y^2$-40xy=225

$25x^2+16y^2$-40X3=225

$25x^2+16y^2$=225+120=345

Q2 If both (x-2)and (x-1/2)are factors of px^2+5x+r,show that p=r.

Sol. Let f(x)=px^2+5x+r ,As x-2 is the factor of f(x),so

f(2)=0

$px2^2$+5x2+r=0

4p+10+r=0….(1)

Also (x-1/2) is a factor of (x),so f(1/2)=0

$P(1/2)^2$+5(1/2)+r=0

P/4+5/2+R=0

P+10+4r=0…….(2)

From 1&2

4p+10+r=p+10+4r

4p-p=10+4r-10-r

3p=3r

P=r

Q3. If a-b=12 &ab=14 find a ^{2}+ab+b^2

Sol. $(a-b)^3=12^3$ cubing both side

a^3-b^3-3ab(a-b)=1728

a^3-b^3-3X14X12=1728

a^3-b^3=1728+504=2232

a^3-b^3=(a-b)(a^2+ab+b^2)=3X(40+31/2)=333/2.

Q4. If $a^2+b^2+c^2$=20& ab+bc+ca=8 find a+b+c

Sol. $(a+b+c)^2=a^2+b^2+c^2$+2ab+2bc+2ca=20+2(ab+bc+ca)=20+2X8=36

a+b+c=$\pm$ 6

Q5. Without finding the cubes, factorise $(x-2y)^3+(2y-3z)^3+(3z-x)^3$.

Sol. Let a=x-2y, b=2y-3x, c=3z-x

If a+b+c=0, then $a^3+b^3+c^3$=3abc

$(x-2y)^3+(2y-3z)^3+(3z-x)^3$=3(x-2y)(2y-3z)(3z-x).

Q6: If the polynomial az^3+4z^2+3z-4 and z^3-4z+a leaves the same remainder when divided by z-3,find a.

Sol. Let p(z)=az^3+4z^2+3z-4

P(3)=ax3^3+4x3^2+3x3-4=27a+36+9-4=27a+41……..(1)

q(z)=z^3-4z+a

q(3)=3^3-4x3+a=27-12+a=15+a …………(2)

ATQ p(3)=q(3)

27a+41=15+a

27a-a=-41+15 or 26a=-26 or a=-1.

Q7: Find the value of x^3-8y^3-36xy-216 when x=2y+6.

Sol: x^3-8y^3-216-36xy

=$x^3+(-2y)^3+(-6)^3$-3(x)(-2y)(-6)

$=(x-2y-6)(x^2+4y^2+36+2xy-12y+6x)$
$0(x^2+4y^2+36+2xy-12y+6x)$
0
Q8: For what value of K, (x+1) is a factor of $p(x)=kx^2-x-4$
Sol:
As x+1 is a factor of p(x), so p(-1)=0
$K(-1)^2-(-1)-4=0$
K+1-4=0
k-3=0 or k=3.
Q9: Evaluate 185x185-15x15
Sol: $(185)^2-(15)^2$
=(185+15) (185-15)
=200x170=34000.
Q10: Factorise; $2x^2-7x-15$
Sol: $2x^2-7x-15$
$=2x^2-10x+3x-15$
=2x(x-5)+3(x-5)
=(x-5)(2x+3).
Q11. Find if $(-2x-5)$ is a factor of the polynomial $p(x) = 3x^4+5x^3-2x^2-4$ or not.
Sol. As $p(x) = 3x^4+5x^3-2x^2-4$
Put
Now, $p\left(\frac{-5}{2}\right) = 3\left(\frac{-5}{2}\right)^4 + 5\left(\frac{-5}{2}\right)^3 - 2\left(\frac{-5}{2}\right)^2 - 4$
$= 3\left(\frac{625}{16}\right) + 5\left(\frac{-125}{8}\right) - 2\left(\frac{25}{4}\right) - 4$
$= \frac{1875}{16} - \frac{625}{8} - \frac{25}{2} - 4$
$= \frac{1875-1250-200-64}{16}$
$= \frac{361}{16} \neq 0$
Q12. Factorise $x^2 + 3\sqrt{3x} + 6$
Sol. $x^2 + 3\sqrt{3x} + 6 = x^2 + 2\sqrt{3x} + \sqrt{3x} + 6$
$= x(x+2\sqrt{3x} + \sqrt{3}(x+2\sqrt{3}$
$= (x+2\sqrt{3})\,(x+\sqrt{3})$
Q13. Simplify : $(5a + 3b)^3 - (5a - 3b)^3$
Sol. $(5a + 3b)^3 - (5a - 3b)^3$
$= [(5a + 3b) - (5a - 3b)]\,[(5a + 3b)^2 + (5a + 3b)(5a - 3b) + (5a - 3b)^2]$
$= (5a + 3b - 5a + 3b)\,\{[25a^2 + 2 \times 5a \times 3b + 9b^2] + [(5a)^2 - (3b)^2] + [25a^2 - 2 \times 5a \times 3b + 9b^2]\}$
$= (6b)\,[25a^2 + 30ab + 9b^2 + 25a^2 - 9b^2 + 25a^2 - 30ab + 9b^2]$
$= 6b\,[75a^2 + 9b^2] = 18b[25a^2 + 3b^2]$
Q14. If $x + \frac{1}{x} = 7$, then find the value of $x^3 + \frac{1}{x^3}$
Sol. We have $x + \frac{1}{x} = 7$
Cubing both side, we have
$$\left(x+\frac{1}{x}\right)^3 = 7^3$$
=> $x^3 + \frac{1}{x^3} + 3 \times x \times \frac{1}{x}\left(x + \frac{1}{x}\right) = 343$
=> $x^3 + \frac{1}{x^3} + 3 \times 7 = 343$
=> $x^3 + \frac{1}{x^3} = 343 - 21 = 322$
Q15 if $x+y+z=0$, show that $x^3 + y^3 + z^3 = 3xyz$.
Sol. As $x+y+z=0$ (given)
=> $x+y = -z$ .... (i)

Cubing both sides, we have
$(x + y)^3 = (-z)^3$
=>$x^3 + y^3 + 3xy\,(x + y) = -z^3$
=> $x^3 + y^3 + z^3 + 3xy\,(x + y) = 0$
But $x + y = -z$ [From (i)]
=> $x^3 + y^3 + z^3 + 3xy\,(-z) = 0$
=> $x^3 + y^3 + z^3 - 3xyz = 0$
=> $x^3 + y^3 + z^3 = 3xyz$
Hence, proved.
Q16. if $x + 2y = 8$ and $xy = 8$, find the value of $x^3 + 8y^3$.
Sol. We have $x + 2y = 8$
Cubing both side, we have
$(x + 2y)^3 = 8^3$
$x^3 + (2y)^3 + 3 \times x \times 2y(x + 2y) = 512$
$x^3 + 8y^3 + 6xy\,(x + 2y) = 512$
$x^3 + 8y^3 + 6 \times 8 \times 8 = 512$
$x^3 + 8y^3 + 384 = 512$
$x^3 + 8y^3 = 512 - 384 = 128$
Q17. if $a + b = 10\ and\ a^2 + b^2 = 58$, find the value of $a^3 + b^3$.
Sol. We have $(a + b)^2 = a^2 + b^2 + 2ab$
=> $10^2 = 58 + 2ab$
=> $100 - 58 = 2ab$
=> $42 = 2ab$
=> $ab = \frac{42}{2} = 21$
Now, $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$
$= (a + b)\,(a^2 + b^2 - ab)$
$= (10)(58 - 21)$
$= 10 \times 37 = 370$
Q18. Factorise : $6x^2 - 5x^2 - 13x + 12$
Sol. Consider $p(x) = 6x^2 - 5x^2 - 13x + 12$
By Hit and Trial Method, we find that
$p(1) = 6(1)^2 - 5(1)^2 - 13(1) + 12$
$= 6 - 5 - 13 + 12$
$= 18 - 18$
$\therefore (x - 1) is\ a\ factor\ of\ p(x)$
Now, divide $p(x)\ by\ (x - 1), we\ have$

$$
\begin{array}{r|l}
 & 6x^2 + x - 12 \\
\hline
x - 1 & 6x^3 - 5x^2 - 13x + 12 \\
 & 6x^3 - 6x^2 \\
 & (-) \quad (+) \\
\hline
 & \qquad x^2 - 13x + 12 \\
 & \qquad x^2 - \quad x \\
 & \qquad (-) \quad (+) \\
\hline
 & \qquad\qquad -12x + 12 \\
 & \qquad\qquad -12x + 12 \\
 & \qquad\qquad (+) \quad (-) \\
\hline
 & \qquad\qquad\quad \times
\end{array}
$$

Q19. Find what must be subtracted from the polynomial $4y^4 + 12y^3 + 6y^2 + 50y + 26$ so that the obtained polynomial is exactly divisible by $y^2 + 4y + 2$.

Sol. By using long division method , we have

$$
\begin{array}{r|l}
 & 4y^2 - 4y + 14 \\
\hline
y^2 + 4y + 2 & 4y^4 + 12y^3 + 6y^2 + 50y + 26 \\
 & 4y^4 + 16y^3 + 8y^2 \\
 & (-) \quad (-) \quad (-) \\
\hline
 & -4y^3 - 2y^2 + 50y \\
 & -4y^3 - 16y^2 - 8y \\
 & (+) \quad (+) \quad (+) \\
\hline
 & 14y^2 + 58y + 26 \\
 & 14y^2 + 56y + 28 \\
 & (-) \quad (-) \quad (-) \\
\hline
 & 2y - 2
\end{array}
$$

Q10. $if\ (x + 1) and\ (x + 2) are\ the\ factors\ of\ x^2 + 3x^2 - 3\alpha x + \beta, then\ find\ \alpha\ and\ \beta.$

Sol. $Let\ p(x) = x^2 + 3x^2 - 3\alpha x + \beta$

Since $(x + 1) and\ (x + 2) are\ factors\ of\ p(x)$

$\therefore Put\ x = -1\ and - 2, we\ obtain$

$p(-1) = (-1)^3 + 3(-1)^3 - 3\alpha(-1) + \beta = 0$

=> $-1 + 3 + 3\alpha + \beta = 0$

=> $3\alpha + \beta = -2$ ..(i)

$p(-2) = (-2)^3 + 3(-2)^2 - 3\alpha(-2) + \beta = 0$

=> $-8 + 12 + 6\alpha + \beta = 0$

=> $6\alpha + \beta = -4$ ..(ii)

Subtracting (i) from (ii), we have

$$3\alpha = -2 => \alpha = -\frac{2}{3}$$

From (i), we have $3 \times \left(-\frac{2}{3}\right) + \beta = -2 => \beta = 0$

Hence, value of $\alpha\ and\ \beta\ are\ \alpha = -\frac{2}{3}\ and\ \beta = 0.$

Topic: Triangles

1. Show that in a right angled triangle, the hypotenuse is the longest side.

Sol. Let ABC be a right angled triangle in which ∟B=90^0.

But ∟B+∟C+∟A=180^0.

90^0+∟C +∟A= 180^0

∟C+ ∟A=90^0

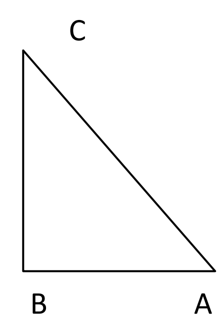
∟C and ∟A are acute angles

∟C<∟90^0 and ∟A<90^0

<C< ∟B and ∟ A < ∟ A

AB <AC and BC<AC (Sides opposite to greater angle is larger)

In a right triangle, the hypotenuse is the longest side.



2. Prove that angles opposite to equal sides of an isosceles triangles are equal.

Sol. Given: In a triangle ABC, AB=AC

To Prove: $\angle B = \angle C$

Construction: Draw AD perpendicular to BC

Proof: In triangles ADC and ADB

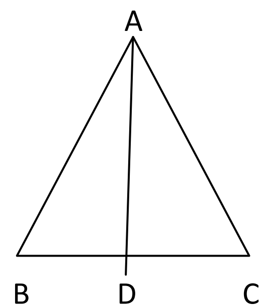
AB =AC (given)

$\angle BAD = \angle CAD$

AD=AD (common)

By SAS Criteria ΔABD is congruent to ΔACD

Therefore $\angle B = \angle C$



3. BE and CF are two equal altitudes of a triangle ABC. Using RHS congruence rule, prove that the triangle ABC is isosceles.

Sol. In triangles BCF AND CEF, we have

$\angle BFC = \angle CEB$ (each 90^0)

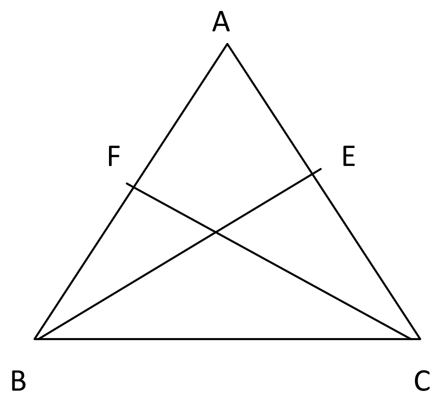
Hyp BC= Hyp BC (common)

FC=EB

By R.H.S Criteria of congruence, we have

$\Delta BCF \approx \Delta ECB$ (C.P.C.T)

Now in Δ ABC , $\angle ABC = \angle ACB$



AB=AC(Sides opposite to equal angles are equal).

Therefore, ΔABC is an isosceles triangle.

4. In ΔABC, AD is the perpendicular bisector of BC. Show that Δ ABC is isosceles triangle in which AB=AC.

Sol. In Δs ABD AND ACD, we have

DB= DC (given)

$\angle ADB = \angle ADC$ (Each 90^0)

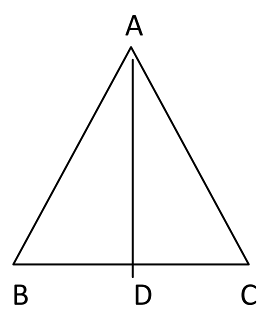
AD=AD

By SAS criteria of congruence, we have

$\Delta ABD \approx \Delta ACD$

AD =AC (C.P.C.T)

Hence ΔABC is isosceles.



5. Show that the angles of an equilateral triangle are 60^0 each.

Sol: let Δ ABC be an equilateral triangle so that AB=AC=BC.

AB=AC

$\angle B = \angle C$ (Angles opposite to equal angles are equal) ....(1)

Also, CB=CA

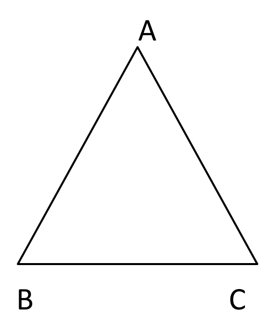
$\angle A = \angle B$ (Angles opposite to equal angles are equal)........(2)

From above equations ,$\angle A = \angle B$

Also, $\angle A + \angle B + \angle C = 180^0$

$3\angle A = 180^0$

$\angle A = 60^0$



Coordinate Geometry

1. Find the ordinate in each of the following;

(a) (-8, 6) (b) (4, -11), (c) (-5, -1)

sol: (a) =6

(b)=-11

(c)=-1

2. In which quadrant does the following point lies;

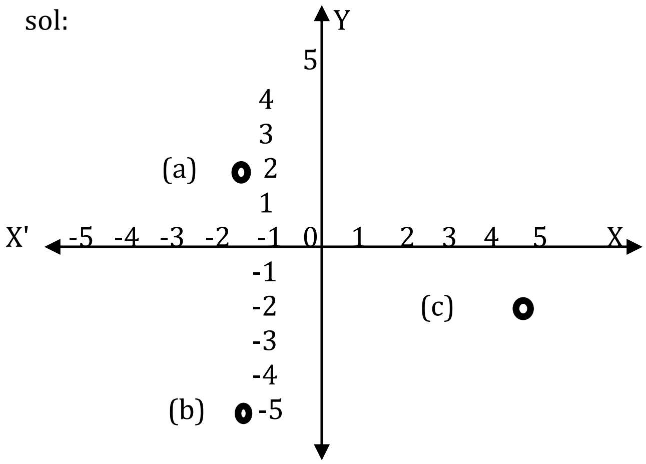
(a) (4, 3), (b) (-5, 6), (c) (8, -4)

sol: (a) First quadrant (b) second quadrant (c) Fourth quadrant

3. Plot the following points in Cartesian plane;

(a) (2, -2), (b) (-2, -5), (c) (4,-2)

sol:



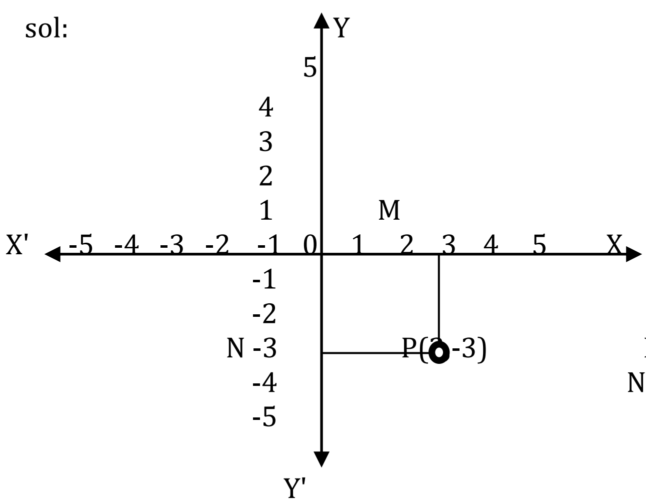
4. Find the mirror images of the following points through y-axis;

(a) (2, 3) and (b) (-3, 5)

sol: (a) (-2, 3) and (b) (3, 5)

5. Plot the point P(2, -3) on the graph and from it draw PM and PN as perpendicular to x-axis and y-axis respectively. Give the coordinates of M and N.

sol:



M=(2,0)

N=(0,-3)