## DELHI PUBLIC SCHOOL <br> BOKARO STEEL CITY

## ASSIGNMENT FOR THE SESSION 2014-2015

Subject : Mathematics
Assignment No. 2

## Square and Square Roots

1. Find the least number of 4 digits which is a perfect square.
2. The area of a square play ground is $477.4225 \mathrm{~m}^{2}$. Find the side of the playgroud.
3. Simplify
i) $\sqrt{400}+\sqrt{0.04}+\sqrt{0.000004}$
ii) $\sqrt{212 \sqrt{154+\sqrt{225}}}$
4. If $\sqrt{4096}=64$ then find the value of $\sqrt{40.96}+\sqrt{0.4096}+\sqrt{0.004096}$
5. Find the square roots of 2304 and 1764 and hence find the value of $\frac{\sqrt{0.2304}+\sqrt{0.1764}}{\sqrt{0.2304}-\sqrt{0.1764}}$
6. Find the smallest number which should be added to 3645 to make it a perfect square.

## Cube and Cube Roots

1. Find the values of i) $\sqrt[3]{3375 \times 729}$ ii) $\sqrt[3]{\sqrt{0.000064}}$
2. Write in the simplest form i) $\sqrt[3]{125 x^{3} y^{6} z^{12}}$ ii) $\sqrt[3]{\frac{216 a^{18}}{729 b^{3}}}$
3. If $\frac{\sqrt[3]{0.512}}{x}=\sqrt[3]{1000}$, then find the value of $x$.
4. Simplify: i) $\sqrt[3]{-27000}$ ii) $\sqrt[3]{0.001} \times 10$

## Playing with numbers

1. If a 3 digit number $5 \times 2$ is divisible by 3 . Find the smallest value of $x$.
2. If a 4 digit number $13 y 1$ is divisible by 3 . Find the smallest value of $y$.
3. If a 4 digit number $24 \times 5$ is divisible by 9 . Find the smallest value of $x$.

## OPERATIONS ON ALGEBRIC EXPRESSIONS

1. Re-arrange suitably and find the sum of the following:
a) $\frac{11}{12}+\frac{-17}{3}+\frac{11}{2}+\frac{-25}{2}$
b) $\frac{4}{13}+\frac{-5}{8}+\frac{-8}{13}+\frac{9}{13}$
2. Evaluate: $\frac{-12}{5}+\frac{-7}{20}+\frac{3}{14}+\frac{1}{7}+\frac{-1}{10}$
3. Simplify: $\left(\frac{3}{11} \times \frac{5}{6}\right)-\left(\frac{9}{12} \times \frac{4}{3}\right)+\left(\frac{5}{13} \times \frac{6}{15}\right)$
4. Multiply $\left(\frac{1}{2} x^{2}+\frac{1}{3} x-1\right)$ by $\left(\frac{3}{4} x^{3}-\frac{2}{3 x}+\frac{1}{9}\right)$.
5. Find the product $\left(x^{3}-2 x^{2}+5\right)(4 x-1)$
6. Divide $x^{5}-x^{4}+3^{3}+4 x^{2}-3 x \quad-3$ by $x^{2}+1$
7. Divide $44\left(x^{4}-5 x^{3}-24 x^{2}\right)$ by $11 x(x-8)$
8. Divide $\left(5 p^{2}-25 p+20\right)$ by $(p-1)$
9. Divide $96 \mathrm{abc}(32-12)(5 b-30)$ by $144(a-4)(b-6)$
10. Divide $63\left(p^{4}+5 p^{3}-24 p^{2}\right)$ by $9 p(P+8)$
11. If $x^{4}+\frac{1}{x^{4}}=194$ find $x^{2}+\frac{1}{x^{2}}$
12. If $\left(x-\frac{1}{x}\right)=5$, find the value of $\left(x^{2}+\frac{1}{x^{2}}\right)$.
13. If $x^{2}+\frac{1}{x^{2}}=27$, find $x-\frac{1}{x}$
14. If $x^{3}+a x^{2}-b x+10$ is exactly divisible by $x^{2}+3 x+2$. Find the values of $a$ and $b$ ?
15. What must be subtracted from $3 x-5 x+1$ to get $x-x+5$

## FACTORISATION

Factorise the following:

1. $x^{2}+(a+b+c) x+a b+b c$
2. $x^{4}+x^{2} y^{2}+y^{4}$
3. $a^{12}-3 a^{4}+\frac{3}{a^{4}}-\frac{1}{a^{12}}$
4. $27-125 x^{3}-135 x+225 x^{2}$
5. $3 \sqrt{3} a^{3}-b^{3}-5 \sqrt{5} c^{3}-3 \sqrt{15} a b c$
6. $p^{3}(q-r)^{3}+q^{3}(r-p)^{3}+r^{3}(p-q)^{3}$
7. Factorise:
a) $8 x^{2}-6 x y-9 y^{2}$
b) $5 x^{6}-7 x^{3}-6$
c) $9(x-2 y)^{2}-4(x-2 y)-13$
8. Factorize: $a^{2}-b^{2}-4 a c+4 c^{2}$
9. Factorize: $x^{2}+y-x y-x$.
10. Factorize: $25(x+y)^{2}-36(x-2 y)^{2}$

Using the identity, evaluate:
a) $95 \times 96$
b) $198 \times 209$
c) $194 \times 189$.
2. Evaluate using identity:
a) $10.2 \times 9.8$
b) $198 \times 198$
3. Evaluate using identity:
a) $8.3 \times 7.7$
b) $97 \times 97$

## Linear equations

1. Solve the following equations.
i) $\frac{2}{x}-\frac{5}{3 x}=\frac{1}{3}$
ii) $\frac{2 x+3}{5 x}-\frac{7}{x}+4=\frac{2}{3 x}$
iii) $6\left(x^{2}-3 x+2\right)-2\left(x^{2}-1\right)=4(x+1)(x+2)-24$.
iv) $\frac{5 x-5}{4 x+7}=\frac{5 x-31}{4 x-23}$
v) $\frac{x^{2}+5 x+4}{x^{2}+3 x+2}=\frac{3}{2}, x \neq-1,-2$
vi) $\frac{4}{x+1}=\frac{3}{2 x+1}+\frac{3}{x+3}$
vii) $\frac{x+3}{x-3}=2-\frac{x+2}{x-2}$
2. A steamer goes downstream from one port to another in 9 hours. It covers the same distance up steam in 10 hours. If the speed of the stream be $1 \mathrm{~km} / \mathrm{hr}$. Find the speed of the steamer in still water and the distance between the ports.
3. When 4 is subtracted from three times a number and the result is divided by 3 more than the number we get $2 / 5$. Find the number.
4. A man invested Rs 35,000 ; a part of it at an annual rate of $12 \%$ and he rest at $14 \%$. If he received a total annual interest of Rs 4460 . How much did he invest at each rate?
5. A man rowing at the rate of $5 \mathrm{~km} / \mathrm{hr}$ in still water takes thrice as much time in going 40 km upstream as he takes in going 40km downstream. Find the rate at which the water is flowing. [Hint: $\frac{40}{5-x}=3\left(\frac{40}{5+x}\right)$
6. Two cars start from a certain town and travel in opposite directions. One goes towards north at $55 \mathrm{~km} / \mathrm{hr}$ and the other goes towards south at $35 \mathrm{~km} / \mathrm{hr}$. After how mach time will they be 135 km apart?
7. Two places $A$ and $B$ are 42 km apart. One person starts from $A$, walks at $4 \mathrm{~km} / \mathrm{hr}$ towards $B$ and meets another person coming from $B$ towards $A$ after 6 hours. Find the rate at which the second person is walking.
8. A man covers a distance of 15 km in 3 hours, partly by walking and partly by riding. If he walks at $3 \mathrm{~km} / \mathrm{hr}$ and rides at $9 \mathrm{~km} / \mathrm{hr}$, find the distance he covered by riding.

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\text { Hint: } \frac{x}{9}+\frac{15-x}{3}=3 .
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8. Samir brought a shirt for Rs 336 , including $12 \%$ sales tax and a necktie for Rs 110 including $10 \%$ sales tax. Find the printed price (without sales tax) of shirt and necktie together.
9. The difference between a two digit number and the number obtained by interchanging the position of its digits is 63 . What is the difference between the two digits of that number?
10. A two digit number becomes five-sixth of itself when its digits are reversed. The two digits differ by One. What is the number?
11. The length of a rectangle exceeds its width by 3 m . If the width is increased by 4 m and the length is decreased by 6 m , the area is decreased by $22 \mathrm{sq} . \mathrm{m}$.

## PROFIT AND LOSS

1. By selling an article, Ramesh earned a profit equal to $1 / 4^{\text {th }}$ of the price he brought it. If he sold it for Rs 375, what was the cost price?
2. A dealer sold $3 / 4$ of his article at a gain of $20 \%$ and the remaining at cost price. Find the gain percent earned by him in the whole transaction.
3. A tradesman marks his goods $30 \%$ above the cost price. If he allows a discount of $6 \frac{1}{4} \%$ then find his gain percent.
4. At what percent above the cost price. Must an article be marked so as to gain $33 \%$ after allowing a discount of $5 \%$.
5. Sahid bought two old scooters for Rs 9000 . By selling one at a profit of $25 \%$ and the other at a loss of $20 \%$, he neither gains nor loses. Find the cost price of each scooter
6. By selling 90 ball pens for Rs. 160, a person loses $20 \%$. How many ball pens should be sold for Rs 96 , so as to have a profit of $20 \%$.
7. Aman bought two articles for Rs: 30,000 . By selling one at a loss of $15 \%$ and other at a gain of $19 \%$, he found that the selling price of both the articles is the same. Find the cost price of each.
8. Which is more favourable to a buyer and by how much Rs 680 with $14 \%$ discount or the same amount with successive discount of $10 \%, 5 \%$ ?
9. Wasim brought two cricket bats for Rs 560 and Rs 240 respectively. He sells the first bat at a gain of $15 \%$ and the second one at a loss of $5 \%$. Find his gain or loss percent in the whole transaction.

## COMPOUND INTEREST

1. What sum will become Rs 5408 after 2 years at $4 \%$ per annum when the interest is compounded annually?
2. Find the annual rate of compound interest at which Rs 8000 will become Rs 10648 after 3 years.
3. After what time will Rs 5400 yield Rs 1373.63 as compound interest at $12 \%$ per annum?
4. The difference between C.I and S.I for 2 years at $5 \%$ sum of money is Rs 2.50 . Find the sum
5. Find the principle, if the compound interest, compounded annually for 2 years at the rate of $10 \%$ p.a is Rs 6615.
6. The value of a refrigerator, which was purchased 2 years ago depreciates at $12 \%$ per annum. If its present value is Rs.9680, for how much was it purchased?
7 In how many rears compound interest on Rs 5000 will amount to Rs 624.32 at $8 \%$ per annum compounded half-yearly.
7. Find the rate of compound interest which will yield a compound interest of Rs 612.08 on a sum of Rs. 10,000 in 9 months, interest payable quarterly.
8. A sum amounts to Rs 9680 in 2 years and to Rs 10648 in 3 years compounded annually. Find the sum (principle) and the rate of interest per annum.
9. A sum compounded annually becomes $25 / 16$ times of itself in 2 years. Determine the rate of interest per annum.
