

30.10.19

UNIT - 2

ALGEBRA

Ex : 2.1

4. 5.

Rules.

$$+ = -$$

$$- = +$$

$$\times = \div$$

$$\div = \times$$

4) Find x :

$$(i) \frac{2x}{3} - 4 = \frac{10}{3}$$

$$\frac{2x}{3} = \frac{10}{3} + 4$$

$$= \frac{22}{3} \quad \times \quad \frac{2x}{3} = \frac{22}{3}$$

$$x = \frac{\frac{22}{3}}{\frac{2}{3}} = \frac{22}{3} \times \frac{3}{2}$$

$$\therefore x = 11$$

(ii) $y + \frac{1}{6} - 3y = \frac{2}{3}$. Find y .

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

$$-2y = \frac{2}{3} - \frac{1}{6}$$

$$\text{LCM} = 6$$

$$-2y = \frac{4-1}{6} = \frac{3}{6} = \frac{1}{2}$$

$$= -2y - \frac{1}{2}$$

$$y = \frac{1}{2(-2)} = \frac{-1}{4}$$

$$\therefore y = \frac{-1}{4}$$

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-2 is a
negative
no. Multiple
by 2
 $y = \frac{1}{2(-2)}$

$$(iii) \frac{1}{3} - \frac{12x}{3} = \frac{7x}{12} + \frac{5}{4}$$

$$\frac{1}{3} = \frac{7x}{12} + \frac{12x}{3} + \frac{5}{4}$$

$$\frac{1}{3} - \frac{5}{4} = \frac{7x + 42x}{12}$$

$$= \frac{4-15}{12} = \frac{11x}{12}$$

$$\frac{-11}{12} = \frac{11x}{12}$$

$$\frac{-11}{12} \times \frac{12}{11} = x$$

$$\therefore x = -1$$

5) Find x :

$$(i) -3(4x+9) = 21$$

$$4x+9 = \frac{21}{-3} = -7$$

$$4x+9 = -7$$

$$4x = -7-9$$

$$4x = -16$$

$$x = \frac{-16}{4} = -4$$

$$\therefore x = -4$$

$$(iii) (7x-5) - 4(2+5x) = 10(2-x)$$

$$7x-5-8-20x = 20-10x$$

$$-13x-13 = 20-10x$$

$$-13-20 = -10x+13x$$

$$-33 = 3x$$

$$\frac{-33}{3} = x$$

$$\therefore x = -11$$

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6) Find x and m

$$(i) \frac{3x-2}{4} - \frac{(x-3)}{5} = -1$$

$$\frac{5(3x-2) - 4(x-3)}{20} = -1$$

$$15x - 10 - 4x + 12 = -1 \times 20$$

$$11x + 2 = -20$$

$$11x = -20 - 2$$

$$11x = -22$$

$$x = \frac{-22}{11}$$

$$\boxed{x = -2}$$

$$(ii) \frac{m+9}{3m+15} = \frac{5}{3}$$

$$\frac{m+9}{3(m+5)} = \frac{5}{3}$$

$$m+9 = \frac{5}{3} \times 3(m+5)$$

$$m+9 = 5m+25$$

$$9-25 = 5m-m$$

$$-16 = 4m$$

$$\frac{-16}{4} = m$$

$$\therefore \boxed{m = -4}$$

$$5) (ii) 20 - 2(5-p) = 8$$

$$-2(5-p) = 8 - 20$$

$$-2(5-p) = -12$$

$$-10 + 2p = -12$$

$$2p = -12 + 10$$

$$p = \frac{-2}{2}$$

$$\therefore \boxed{p = -1}$$

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$$9-25 = 5m-m$$

$$-16 = 4m$$

$$\frac{-16}{4} = \frac{4m}{4} \therefore \boxed{m = -4}$$

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$$-2(5-p) = 8 - 20$$

$$-2(5-p) = -12$$

$$-10 + 2p = -12$$

$$2p = -12 + 10$$

$$p = \frac{-2}{2} = -1$$

$$\therefore \boxed{p = -1}$$

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Exercise : 2. 2

3. One number is seven times another. If their difference is 18, Find the numbers.

Let x , $7x$ be two numbers.

$$\text{G.T } 7x - x = 18$$

$$6x = 18$$

$$x = \frac{18}{6} = 3$$

$$\therefore x = 3$$

$$7x = 7(3) = 21$$

3, 21 are required numbers.

4. The sum of the three consecutive odd numbers is 75. Which is the largest among them?

Let x , $x+2$, $x+4$ be three consecutive odd numbers.

$$\text{G.T } x + x + 2 + x + 4 = 75$$

$$3x + 6 = 75$$

$$3x = 75 - 6$$

$$3x = 69$$

$$x = \frac{69}{3} = 23$$

$$x = 23$$

Largest number $x+4 = 23+4 = 27$

5. The length of a rectangle is $\frac{1}{3}$ of its breadth. If its perimeter is 64 m, then find the length and breadth of the rectangle.

Let l , b be the length, breadth of the rectangle.

$$G.T = d = \frac{1}{3}b \Rightarrow \textcircled{1}$$

G.T Perimeter of rectangle = 64

$$2(d+b) = 64$$

$$2\left(\frac{1}{3}b + b\right) = 64$$

$$\frac{b+3b}{3} = \frac{64}{2}$$

$$4b = 32 \times 3$$

$$b = \frac{32 \times 3}{4} = 24 \text{ cm}$$

$$b = 24$$

$$\textcircled{1} \Rightarrow d = \frac{1}{3} \times 24$$

$$d = 8 \text{ cm}$$

$$\therefore \text{length} = 8 \text{ cm}$$

$$\text{breadth} = 24 \text{ cm}$$

- b. A total of 90 currency notes, consisting only of ₹ 5 and ₹ 10 denominations, amount to ₹ 500. Find the number of notes in each denomination.

Let x be the number of 5 rupees note.

Let y be the number of 10 rupees note.

G.T total currency note = 90

$$x + y = 90 \Rightarrow x = 90 - y \Rightarrow \textcircled{1}$$

G.T total amount = 500

$$50x + 10y = 500$$

$$(\div 5) \quad x + 2y = 100 \Rightarrow \textcircled{2}$$

$$\textcircled{1} \text{ sub } \textcircled{2} \Rightarrow 90 - y + 2y = 100$$

$$y + 90 = 100$$

$$y = 100 - 90$$

$$\therefore y = 10$$

$$\text{if } y = 10 \quad \textcircled{1} \Rightarrow x = 90 - 10$$

$$x = 80$$

number of 5 Rupees note = 80

number of 10 Rupees note = 10

8. A number consists of two digits whose sum is 9. If 27 is subtracted from the original number, its digits are interchanged. Find the original number.

Let x, y be the two numbers in tens place and ones place.

$$\text{G.T } x + y = 9 \rightarrow \textcircled{1}$$

$$\text{G.T } 10x + y - 27 = 10y + x$$

$$10x - x + y - 10y = 27$$

$$9x - 9y = 27$$

$$(\div 9) \quad x - y = 3 \rightarrow \textcircled{2}$$

$$\textcircled{1} + \textcircled{2} \quad 2x = 12$$

$$x = \frac{12}{2} = 6$$

$$\therefore x = 6$$

$$\text{if } x = 6 \textcircled{1} \Rightarrow 6 + y = 9$$

$$y = 9 - 6 = 3$$

$$y = 3$$

$$6 \times 10 = 60$$

$$1 \times 3 = 3$$

$$60 + 3 = 63$$

9. The denominator of a fraction exceeds its numerator by 8. If the numerator is increased by 17 and the denominator is decreased by 1, we get $\frac{3}{2}$. Find the original fraction.

Let x be the numerator of fraction.

$$\text{G.T } \frac{x}{x+8}, \frac{x+17}{x+8-1} = \frac{3}{2}$$

$$\frac{x+17}{x+7} = \frac{3}{2}$$

$$\frac{x+17}{7} = \frac{3}{2}$$

$$2(x+17) = 3(x+7)$$

$$2x + 34 = 3x + 21$$

$$34 - 21 = 3x - 2x$$

$$13 = x$$

∴ The original fraction $\frac{x}{x+8} = \frac{13}{13+8} = \frac{13}{21}$

7. At present, Thenmozhi's age is 5 years more than that of Murali's age. Five years ago, the ratio of Thenmozhi's age to Murali's age was 3:2. Find their present ages.

Thenmozhi

Murali

Present age: $x+5$

x

5 years ago $x+5-5$

$x-5$

x

$x-5$

$$x : x - 5 = 3 : 2$$

$$\frac{x}{x-5} = \frac{3}{2} \Rightarrow 2x = 3(x-5)$$

$$2x = 3x - 15$$

$$15 = 3x - 2x$$

$$= 15 = x$$

Present age of Murali $x = 15$ years

Present age Then $x+5 = 15+5 = 20$ years

10. If a train runs at 60 km/hr it reaches its destination late by 15 minutes. But, if it runs at 85 kmph it is late by only 4 minutes. Find the distance to be covered by the train.

Let the distance be ' x ' km

Time taken to cover ' x ' km at

60 km/h

$$T_1 = \frac{x}{60} \text{ hrs}$$

Time taken to cover ' x ' km at 85 km/h $T_2 = \frac{x}{85}$

$$\text{Difference } T_1 - T_2 = 4 + 15 = 19 \text{ min}$$

$$= \frac{19}{60} \text{ hrs}$$

$$\frac{x}{60} - \frac{x}{85} = \frac{19}{60}$$

$$= x \left(\frac{17-12}{12 \times 17} \right) = \frac{19}{12}$$

$$(x5) x \left(\frac{5}{60} - \frac{5}{85} \right) = \frac{19 \times 5}{60}$$

$$x \left(\frac{5}{12 \times 17} \right) = \frac{19}{12}$$

$$x = \frac{19}{12} \times 12 \times 17 = 312$$

Exercise : 2.3

3. Find the quadrants without plotting the points on a graph sheet.

$(3, -4)$, $(5, 7)$, $(2, 0)$, $(-3, -5)$, $(4, -3)$, $(-1, 2)$, $(-8, 0)$, $(0, 10)$, $(-9, 50)$.

$3, -4$ - lies in IV Quadrant.

$5, 7$ - lies in I Quadrant.

$2, 0$ - lies in x axis.

$-3, -5$ - lies in III Quadrant.

$4, -3$ - lies in IV Quadrant.

$-1, 2$ - lies in II Quadrant.

$-8, 0$ - lies in x axis.

$0, 10$ - lies in y axis.

$-9, 50$ - lies in II Quadrant.

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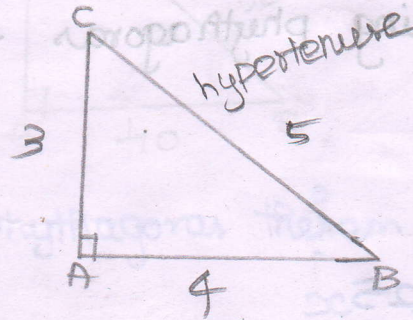
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UNIT - 3

Geometry

Pythagorean Theorem:

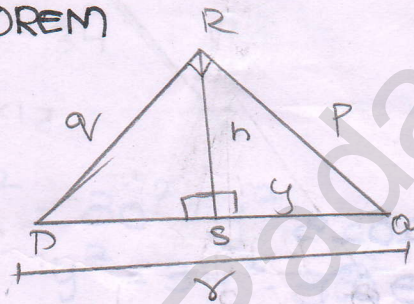


$$BC^2 = AB^2 + AC^2$$

In statement of the theorem.

In a right angled triangle, the square on the hypotenuse is equal to the sum of the squares on the other two sides.

THEOREM



If an altitude is drawn to the hypotenuse of an right angle triangle, then

The two triangles are similar to the given triangle and also to each other.

That is $\triangle PRQ \sim \triangle PSR \sim \triangle RSQ$

$$h^2 = xy$$

$p^2 = yr$ and $q^2 = xr$, where $r = x + y$.

Exercise : 3.1

3. check whether given sides are the sides of right angled triangle, using pythagoras theorem.

(i) 8, 15, 17

$$17^2 = 289 \Rightarrow \textcircled{1}$$

$$8^2 + 15^2 = 64 + 225 \\ = 289 \Rightarrow \textcircled{2}$$

$$17^2 = 8^2 + 15^2$$

\therefore by Pythagoras theorem form a right angled Δ .

(ii) 24, 45, 51

$$51^2 = 2601 \Rightarrow \textcircled{1}$$

$$24^2 + 45^2 = 576 + 2025 \\ = 2601 \Rightarrow \textcircled{2}$$

From $\textcircled{1}$ $\textcircled{2}$

$$51^2 = 24^2 + 45^2$$

\therefore by P.T its form a right angle Δ .

(iii) 12, 13, 15

$$15^2 = 225 \Rightarrow \textcircled{1}$$

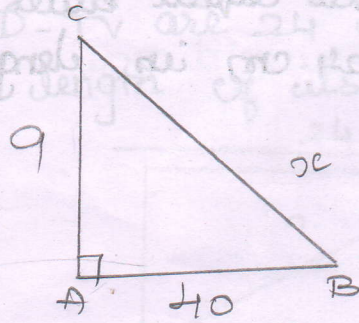
$$12^2 + 13^2 = 144 + 169 \\ = 313 \Rightarrow \textcircled{2}$$

$$15^2 = 12^2 + 13^2$$

\therefore by P.T it is not form a triangle.

4. Find the unknown side in the following triangles.

(i)



by pythagoras theorem $x^2 = 9^2 + 40^2$

$$x^2 = 81 + 1600$$

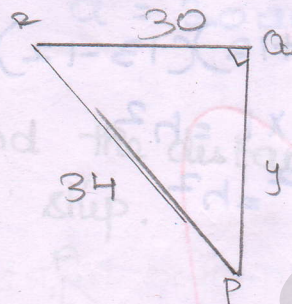
$$x^2 = 1681$$

$$x = \sqrt{1681} = 41$$

$$\begin{array}{r} 2 \overline{) 1681} \\ \underline{98} \\ 2 \overline{) 1681} \\ \underline{9} \\ 78 \\ \underline{72} \\ 6 \end{array}$$

$$\sqrt{1681} = 41$$

41x41 = 1681
so answer is 1681



$$34^2 = 30^2 + y^2$$

$$y^2 = 34^2 - 30^2$$

$$y^2 = (34+30)(34-30)$$

$$y^2 = 64 \times 4$$

$$y^2 = 8^2 \times 2^2$$

$$y = 8 \times 2$$

$$y = 16$$

$$\begin{array}{r} 84 \times 39 \\ \underline{36} \\ 117 \\ \underline{15} \\ 1531 \end{array}$$

$$x = 39^2 + 36^2$$

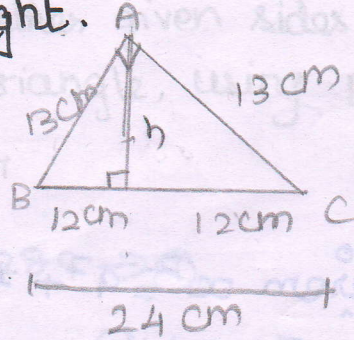
$$x = 1521 + 1296$$

$$x = 2817$$

$$\sqrt{2817} = 53.1$$

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5. An isosceles triangle has equal sides each 13 cm and a base 24 cm in length. Find its height.



by P.T

$$\Delta ABD \quad 13^2 = 12^2 + h^2$$

$$13^2 - 12^2 = h^2$$

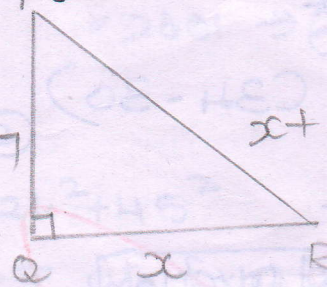
$$a^2 - b^2 = (a+b)(a-b) \quad (13+12)(13-12) = h^2$$

$$25 \times 1 = h^2$$

$$5^2 = h^2$$

$$\therefore h = 5 \text{ cm}$$

6. In the figure find PR and QR.



Find PR and QR

$$\text{by P.T } (x+1)^2 = 7^2 + x^2$$

$$x^2 + 2x + 1 = 49 + x^2$$

$$x^2 + 2x - x^2 = 49 - 1 = 48$$

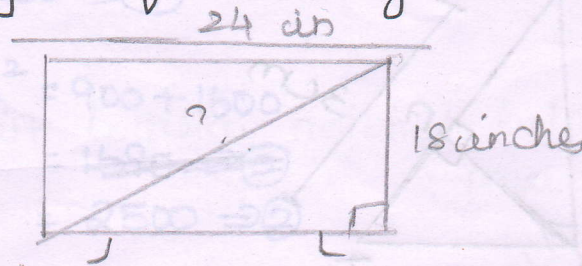
$$2x = 48$$

$$x = \frac{48}{2} = 24$$

$$QR = 24 \text{ cm}$$

$$PR = x + 1 = 24 + 1$$

7. The length and breadth of the screen of an LED-TV are 24 inches and 18 inches. Find the length of its diagonal.



by P.T

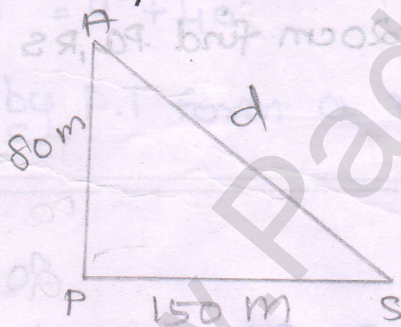
$$d^2 = 24^2 + 18^2$$

$$d^2 = 576 + 324$$

$$d^2 = 900 = 30^2$$

$$d = 30 \text{ inches.}$$

8. Find the distance between the helicopter and the ship.



by P.T

$$AS^2 = 80^2 + 150^2$$

$$AS^2 = 8^2 \times 10^2 + 15^2 \times 10^2$$

$$AS^2 = 10^2 (8^2 + 15^2)$$

$$AS^2 = 10^2 (64 + 225)$$

$$AS^2 = 10^2 \times 289 = 10^2 \times 10^2$$

$$AS = 10 \times 17 = 170 \text{ m}$$

distance = 170m

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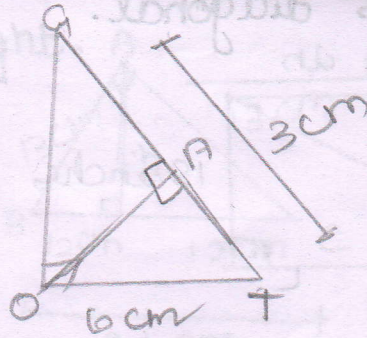
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9. From the figure.

(i) IF $TA = 3\text{cm}$ and $OT = 6\text{cm}$, Find TG



by theorem $= P^2 = YR$

$$OT^2 = TG \times TO$$

$$6^2 = TG \times 3$$

$$\frac{36}{3} = TG$$

$$\therefore TG = 12\text{cm}$$

$$6^2 = TG \times 3$$

$$\frac{36}{3} = TG$$

$$TG = 12\text{cm}$$

10. If $RQ = 15\text{cm}$ and $RP = 20\text{cm}$ find PQ, RS and

G.T $RQ = 15\text{cm}$

$RP = 20\text{cm}$ Find PQ, PS, SQ

In ΔPQR is a r.t

$$\text{by P.T } PQ^2 = PR^2 + RQ^2$$

$$= 20^2 + 15^2$$

$$= 400 + 225 = 625$$

$$PQ^2 = 625 = 25^2$$

$$PQ = 25\text{cm}$$

$$RQ^2 = SQ \times PQ$$

$$15^2 = SQ \times 25$$

$$SQ = \frac{15 \times 15}{25} = 9\text{cm}$$

$$SQ = 9\text{cm}$$

$$PS = RQ = SQ = 25 - 9 = 16\text{cm}$$

2. (iii) 30, 40, 50

$$50^2 = 2500 \Rightarrow \textcircled{1}$$

$$\begin{aligned} 30^2 + 40^2 &= 900 + 1600 \\ &= 2500 \Rightarrow \textcircled{2} \end{aligned}$$

$$50^2 = 30^2 + 40^2$$

by P.T form a right angled Δ .

(iv) 9, 40, 41

$$41^2 = 1681 \rightarrow \textcircled{1}$$

$$\begin{aligned} 9^2 + 40^2 &= 81 + 1600 \\ &= 1681 \rightarrow \textcircled{2} \end{aligned}$$

$$41^2 = 9^2 + 40^2$$

\therefore by P.T form a right angle Δ .

9/9

$$\begin{array}{r} 50 \times 50 \\ \hline 2500 \end{array}$$

$$30 \times 30$$

$$\begin{array}{r} 900 \\ \hline 900 \end{array}$$

$$40 \times 40$$

$$\begin{array}{r} 1600 \\ \hline 1600 \end{array}$$

$$1600$$

$$\begin{array}{r} 1600 \\ \hline 1600 \end{array}$$

$$1600$$

$$\begin{array}{r} 900 \\ \hline 900 \end{array}$$

$$2500$$

$$41 \times 41$$

$$\begin{array}{r} 41 \\ \hline 164 \end{array}$$

$$1681$$

$$1600$$

$$\begin{array}{r} 1600 \\ \hline 81 \end{array}$$

$$1681$$

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18-11-19

UNIT-4

INFORMATION
PROCESSING

Exercise 4.2

2. Using repeated division method find HCF of the following:

(i) 455 and 26

$$\begin{array}{r} 26 \overline{) 455} \quad (17 \\ \underline{26} \\ 195 \\ \underline{182} \\ 13 \end{array} \quad \begin{array}{r} 26 \overline{) 26} \quad (1 \\ \underline{26} \\ 0 \end{array}$$

HCF of 455, 26 is 13

(iv) 184, 230, 276

$$\begin{array}{r} 230 \overline{) 276} \quad (1 \\ \underline{230} \\ 46 \end{array} \quad \begin{array}{r} 230 \overline{) 230} \quad (1 \\ \underline{230} \\ 0 \end{array}$$

HCF of 230, 276 is 46

$$\begin{array}{r} 46 \overline{) 184} \quad (4 \\ \underline{184} \\ 0 \end{array}$$

HCF of 184, 230, 276 is 46

3. Using repeated subtracting method find HCF of the following.

(i) 42, 70

$$70 - 42 = 28$$

$$42 - 28 = 14$$

$$28 - 14 = 14$$

$$14 - 14 = 0$$

HCF of 42, 70 is 14

(ii) 36 and 80

$$80 - 36 = 44$$

$$44 - 36 = 8$$

$$36 - 8 = 28$$

$$28 - 8 = 20$$

$$20 - 8 = 12$$

$$12 - 8 = 4$$

$$8 - 4 = 4$$

$$4 - 4 = 0$$

HCF of 36 and 80 is 4

(iii) 280 and 420

$$420 - 280 = 140$$

$$280 - 140 = 140$$

$$140 - 140 = 0$$

HCF of 280 and 420 is 140

(iv) 1014 and 654

$$1014 - 654 = 360$$

$$654 - 360 = 294$$

$$360 - 294 = 66$$

$$36 - 30 = 6$$

$$30 - 6 = 24$$

$$24 - 6 = 18$$

$$18 - 6 = 12$$

$$12 - 6 = 6$$

$$294 - 66 = 228$$

$$228 - 66 = 162$$

$$162 - 66 = 96$$

$$96 - 66 = 30$$

$$30 - 6 = 24$$

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4.

(i) 56 and 12

$$56 - 12 = 44$$

$$44 - 12 = 32$$

$$32 - 12 = 20$$

$$20 - 12 = 8$$

$$12 - 8 = 4$$

$$8 - 4 = 4$$

$$4 - 4 = 0$$

HCF of 56 and 12 is 4

(ii) 320, 120 and 95

$$320 - 120 = 200$$

$$120 - 200 = 80$$

$$80 - 40 = 40$$

$$40 - 40 = 0$$

HCF of 320, 120 is 40

$$95 - 40 = 55$$

$$55 - 40 = 15$$

$$40 - 15 = 25$$

$$25 - 15 = 10$$

$$15 - 10 = 5$$

$$10 - 5 = 5$$

$$5 - 5 = 0$$

HCF of 320, 120 and 95 is 5

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(2)

(ii) 392 and 256

$$\begin{array}{r}
 256 \overline{)392} [1 \\
 \underline{256} \\
 136 \\
 136 \overline{)136} [1 \\
 \underline{136} \\
 0 \\
 16 \overline{)120} [7 \\
 \underline{112} \\
 8 \overline{)16} [2 \\
 \underline{16} \\
 0
 \end{array}$$

HCF of 392 and 256 is 8

(iii) 6765 and 610

$$\begin{array}{r}
 610 \overline{)6765} [11 \\
 \underline{610} \\
 665 \\
 610 \\
 \underline{55} \\
 55 \overline{)610} [11 \\
 \underline{55} \\
 60 \\
 55 \\
 \underline{5} \\
 5 \overline{)55} [11 \\
 \underline{55} \\
 0
 \end{array}$$

HCF of 6765 and 610 is 5

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5. On a school trip, 56 girls and 98 boys went to Kanyakumari. They were divided into as many groups as possible so that there were equal numbers of girls and boys in each group. Find the largest group possible?

Exercise : 3.2

Miscellaneous Practice problems.

1. The sides of a triangle are 1.2 cm, 3.5 cm and 3.7 cm. Is this triangle a right triangle? If so, which side is the hypotenuse?

$$3.7^2 = 13.69 \rightarrow \textcircled{1}$$

$$1.2^2 + 3.5^2 = 1.44 + 12.25 = 13.69 \rightarrow \textcircled{2}$$

from $\textcircled{1}, \textcircled{2}$ $3.7^2 = 1.2^2 + 3.5^2$

\therefore 3.7 cm, 1.2 cm, 3.5 cm form a right angled triangle. Side of hypotenuse 3.7 cm.

2. Rithika buys an LED TV which has a 25 inches screen. If its height is 7 inches. how wide is the screen? Her TV cabinet is 20 inches wide. Will the TV fit into the cabinet? Why?

Wide of TV by P.T $25^2 = 7^2 + w^2$

$$= 25^2 - 7^2 = w^2$$

$$(25+7)(25-7) = w^2$$

$$32 \times 18 = w^2$$

$$16 \times 2 \times 9 \times 2 = w^2$$

$$4^2 \times 2^2 \times 3^2 = w^2$$

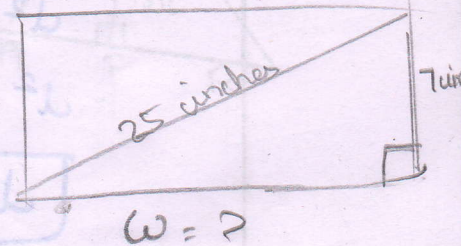
$$w = 4 \times 2 \times 3 = 24$$

wide of LED TV
= 24 inch

cabinet TV < wide TV

$$20 < 24 \text{ inch}$$

TV cabinet cannot fit.



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3. Find the length of the support cable required to support the tower with the floor.

by P.T

$$x^2 = 20^2 + 15^2$$

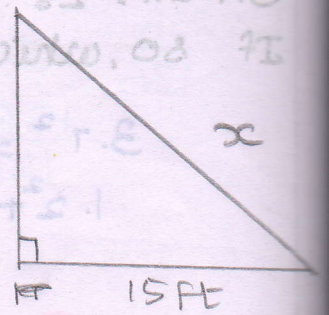
$$x^2 = 400 + 225$$

$$x^2 = 625$$

$$x = 25$$

$$x = 25 \text{ ft.}$$

length of support cable = 25 ft.



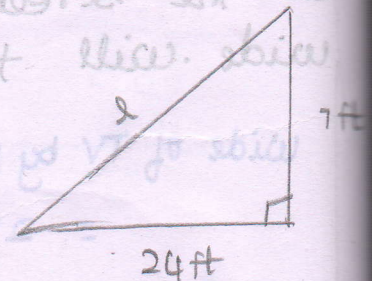
4. A ramp is constructed in a hospital as shown. Find the length of the ramp.

by P.T $d^2 = 24^2 + 7^2$

$$d^2 = 576 + 49$$

$$d^2 = 625 = 25^2$$

$$d = 25 \text{ ft}$$



5. In the figure, find MT and AH

Find MT and AH

ΔMTH by P.T. $MT^2 = MH^2 + HT^2$

$$MT^2 = 60^2 + 80^2$$

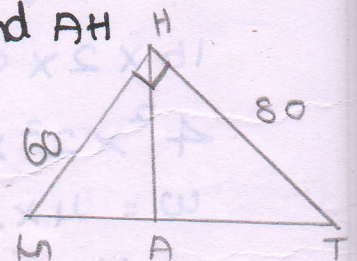
$$MT^2 = 3600 + 6400$$

$$MT^2 = 10000 = 100^2$$

$$MT = 100$$

$$AH = \frac{MH \times HT}{MT} = \frac{60 \times 80}{100}$$

$$AH = 48$$



6. Mayan travelled 28 km due north and then 21 km due east. What is the least distance that he could have travelled from his starting point?

by P.T $\triangle ABC$

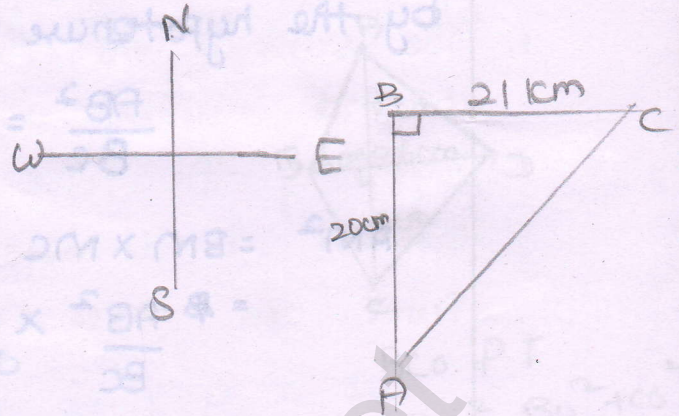
$$AC^2 = AB^2 + BC^2$$

$$= 28^2 + 21^2$$

$$AC^2 = 184 + 441$$

$$AC^2 = 1225 = 35^2$$

\therefore Short distance $AC = 35 \text{ km}$



9. In the figure MT and AH

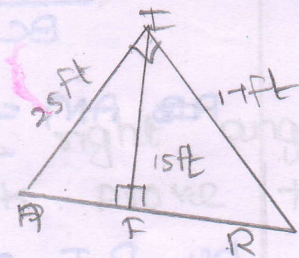
Find AR

$$FI = \frac{AI \times IR}{AR}$$

$$15 = \frac{25 \times 17}{AR}$$

$$AR = \frac{25 \times 17}{15} = \frac{85}{3}$$

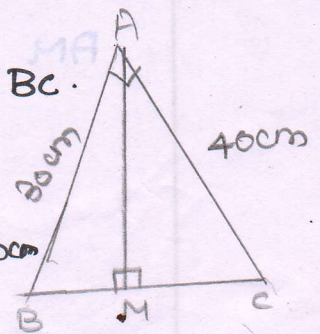
$$\therefore AR = \frac{85}{3} \text{ ft}$$



10. $\triangle ABC$ is a right angled triangle in which $\angle A = 90^\circ$ and $AM \perp BC$. Prove that

$$AM = \frac{AB \times AC}{BC} \text{ Also if } AB = 30 \text{ cm}$$

and $AC = 40 \text{ cm}$ find AM .



To prove $AM = \frac{AB \times AC}{BC}$

by the hypotenuse $AB^2 = \underline{BM \times BC}$

$$\frac{AB^2}{BC} = BM$$

$$AM^2 = BM \times MC$$

$$= \frac{AB^2}{BC} \times \frac{AC^2}{BC}$$

$$AM^2 = \frac{AB^2 \times AC^2}{BC^2}$$

$$AC^2 = MC \times BC$$

$$\frac{AC^2}{BC} = MC$$

$$\frac{AB \times AM}{BC} = \frac{AB \times AC}{BC}$$

by P.T $BC^2 = AB^2 + AC^2$

$$BC^2 = 30^2 + 40^2$$

$$BC^2 = 900 + 1600$$

$$= 2500 = 50^2$$

$$BC^2 = 50^2 \therefore \boxed{BC = 50\text{cm}}$$

$$AM = \frac{AB \times AC}{BC} = \frac{20 \times 40}{50} = \frac{120}{5}$$

$$\boxed{= 24\text{cm}}$$

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8. The diagonals of the rhombus is 12cm and 16cm. Find its perimeter. (Hint: the diagonals of rhombus bisect each other at right angles.)

ΔBCO P.T

$$BC^2 = BO^2 + CO^2$$

$$BC^2 = 6^2 + 8^2$$

$$= 36 + 64 = 100$$

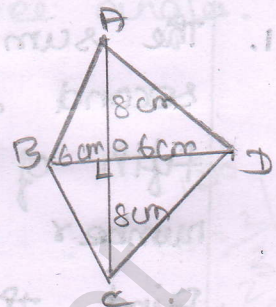
$$100 = 10^2$$

$$BC = 10\text{cm}$$

$$\text{Perimeter of rhombus} = 4a$$

$$= 4 \times 10$$

$$= 40\text{cm}$$



ΔBCO P.T

$$BC^2 = BO^2 + CO^2$$

$$BC^2 = 6^2 + 8^2$$

$$= 36 + 64$$

$$= 100$$

$$\sqrt{100} = 10$$

$$= 4 \times 10 = 40$$

7. IF ΔAPK is an isosceles right angled triangle, right angled at K. Prove that

$$AP^2 = 2AK^2$$

$$\text{G.T } AK = AP$$

by P.T ΔAPK

$$AP^2 = AK^2 + KP^2$$

$$= AK^2 + AK^2$$

$$AP^2 = 2AK^2$$

$$AK = AP$$

by P.T ΔAPK

$$AP^2 = AK^2 + AK^2$$

$$AK^2 = AK^2$$

$$AP^2 = 2AK^2$$

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Exercise 2.5

Miscellaneous Problems

1. The sum of the three numbers is 58. The second number is three times of two-fifth of the first number and the third number is 6 less than the first number. Find the three numbers.

Let x, y, z be the required numbers.

$$\text{G.T } x + y + z = 58 \quad y = 3 \times \frac{2}{5}x = \frac{6x}{5}$$

$$z = x - 6$$

$$x + \frac{6x}{5} + x - 6 = 58$$

$$\frac{2x + 6x}{5} = 58 + 6$$

$$\frac{10x + 6x}{5} = 64$$

$$\frac{16x}{5} = 64$$

$$x = \frac{64 \times 5}{16}$$

$$\boxed{x = 20}$$

$$y = \frac{6x}{5} = \frac{6(20)}{5} = 24$$

$$\boxed{y = 24}$$

$$z = 20 - 6$$

$$\boxed{z = 14}$$

\therefore required 3 numbers are

20, 24, 14

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2. In triangle ABC, the measure of $\angle B$ is two-third of the measure of $\angle A$. The measure of $\angle C$ is 20 more than the measure of $\angle A$. Find the measure of the three angles.

In $\triangle ABC$

$$\angle A + \angle B + \angle C = 180^\circ \Rightarrow \textcircled{1}$$

G.T $\angle B = \frac{2}{3} \angle A$ $\angle C = \angle A + 20^\circ$

$$\textcircled{1} \Rightarrow \angle A + \frac{2}{3} \angle A + 20^\circ = 180^\circ$$

$$2 \angle A + \frac{2}{3} \angle A = 180 - 20$$

$$\angle A \left(2 + \frac{2}{3} \right) = 160$$

$$\angle A \frac{8}{3} = 160$$

$$\angle A = 160 \times \frac{3}{8} = 60$$

$$\boxed{A = 60^\circ}$$

$$\angle B = \frac{2}{3} \angle A = \frac{2}{3} \times 60 = \boxed{40^\circ}$$

$$\angle C = \angle A + 20^\circ = 60 + 20 = \boxed{80^\circ}$$

$$\angle A = 60^\circ \quad \angle B = 40^\circ \quad \angle C = 80^\circ$$

3. Two equal sides of an isosceles triangle are $5y - 2$ and $4y + 9$ units. The third side is $2y + 5$ units. Find 'y' and the perimeter of the triangle.

G.T Two equal sides $5y - 2 = 4y + 9$

$$= 5y - 4y = 9 + 2$$

$$= \boxed{y = 11}$$

Perimeter of $\triangle = 5y - 2 + 4y + 9 + 2y + 5$

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4. In the given figure, angle $\angle XOZ$ and angle $\angle YOZ$ form a linear pair. Find the value of x .

sum of linear pair = 180°

$$5x + 6 + 3x - 2 = 180$$

$$8x + 4 = 180$$

$$8x = 180 - 4$$

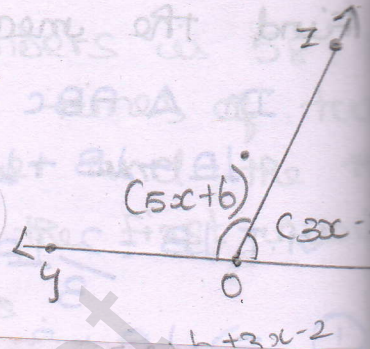
$$8x = 176$$

$$x = \frac{176}{8} = 22$$

$$x = 22$$

$$5x + 6 = 5(22) + 6 = 110 + 6 = 116$$

$$3x - 2 = 3(22) - 2 = 66 - 2 = 64$$



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6. Three consecutive integers, when taken in increasing order and multiplied by 2, 3 and respectively, total up to 74. Find the three numbers.

Let $x, x+1, x+2$ be 3 consecutive integers

$$\text{G.T } 2x + 3(x+1) + 4(x+2) = 74$$

$$9x + 11 = 74$$

$$9x = 74 - 11 = 63$$

$$x = \frac{63}{9} = 7$$

$$\therefore x = 7$$

Required number $7, 7+1, 7+2 = 7, 8, 9$

7. 331 students went on field trip. Six buses were filled to capacity and 7 students had to travel in a van. How many students were there in each bus?

Total student on a field trip = 331

Let x be students in each bus

$$331 = 6x + 7$$

$$331 - 7 = 6x$$

$$324 = 6x$$

$$\frac{324}{6} = x$$

$$x = 54$$

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8. A mobile vendor has 22 items, some which are pencils and others are ball pens. On a particular day, he is able to sell the pencils and ball pens. Pencils are sold for ₹ 15 each and ball pens are sold at ₹ 20 each. If the total sale amount with the vendor is ₹ 380, how many pencils did he sell?

Let x, y be the no. of pencils and pens

$$\text{G.T } x + y = 22 \Rightarrow y = 22 - x \Rightarrow \textcircled{1}$$

Cost of 1 pencil = Rs. 15

Cost of 1 pen = Rs. 20

$$\text{G.T } 15x + 20y = 380 \Rightarrow \textcircled{2}$$

Substitute $\textcircled{1}$ in $\textcircled{2}$

$$15x + 20(22 - x) = 380$$

$$-5 \quad 3x + 4(22 - x) = 75$$

$$3x + 88 - 4x = 75$$

$$88 = 75 + x$$

$$88 - 75 = x$$

$$x = 13$$

\therefore no. of pencils = 13

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Exercise 4.4

1. The rule of Fibonacci sequence is $F(n) = F(n-1) + F(n-2)$. Find the 11th to 20th Fibonacci numbers.

$$\text{G.T } F(n) = F(n-2) + F(n-1)$$

From Table 11 Pg: 85

$$9^{\text{th}} = 34$$

$$10^{\text{th}} = 55$$

$$n = 11$$

$$F(11) = F(11-2) + F(11-1)$$

$$= 5(9 + F(10))$$

$$= F(11) = 34 + 55 = 89$$

$$89, 144$$

$$n = 12 \quad F(12) = F(10) + F(11)$$

$$= 55 + 89 = 144$$

89, 144, 233, 377, 610, 987, 1597, 2584, 4181.

2. In a library, 385 Math books, 297 Science books and 143 Tamil books are bundled equally in numbers. What is the maximum number of books possible in a bundle for all types of books? (Use repeated division method).

$$297 \overline{)385} \begin{array}{l} 1 \\ 297 \\ \hline 88 \end{array}$$

$$88 \overline{)297} \begin{array}{l} 3 \\ 264 \\ \hline 33 \end{array}$$

$$33 \overline{)88} \begin{array}{l} 2 \\ 66 \\ \hline 22 \end{array}$$

$$22 \overline{)33} \begin{array}{l} 1 \\ 22 \\ \hline 11 \end{array}$$

$$11 \overline{)22} \begin{array}{l} 2 \\ 22 \\ \hline 0 \end{array}$$

\therefore HCF of 385
and 297 is 11

$$11 \overline{)143} \begin{array}{l} 13 \\ 143 \\ \hline 0 \end{array}$$

\therefore HCF of 143, 11 is 11

4. Using both repeated division method and repeated subtraction method and find the greatest number that divides 167 and 95, leaving 5 as remainder.

G.T 167, 95 (repeated division)

leaving 5 as remainder

$$167 - 5 = 162$$

$$95 - 5 = 90$$

$$90 \overline{)162} \begin{array}{l} 1 \\ 90 \\ \hline 72 \end{array}$$

$$72 \overline{)90} \begin{array}{l} 1 \\ 72 \\ \hline 18 \end{array}$$

$$18 \overline{)72} \begin{array}{l} 4 \\ 72 \\ \hline 0 \end{array}$$

\therefore HCF of 162, 90 is 18

(subtraction)

$$162 - 90 = 72$$

$$90 - 72 = 18$$

$$72 - 18 = 54$$

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2. Find the length of the largest which piece of wood used to measure exactly the 4m 50cm and 6m 30 cm (Use repeated subtraction method)

$$4m = 400cm \quad 6m = 600cm$$

$$400 + 50 = 450 \quad 600 + 30 = 630$$

$$630 - 450 = 180$$

$$450 - 180 = 270$$

$$270 - 180 = 90$$

$$180 - \boxed{90} = 90$$

$$90 - 90 = 0$$

∴ HCF OF 450, 630 are 90.

9-9

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