Level 8 (Summer Review).

Pg 1

1) CP = \$ 172
Overhead = \$ 61
Total (CP) = \$ 233

Gain = 12%

SP = 112% of 233

$= \frac{112}{100} \times 233$

$= \boxed{\$\ 260.96}$

2) <u>Case 1</u>

Loss% = 25%

SP = \$ 123

SP = 75% of CP

$123 = \frac{75}{100} \times CP$

$\frac{123 \times 100}{75} = CP$

CP = \$ 164

<u>Case 2</u>

SP = \$ 188.60

CP = \$ 164

Pg 1 contd

2) Gain = \$ 24.60

$Gain\% = \frac{24.60}{164} \times 100$

$Gain\% = \boxed{15\%}$

3) LCM of 11 and 10
= 110

CP of 110 melons = \$ 300

SP of 110 melons = = 31×11 = \$ 341

Gain = \$ 341 − \$ 300
= \$ 41

$Gain\% = \frac{41}{300} \times 100$

$= \boxed{13\frac{2}{3}\%}$

Level 8 (Summer Review) 2015-16

Pg 1 contd

4) Difference in % Profit
$= 16\% - 7\%$
$= 9\%$

9% of Cost Price = \$63

$CP = \frac{63 \times 100}{9} = \$700$

$CP = \boxed{\$700}$

Pg 2

Let

5) Original CP for Andy $= \$100$

P% for Andy = 15%

SP(Andy) = \$115
CP(Ben) = \$115
P% (Ben) = 20% of \$115

Pg 2 contd

5) $SP(Ben) = \frac{120}{100} \times 115$

$= \frac{6}{\cancel{5}_1} \times \cancel{115}^{23}$

$= \$138$

Gain (Ben) = \$23

(Original CP)

\$23 → \$100
\$207 → x

$x = \frac{207 \times 100}{23} = 900$

$\boxed{\$900}$

6) CP (80 Cartoons)
$= 80 \times 25$ \$
$= \$2000$

Total Gain = 20%

SP of $= \frac{120}{100} \times 2000$

$= \$2400$

Level 8 (Summer Review) 2015-16

Pg 2 Contd

6) CP(50 Cartoons) = $\$25 \times 50$

$= \$1250$

Loss % = 10%

$SP = \frac{9\cancel{0}}{1\cancel{0}\cancel{0}} \times 125\cancel{0}$

$= \$1125$

SP (remaning 30 cartoon) = $\$2400 - \$1125$

1275

SP (each remaing Cartoon) = $30\overline{)1275}$

$= \boxed{\$42.50}$

Pg 2 Contd

7) <u>Ist Car</u>

SP(1st Car) = \$13800

P% = 15%

$SP = \frac{115}{100} \times CP$

$\frac{13800 \times 100}{115} = CP(\text{Car } 1)$

CP(Car 1) = \$12,000

Profit (Car 1) = \$1,800

= Loss (Car 2)

<u>Car 2</u>

10% of CP = \$1800

$CP = \frac{1800 \times 10\cancel{0}}{1\cancel{0}}$

CP (Car2) = 18,000

CP (Car 2) = $\boxed{\$18,000}$

Pg 2 contd

8) First Gain = 15%
Second Gain = 20%

Difference (Gain) = 5%

Difference Gain	CP
5	100
375	x

$$x = \frac{375 \times 100}{5}$$

$$= \$7500$$

CP = $\boxed{\$7500}$

Pg 3

9) $9x + 2y = -9$ (Eq I) $\times 2$

$$18x + 4y = -18$$
$$18x - 5y = -18$$
$$- \quad + \quad +$$

$$9y = 0$$
$$y = 0$$

Substituting $y = 0$ in Eq (I)

$$9x = -9$$
$$x = -1$$

Sol^n = $\boxed{(-1, 0)}$

10) $6x - y = -4$ Eq I $\times 2$

$$12x - 2y = -8$$
$$3x - 2y = 1$$
$$- \quad + \quad -$$

$$9x = -9$$

Pg 3 contd

10) $x = -1$

Substituting $x = -1$ in Eq (I)

$6(-1) - y = -4$

$-6 - y = -4$

$-y = 2$

$y = -2$

Solution = $\boxed{(-1, -2)}$

11) Adding both Eq^n's we get

$5x + 5y = -20$

$x + y = -4$

Subtracting the two eq^n we get

$x - y = -4$

$x + y = -4$

$2x = -8$

Pg 3 contd

11) $x = -4$

$y = 0$

$\boxed{(-4, 0)}$

12) $8x + 3y = 27$

$-(8x - 20y = 4)$

$23y = 23$

$y = 1$

Substituting $y = 1$ in Eq

$2x - 5y = 1$

$2x - 5 = 1$

$2x = 6$

$x = 3$

Sol^n = $\boxed{(3, 1)}$

13)

$4x - 2y = 0$ Eq I × 3

$5x + 3y = -11$ Eq II × 2

Level 8 (Summer Review) 2015-16

Pg 3 Contd

$$12x - \cancel{6y} = 0$$
$$10x + \cancel{6y} = -22$$
$$22x = -22$$
$$x = -1$$

Substituting $x = -1$
in Eq $4x - 2y = 0$
$$4(-1) - 2y = 0$$
$$-4 - 2y = 0$$
$$-2y = 4$$
$$y = -2$$

Sol^n = $\boxed{(-1, -2)}$

Pg 4

$$7x - 7y = 35$$
$$x - y = 5$$

$$4x - 3y = 18$$
$$-3x + 4y = -17$$
$$x + y = 1$$
$$x - y = 5$$
$$2x = 6$$
$$x = 3$$
$$3 - y = 5$$
$$3 - 5 = y$$
$$y = -2$$

Solution Set = $\boxed{(3, -2)}$

Pg 4

14) $4x - 3y = 18$
$3x - 4y = 17$
Adding and subtracting the two equations

15) $P = \$15,625$
$R = 16\%$ yearly
$R = 4\%$ quarterly
$T = 3$ term
$$A = P\left(1 + \frac{R}{100}\right)^T$$

Level 8 (Summer Review) 2015-16

Pg 4 contd

15 $A = 15625\left(\frac{104}{100}\right)^3$

$= 15625 \times (1.04)^3$

$\approx \$17576$

Interest = $\boxed{\$1951}$

16) $P = \$14,500$

$R = 10\%$

$T = 3$ years

$A = 14500\left(\frac{110}{100}\right)^3$

$A = 14500 \times (1.1)^3$

$A = \$19299.50$

Interest = $\boxed{\$4799.50}$

Pg 4 contd

17) $P = \$12800$

$R = 7.5\%$

$T = 3$ years

$A = P\left(\frac{100+R}{100}\right)^T$

$= 12800\left(\frac{107.5}{100}\right)^3$

$= 12800 \times (1.075)^3$

$A = 15901.40$

He will have to repay $= \boxed{\$15901.40}$

18) $A = P\left(1 + \frac{r_1}{100}\right)\left(1 + \frac{r_2}{100}\right)$

$A = 12500 \times \frac{115}{100} \times \frac{116}{100}$

$A = \boxed{\$16,675}$

Level 8 (Summer Review) 2015-16

Pg 5

19)

a) $a^3 - 5a^2 - a + 5$

$= a^2(a-5) - 1(a-5)$

$= (a-5)(a^2-1)$

$= \boxed{(a-5)(a-1)(a+1)}$

b) $x^2 - y^2 + 2yx - z^2$

$= (x-y)^2 - z^2$

$= [(x-y)+z][(x-y)-z]$

$= \boxed{(x-y+z)(x-y-z)}$

Pg 5

20) $x - y - x^2 + y^2$

a)

$= (x-y) - (x^2-y^2)$

$= (x-y) - (x-y)(x+y)$

$= (x-y)[1-(x+y)]$

$= \boxed{(x-y)(1-x-y)}$

b) $4x^2y - 9y^3$

$= y(4x^2 - 9y^2)$

$= \boxed{y(2x-3y)(2x+3y)}$

Level 8 (Summer Review) 2015 - 16

Pg 5 Contd

21 a) $x^2 - 4xz + 4z^2 - y^2$

$= (x-2z)^2 - (y)^2$

$= [(x-2z)+y][(x-2z)-y]$

$= \boxed{(x-2z+y)(x-2z-y)}$

21 b) $2(x-3)^2 - 32$

$= 2[(x-3)^2 - 16]$

$= 2[(x-3)^2 - (4)^2]$

$= 2[(x-3)-4][(x-3)+4]$

$= \boxed{2(x-7)(x+1)}$

Pg 6

(22) a) $2x^2 + 5x - 3 = 0$

$2x^2 + 6x - 1x - 3 = 0$

$2x(x+3) - 1(x+3) = 0$

$(x-3)(2x-1) = 0$

$x = 3$ OR $1/2$

$x = \boxed{3, 1/2}$

22 b) $2x^2 + 3x - 90 = 0$

$2x^2 - 12x + 15x - 90 = 0$

$2x(x-6) + 15(x-6) = 0$

$(x-6)(2x+15) = 0$

$x = 6$ OR $x = \frac{-15}{2}$

$x = \boxed{6, \frac{-15}{2}}$

Level 8 (Summer Review) 2015-16

Pg 6 contd.

23

a) $10 + 3x - x^2 = 0$

$10 + 5x - 2x - x^2 = 0$

$5(2+x) - x(2+x) = 0$

$(5-x)(2+x) = 0$

$x = 5$ or $x = -2$

$x = \boxed{5, -2}$

23

b) $-4x^2 - 12x + 7 = 0$

$-4x^2 - 14x + 2x + 7 = 0$

$-2x(2x+7) + 1(2x+7) = 0$

$(2x+7)(-2x+1) = 0$

$2x = -7$ OR $2x = 1$

$x = \frac{-7}{2}$ OR $x = \frac{1}{2}$

$x = \boxed{\frac{-7}{2}, \frac{1}{2}}$

Pg 6 contd

24

a) $12y^2 + 4y - 5 = 0$

$12y^2 + 10y - 6y - 5 = 0$

$2y(6y+5) - 1(6y+5) = 0$

$(6y+5)(2y-1) = 0$

$6y + 5 = 0$ OR $2y - 1 = 0$

$y = \frac{-5}{6}$ OR $y = \frac{1}{2}$

$y = \boxed{\frac{-5}{6}, \frac{1}{2}}$

24

b) $3x^2 - 4x - 7 = 0$

$3x^2 + 3x - 7x - 7 = 0$

$3x(x+1) - 7(x+1) = 0$

$(x+1)(3x-7) = 0$

$x = -1$ or $x = 7/3$

$x = \boxed{-1, 7/3}$

Level 8 (Summer Review) 2015-16

Pg 7

25) $\dfrac{(x+1)}{(x-2)} = \dfrac{(x-2)}{(x-3)}$

By Cross multiplication

$(x+1)(x-3) = (x-2)^2$

$x^2 - 2x - 3 = x^2 - 4x + 4$

$-2x - 3 = -4x + 4$

$2x = 7$

$\boxed{x = 7/2}$

26) $(2x-3)(3x+1) = (3x-1)(2x-1)$

$\cancel{6x^2} + 2x - 9x - 3 = \cancel{6x^2} - 3x - 2x + 1$

$-7x - 3 = -5x + 1$

$-2x = 4$

$\boxed{x = -2}$

Pg 7 Contd

27) $x - 1 = \dfrac{3}{4}(x+1) - \dfrac{1}{2}$

$x - \dfrac{1}{2} = \dfrac{3}{4}x + \dfrac{3}{4}$

$x - \dfrac{3}{4}x = \dfrac{3}{4} + \dfrac{1}{2}$

$\dfrac{1}{4}x = \dfrac{5}{4}$

$\boxed{x = 5}$

28) $\dfrac{(x+7)}{3} = 1 + \dfrac{(3x-2)}{5}$

LCM = 15

$5(x+7) = 15 + 3(3x-2)$

$5x + 35 = 15 + 9x - 6$

$35 - 9 = 4x$

$26 = 4x$

$x = 13/2$

$\boxed{x = 6\tfrac{1}{2}}$

Level 8 (Summer Review) 2015-16

Pg 8

(29) $x^2 - 16 = x^2 - 3x - 28 + 33$

$-16 = -3x + 5$

$-21 = -3x$

$\boxed{x = 7}$

30) $x^2 + 1x - 6 = x^2 - 4$

$1x - 6 = -4$

$\boxed{x = +2}$

31) $\frac{(x-4)}{5} + \frac{(x+2)}{2} = 10$

LCM = 10

$(x-4) \times 2 + 5(x+2) = 100$

$2x - 8 + 5x + 10 = 100$

$7x + 2 = 100$

$7x = 98$

$\boxed{x = 14}$

Pg 8 Contd

(32) $\frac{5-4x}{3-2x} = \frac{13}{7}$

Cross multiplying,

$7(5-4x) = 13(3-2x)$

$35 - 28x = 39 - 26x$

$-28x + 26x = 39 - 35$

$-2x = 4$

$\boxed{x = -2}$

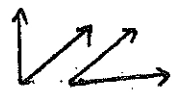
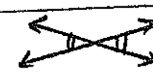
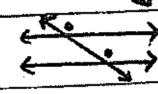
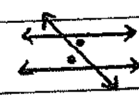
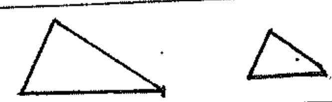
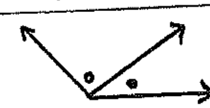
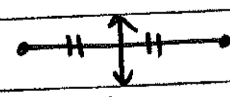
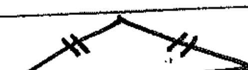
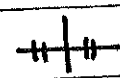
Summer Review

Answer Key

Definitions, Postulates and Theorems

Read the Theorm's properly and Memorize

Definitions

Name	Definition	Visual Clue
Complementary Angles	Two angles whose measures have a sum of 90°	
Supplementary Angles	Two angles whose measures have a sum of 180°	
Theorem	A statement that can be proven	
Vertical Angles	Two angles formed by intersecting lines and facing in the opposite direction	
Transversal	A line that intersects two lines in the same plane at different points	
Corresponding angles	Pairs of angles formed by two lines and a transversal that make an F pattern	
Same-side interior angles	Pairs of angles formed by two lines and a transversal that make a C pattern	
Alternate interior angles	Pairs of angles formed by two lines and a transversal that make a Z pattern	
Congruent triangles	Triangles in which corresponding parts (sides and angles) are equal in measure	
Similar triangles	Triangles in which corresponding angles are equal in measure and corresponding sides are in proportion (ratios equal)	
Angle bisector	A ray that begins at the vertex of an angle and divides the angle into two angles of equal measure	
Segment bisector	A ray, line or segment that divides a segment into two parts of equal measure	
Legs of an isosceles triangle	The sides of equal measure in an isosceles triangle	
Base of an isosceles triangle	The third side of an isosceles triangle	
Equiangular	Having angles that are all equal in measure	
Perpendicular bisector	A line that bisects a segment and is perpendicular to it	
Altitude	A segment from a vertex of a triangle perpendicular to the line containing the opposite side	

Pg 9

Read properly and Memorize

Answer Key

Definitions, Postulates and Theorems

Definitions

Name	**Definition**	**Visual Clue**
Geometric mean	The value of x in proportion a/x = x/b where a, b, and x are positive numbers (x is the geometric mean between a and b)	$x^2 = ab$ $x = \sqrt{ab}$
Sine, sin	For an acute angle of a right triangle, the ratio of the side opposite the angle to the measure of the hypotenuse. (opp/hyp)	$\text{Sin} = \frac{\text{opp}}{\text{hyp}}$
Cosine, cos	For an acute angle of a right triangle the ratio of the side adjacent to the angle to the measure of the hypotenuse. (adj/hyp)	$\text{Cosine} = \frac{\text{adj}}{\text{Hyp}}$
Tangent, tan	For an acute angle of a right triangle, the ratio of the side opposite to the angle to the measure of the side adjacent (opp/adj)	$\text{Tan} = \frac{\text{opp}}{\text{Adj}}$

Algebra Postulates

Name	**Definition**	**Visual Clue**
Addition Prop. Of equality	If the same number is added to equal numbers, then the sums are equal	If $a = b$ then $a + x = b + x$
Subtraction Prop. Of equality	If the same number is subtracted from equal numbers, then the differences are equal	If $a = b$ then $a - x = b - x$
Multiplication Prop. Of equality	If equal numbers are multiplied by the same number, then the products are equal	If $a = b$ then $ax = bx$
Division Prop. Of equality	If equal numbers are divided by the same number, then the quotients are equal	If $a = b$ then $a/x = b/x$
Reflexive Prop. Of equality	A number is equal to itself	$a = a$
Symmetric Property of Equality	If a = b then b = a	done
Substitution Prop. Of equality	If values are equal, then one value may be substituted for the other.	If $x = y$ $a + x = a + y$
Transitive Property of Equality	If a = b and b = c then a = c	done
Distributive Property	a(b + c) = ab + ac	done

Congruence Postulates

Name	**Definition**	**Visual Clue**
Reflexive Property of Congruence	$A \cong A$	
Symmetric Property of Congruence	If $A \cong B$, *then* $B \cong A$	
Transitive Property of Congruence	If $A \cong B$ and $B \cong C$ then $A \cong C$	

Read Properly and Memorize

Answer key

Definitions, Postulates and Theorems

Angle Postulates And Theorems		Visual Clue
Name	**Definition**	
Angle Addition postulate	For any angle, the measure of the whole is equal to the sum of the measures of its non-overlapping parts	a, b, x; $x = a + b$
Linear Pair Theorem	If two angles form a linear pair, then they are supplementary.	x / y; $x + y = 180^\circ$
Congruent supplements theorem	If two angles are supplements of the same angle, then they are congruent.	If $x + a = 180^\circ$, $x + b = 180^\circ$ then $a = b$
Congruent complements theorem	If two angles are complements of the same angle, then they are congruent.	If $x + a = 90^\circ$, $x + b = 90^\circ$ then $a = b$
Right Angle Congruence Theorem	All right angles are congruent.	a 90, b 90; $a \cong b$
Vertical Angles Theorem	Vertical angles are equal in measure	x, y; $x = y$
Theorem	If two congruent angles are supplementary, then each is a right angle.	$x = y$ and $x + y = 180^\circ$; $x = y = 90^\circ$
Angle Bisector Theorem	If a point is on the bisector of an angle, then it is equidistant from the sides of the angle.	
Converse of the Angle Bisector Theorem	If a point in the interior of an angle is equidistant from the sides of the angle, then it is on the bisector of the angle.	

Lines Postulates And Theorems		Visual Clue
Name	**Definition**	
Segment Addition postulate	For any segment, the measure of the whole is equal to the sum of the measures of its non-overlapping parts	a, b, c; A B C D; $a + b = c + b$
Postulate	Through any two points there is exactly one line	A B
Postulate	If two lines intersect, then they intersect at exactly one point.	
Common Segments Theorem	Given collinear points A,B,C and D arranged as shown, if $\overline{AB} \cong \overline{CD}$ then $\overline{AC} \cong \overline{BC}$	A B C D; $AC = BD$
Corresponding Angles Postulate	If two parallel lines are intersected by a transversal, then the corresponding angles are equal in measure	a, b; If $l \parallel m$ the $a = b$
Converse of Corresponding Angles Postulate	If two lines are intersected by a transversal and corresponding angles are equal in measure, then the lines are parallel	a l, b m; If $a = b$ then $l \parallel m$

Pg 11

Read properly and Memorize

Answer key

Definitions, Postulates and Theorems

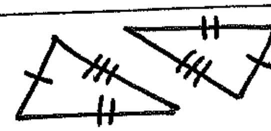
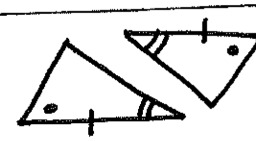
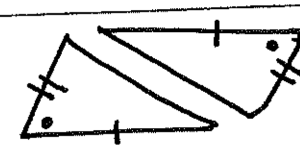
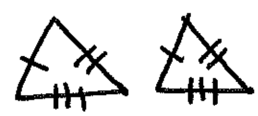
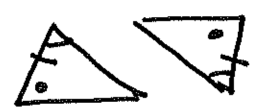
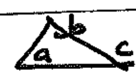
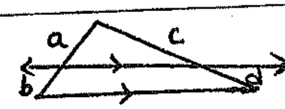
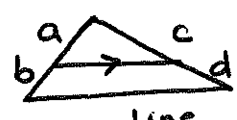
Lines Postulates And Theorems

Name	Definition	Visual Clue
Postulate	Through a point not on a given line, there is one and only one line parallel to the given line	x l
Alternate Interior Angles Theorem	If two parallel lines are intersected by a transversal, then alternate interior angles are equal in measure	If $a=b$ then $l \parallel m$
Alternate Exterior Angles Theorem	If two parallel lines are intersected by a transversal, then alternate exterior angles are equal in measure	If $l \parallel m$ then $a=b$
Same-side Interior Angles Theorem	If two parallel lines are intersected by a transversal, then same-side interior angles are supplementary.	If $l \parallel m$ $a+b=180°$
Converse of Alternate Interior Angles Theorem	If two lines are intersected by a transversal and alternate interior angles are equal in measure, then the lines are parallel	If $a+b=180°$ then $l \parallel m$
Converse of Alternate Exterior Angles Theorem	If two lines are intersected by a transversal and alternate exterior angles are equal in measure, then the lines are parallel	If $a=b$ then $l \parallel m$
Converse of Same-side Interior Angles Theorem	If two lines are intersected by a transversal and same-side interior angles are supplementary, then the lines are parallel	If $a+b=180°$ $l \parallel m$
Theorem	If two intersecting lines form a linear pair of congruent angles, then the lines are perpendicular	90°
Theorem	If two lines are perpendicular to the same transversal, then they are parallel	
Perpendicular Transversal Theorem	If a transversal is perpendicular to one of two parallel lines, then it is perpendicular to the other one.	
Perpendicular Bisector Theorem	If a point is on the perpendicular bisector of a segment, then it is equidistant from the endpoints of the segment	
Converse of the Perpendicular Bisector Theorem	If a point is the same distance from both the endpoints of a segment, then it lies on the perpendicular bisector of the segment	
Parallel Lines Theorem	In a coordinate plane, two nonvertical lines are parallel IFF they have the same slope.	$a=b$
Perpendicular Lines Theorem	In a coordinate plane, two nonvertical lines are perpendicular IFF the product of their slopes is -1.	
Two-Transversals Proportionality Corollary	If three or more parallel lines intersect two transversals, then they divide the transversals proportionally.	$\frac{a}{b}=\frac{c}{d}$

Read Properly and Memorize

Answer Key

Definitions, Postulates and Theorems

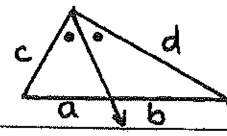
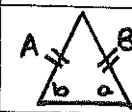
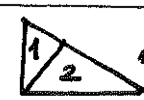
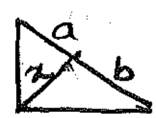
Triangle Postulates And Theorems		
Name	**Definition**	**Visual Clue**
Angle-Angle (AA) Similarity Postulate	If two angles of one triangle are equal in measure to two angles of another triangle, then the two triangles are similar	
Side-side-side (SSS) Similarity Theorem	If the three sides of one triangle are proportional to the three corresponding sides of another triangle, then the triangles are similar.	
Side-angle-side SAS) Similarity Theorem	If two sides of one triangle are proportional to two sides of another triangle and their included angles are congruent, then the triangles are similar.	
Third Angles Theorem	If two angles of one triangle are congruent to two angles of another triangle, then the third pair of angles are congruent	
Side-Angle-Side Congruence Postulate SAS	If two sides and the included angle of one triangle are equal in measure to the corresponding sides and angle of another triangle, then the triangles are congruent.	
Side-side-side Congruence Postulate SSS	If three sides of one triangle are equal in measure to the corresponding sides of another triangle, then the triangles are congruent	
Angle-side-angle Congruence Postulate ASA	If two angles and the included side of one triangle are congruent to two angles and the included side of another triangle, then the triangles are congruent.	
Triangle Sum Theorem	The sum of the measure of the angles of a triangle is 180°	 $a+b+c=180^\circ$
Corollary	The acute angles of a right triangle are complementary.	
Exterior angle theorem	An exterior angle of a triangle is equal in measure to the sum of the measures of its two remote interior angles.	 $x = a+b$
Triangle Proportionality Theorem	If a line parallel to a side of a triangle intersects the other two sides, then it divides those sides proportionally.	$\frac{a}{b} = \frac{c}{d}$ 
Converse of Triangle Proportionality Theorem	If a line divides two sides of a triangle proportionally, then it is parallel to the third side.	 If $\frac{a}{b} = \frac{c}{d}$ the line $\parallel$

Pg 13

Read Properly and Memorize

Answer Key

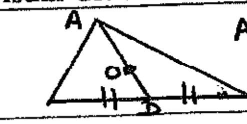
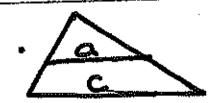
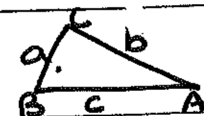
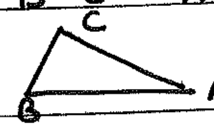
Definitions, Postulates and Theorems

Triangle Postulates And Theorems		
Name	**Definition**	**Visual Clue**
Triangle Angle Bisector Theorem	An angle bisector of a triangle divides the opposite sides into two segments whose lengths are proportional to the lengths of the other two sides.	 $\frac{a}{b} = \frac{c}{d}$
Angle-angle-side Congruence Theorem AAS	If two angles and a non-included side of one triangle are equal in measure to the corresponding angles and side of another triangle, then the triangles are congruent.	
Hypotenuse-Leg Congruence Theorem HL	If the hypotenuse and a leg of a right triangle are congruent to the hypotenuse and a leg of another right triangle, then the triangles are congruent.	
Isosceles triangle theorem	If two sides of a triangle are equal in measure, then the angles opposite those sides are equal in measure	 If $A = B$ then $a = b$
Converse of Isosceles triangle theorem	If two angles of a triangle are equal in measure, then the sides opposite those angles are equal in measure	
Corollary	If a triangle is equilateral, then it is equiangular	
Corollary	The measure of each angle of an equiangular triangle is 60°	
Corollary	If a triangle is equiangular, then it is also equilateral	
Theorem	If the altitude is drawn to the hypotenuse of a right triangle, then the two triangles formed are similar to the original triangle and to each other.	 $\Delta 1 \sim \Delta 2$
Pythagorean theorem	In any right triangle, the square of the length of the hypotenuse is equal to the sum of the square of the lengths of the legs.	$a^2+b^2=c^2$
Geometric Means Corollary a	The length of the altitude to the hypotenuse of a right triangle is the geometric mean of the lengths of the two segments of the hypotenuse.	
Geometric Means Corollary b	The length of a leg of a right triangle is the geometric mean of the lengths of the hypotenuse and the segment of the hypotenuse adjacent to that leg.	 $x^2 = ab$
Circumcenter Theorem	The circumcenter of a triangle is equidistant from the vertices of the triangle. (pt of intersection of Altitudes)	
Incenter Theorem	The incenter of a triangle is equidistant from the sides of the triangle. (pt. of intersection of angle bisectors)	

Read Properly and Memorize

Answer Key

Definitions, Postulates and Theorems

Triangle Postulates And Theorems		
Name	**Definition**	**Visual Clue**
Centriod Theorem	The centriod of a triangle is located 2/3 of the distance from each vertex to the midpoint of the opposite side. (intersection of medians)	 $AO = \frac{2}{3} AD$
Triangle Midsegment Theorem	A midsegment of a triangle is parallel to a side of triangle, and its length is half the length of that side.	 $a = \frac{1}{2} c$
Theorem	If two sides of a triangle are not congruent, then the larger angle is opposite the longer side.	 If $a < b$ then $\angle A < \angle B$
Theorem	If two angles of a triangle are not congruent, then the longer side is opposite the larger angle.	 If $\angle A > \angle B$ then $a > b$
Triangle Inequality Theorem	The sum of any two side lengths of a triangle is greater than the third side length.	
Hinge Theorem	If two sides of one triangle are congruent to two sides of another triangle and the third sides are not congruent, then the longer third side is across from the larger included angle.	
Converse of Hinge Theorem	If two sides of one triangle are congruent to two sides of another triangle and the third sides are not congruent, then the larger included angle is across from the longer third side.	
Converse of the Pythagorean Theorem	If the sum of the squares of the lengths of two sides of a triangle is equal to the square of the length of the third side, then the triangle is a right triangle.	
Pythagorean Inequalities Theorem	In ΔABC, c is the length of the longest side. If $c^2 > a^2 + b^2$, then ΔABC is an obtuse triangle. If $c^2 < a^2 + b^2$, then ΔABC is acute.	
45°-45°-90° Triangle Theorem	In a 45°-45°-90° triangle, both legs are congruent, and the length of the hypotenuse is the length of a length times the square root of 2.	
30°-60°-90° Triangle Theorem	In a 30°-60°-90° triangle, the length of the hypotenuse is 2 times the length of the shorter leg, and the length of the longer leg is the length of the shorter leg times the square root of 3.	
Law of Sines	For any triangle ABC with side lengths a, b, and c, $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$	
Law of Cosines	For any triangle, ABC with sides a, b, and c, $a^2 = b^2 + c^2 - 2bc\cos A, b^2 = a^2 + c^2 - 2ac\cos B,$ $c^2 = a^2 + b^2 - 2ac\cos C$	

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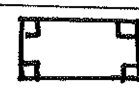
Read Properly and Memorize

Answer Key

Definitions, Postulates and Theorems

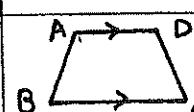
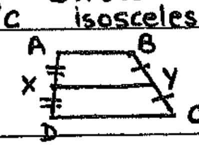
Plane Postulates And Theorems		
Name	**Definition**	**Visual Clue**
Postulate	Through any three noncollinear points there is exactly one plane containing them.	
Postulate	If two points lie in a plane, then the line containing those points lies in the plane	
Postulate	If two points lie in a plane, then the line containing those points lies in the plane	

Polygon Postulates And Theorems		
Name	**Definition**	**Visual Clue**
Polygon Angle Sum Theorem	The sum of the interior angle measures of a convex polygon with *n* sides.	$(n-2) \times 180°$
Polygon Exterior Angle Sum Theorem	The sum of the exterior angle measures, one angle at each vertex, of a convex polygon is 360°.	Sum (ext ∠'s) = 360°
Theorem	If a quadrilateral is a parallelogram, then its opposite sides are congruent.	 □ABCD is llgm
Theorem	If a quadrilateral is a parallelogram, then its opposite angles are congruent.	
Theorem	If a quadrilateral is a parallelogram, then its consecutive angles are supplementary.	
Theorem	If a quadrilateral is a parallelogram, then its diagonals bisect each other.	
Theorem	If one pair of opposite sides of a quadrilateral are parallel and congruent, then the quadrilateral is a parallelogram.	
Theorem	If both pairs of opposite sides of a quadrilateral are congruent, then the quadrilateral is a parallelogram.	
Theorem	If both pairs of opposite angles are congruent, then the quadrilateral is a parallelogram.	
Theorem	If an angle of a quadrilateral is supplementary to both of its consecutive angles, then the quadrilateral is a parallelogram.	
Theorem	If the diagonals of a quadrilateral bisect each other, then the quadrilateral is a parallelogram.	
Theorem	If a quadrilateral is a rectangle, then it is a parallelogram.	
Theorem	If a parallelogram is a rectangle, then its diagonals are congruent.	
Theorem	If a quadrilateral is a rhombus, then it is a parallelogram.	

Read Properly and Memorize

Answer Key

Definitions, Postulates and Theorems

Polygon Postulates And Theorems		
Name	**Definition**	**Visual Clue**
Theorem	If a parallelogram is a rhombus then its diagonals are perpendicular.	
Theorem	If a parallelogram is a rhombus, then each diagonal bisects a pair of opposite angles.	
Theorem	If one angle of a parallelogram is a right angle, then the parallelogram is a rectangle.	
Theorem	If the diagonals of a parallelogram are congruent, then the parallelogram is a rectangle.	
Theorem	If one pair of consecutive sides of a parallelogram are congruent, then the parallelogram is a rhombus.	
Theorem	If the diagonals of a parallelogram are perpendicular, then the parallelogram is a rhombus.	
Theorem	If one diagonal of a parallelogram bisects a pair of opposite angles, then the parallelogram is a rhombus.	
Theorem	If a quadrilateral is a kite then its diagonals are perpendicular.	
Theorem	If a quadrilateral is a kite then exactly one pair of opposite angles are congruent.	
Theorem	If a quadrilateral is an isosceles trapezoid, then each pair of base angles are congruent.	
Theorem	If a trapezoid has one pair of congruent base angles, then the trapezoid is isosceles.	
Theorem	A trapezoid is isosceles if and only if its diagonals are congruent.	 If AC = BD ▱ABCD is isosceles Trap
Trapezoid Midsegment Theorem	The midsegment of a trapezoid is parallel to each base, and its length is one half the sum of the lengths of the bases.	

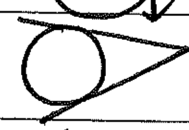
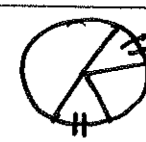
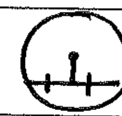
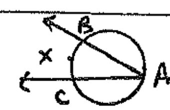
Pg 17

Read Properly and Memorize

Answer Key

Definitions, Postulates and Theorems

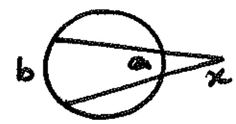
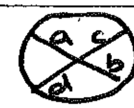
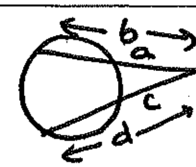
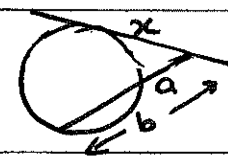
Polygon Postulates And Theorems		
Name	**Definition**	**Visual Clue**
Proportional Perimeters and Areas Theorem	If the similarity ratio of two similar figures is $\frac{a}{b}$, then the ratio of their perimeter is $\frac{a}{b}$ and the ratio of their areas is $\frac{a^2}{b^2}$ or $\left(\frac{a}{b}\right)^2$	
Area Addition Postulate	The area of a region is equal to the sum of the areas of its nonoverlapping parts.	 a+b

Circle Postulates And Theorems		
Name	**Definition**	**Visual Clue**
Theorem	If a line is tangent to a circle, then it is perpendicular to the radius drawn to the point of tangency.	
Theorem	If a line is perpendicular to a radius of a circle at a point on the circle, then the line is tangent to the circle.	
Theorem	If two segments are tangent to a circle from the same external point then the segments are congruent.	
Arc Addition Postulate	The measure of an arc formed by two adjacent arcs is the sum of the measures of the two arcs.	 xz = xy + yz
Theorem	In a circle or congruent circles: congruent central angles have congruent chords, congruent chords have congruent arcs and congruent acrs have congruent central angles.	
Theorem	In a circle, if a radius (or diameter) is perpendicular to a chord, then it bisects the chord and its arc.	
Theorem	In a circle, the perpendicular bisector of a chord is a radius (or diameter).	
Inscribed Angle Theorem	The measure of an inscribed angle is half the measure of its intercepted arc.	 $\angle BAC = \frac{1}{2}$ arc BXC
Corollary	If inscribed angles of a circle intercept the same arc or are subtended by the same chord or arc, then the angles are congruent	 x = y
Theorem	An inscribed angle subtends a semicircle IFF the angle is a right angle	 $a = \frac{1}{2} x$
Theorem	If a quadrilateral is inscribed in a circle, then its opposite angles are supplementary.	 $a + b = 180°$

Answer Key

Read Properly and Memorize

Definitions, Postulates and Theorems

Circle Postulates And Theorems		
Name	**Definition**	**Visual Clue**
Theorem	If a tangent and a secant (or chord) intersect on a circle at the point of tangency, then the measure of the angle formed is half the measure of its intercepted arc.	 $a = \frac{1}{2}x$
Theorem	If two secants or chords intersect in the interior of a circle, then the measure of each angle formed is half the sum of the measures of the intercepted arcs.	 $x = \frac{a+b}{2}$
Theorem	If a tangent and a secant, two tangents or two secants intersect in the exterior of a circle, then the measure of the angle formed is half the difference of the measure of its intercepted arc.	 $x = \frac{b-a}{2}$
Chord-Chord Product Theorem	If two chords intersect in the interior of a circle, then the products of the lengths of the segments of the chords are equal.	 $a \times b = c \times d$
Secant-Secant Product Theorem	If two secants intersect in the exterior of a circle, then the product of the lengths of one secant segment and its external segment equals the product of the lengths of the other secant segment and its external segment.	 $a \times b = c \times d$
Secant-Tangent Product Theorem	If a secant and a tangent intersect in the exterior of a circle, then the product of the lengths of the secant segment and its external segment equals the length of the tangent segment squared.	 $x^2 = ab$
Equation of a Circle	The equal of a circle with center (h, k) and radius r is $(x-h)^2 + (y-k)^2 = r^2$	

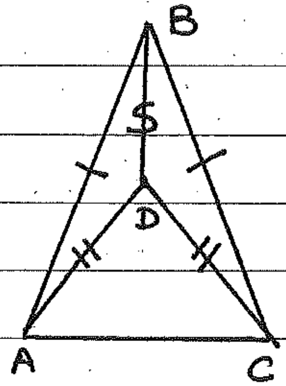
Other		
Name	**Definition**	**Visual Clue**

Answer Key Summer Review

2 parts writing paper with margins – half wide

(Level 8)

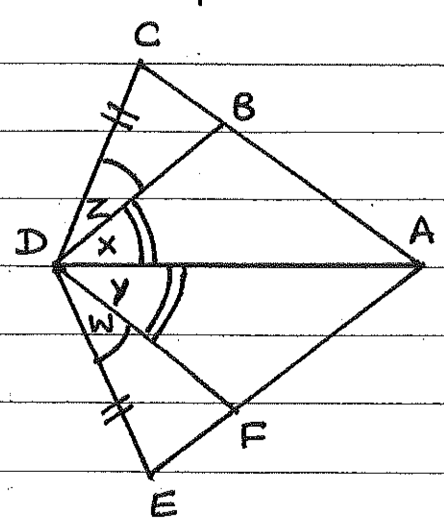
Pg 19 Column 2



Proof:

1	$\overline{BD} \cong \overline{BD}$	Reflexivity
2	$\Delta ABD \cong \Delta CBD$	SSS Test
3	$\angle ABD \cong \angle CBD$	cpctc
4	$\overline{BD}$ bisects $\angle ABC$	def^n of $\angle$ bisector

Pg 20

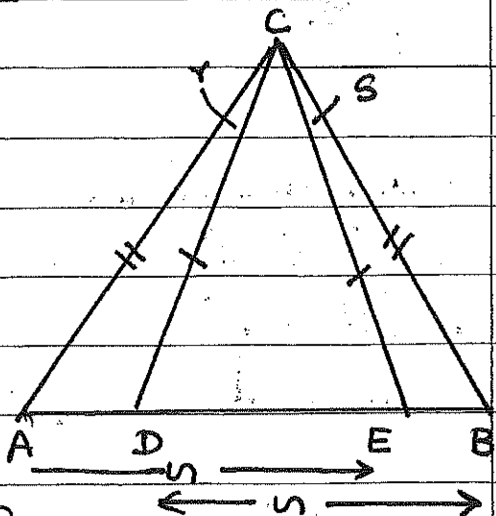


Pg 20 Continued

1	$\angle Z \cong \angle W$	Given
	$\angle x \cong \angle y$	Given
2	$\angle Z + \angle x \cong \angle W + \angle y$	$\angle$ Add^n postulate
3	$\angle CDA \cong \angle EDA$	
4	In ΔCDA & ΔEDA	
a	$\angle CDA \cong \angle EDA$	St 3
b	$\overline{CD} \cong \overline{ED}$	Given
c	$\overline{AD} \cong \overline{AD}$	Reflexivity
4	$\Delta CDA \cong \Delta EDA$	SAS Test
	$\overline{AC} \cong \overline{AE}$	cpctc

Summer Review (Level 8)

Pg 20 Column 2

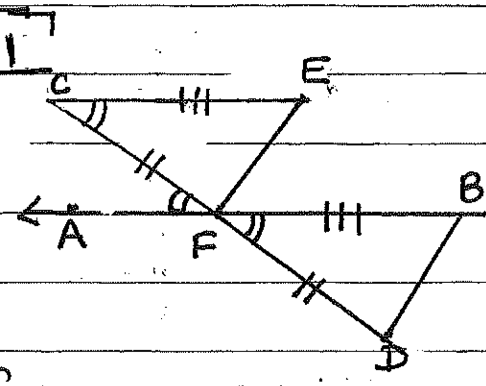


Proof:

1	$\overline{AE} \cong BD$	Given
2	$\overline{AD} + \overline{DE} \cong \overline{BE} + \overline{DE}$	Segment add^n postulate
3	$\overline{AD} \cong \overline{BE}$	Subtracting $\overline{DE}$
4	$\Delta CAD \cong \Delta CBE$	SSS Test
5	$\angle ACD \cong \angle BCE$	cpctc

$\angle r \cong \angle S$

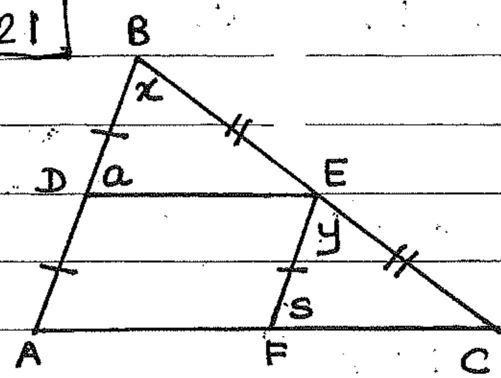
Pg 21



Proof :

1	$\angle CFA \cong \angle DFB$	Vertical $\angle$'s
2	$\Delta CEF \cong \Delta FBD$	SAS Test
3	$\angle E \cong \angle B$	cpctc

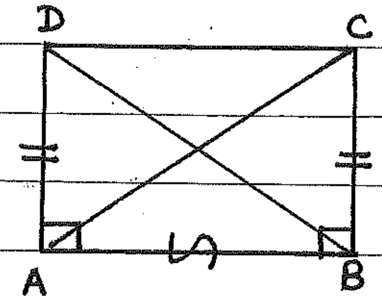
Pg 21



1.	$\Delta BDE \cong \Delta EFC$	SAS Test
2	$\angle a \cong \angle s$	cpctc

Summer Review. (Level 8)

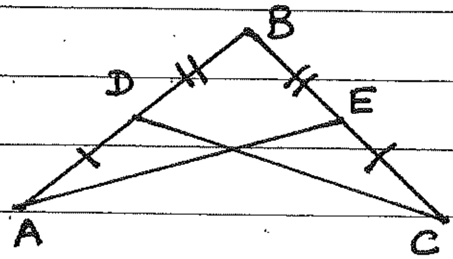
Pg22



Proof :

1	In ΔDAB & CBA	
	$\overline{DA} \cong \overline{CB}$	Given
	$\angle DAB \cong \angle CBA$	each is 90°
	$\overline{AB} \cong \overline{BA}$	Symenetry
2	$\Delta DAB \cong \Delta CBA$	SAS Test
3	$\overline{BD} \cong \overline{AC}$	cpctc

Pg22



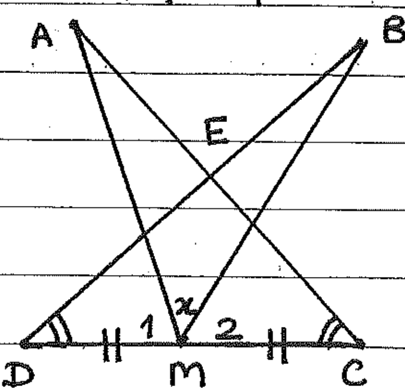
Proof :

1	$\overline{AB} = \overline{AD} + \overline{DB}$	
	$= \overline{CE} + \overline{EB}$	$\overline{AD} = \overline{CE}$
	$= CB$	$\overline{DB} = \overline{EB}$
2	$\overline{AB} \cong CB$	

Pg22

3	In ΔABE & ΔCBD	
a	$\overline{AB} \cong \overline{CB}$	st 2
b	$\overline{BE} \cong \overline{BD}$	Given
c	$\angle B \cong \angle B$	common $\angle$
4	$\Delta ABE \cong \Delta CBD$	SAS Test
5	$\angle A \cong \angle C$	cpctc

Pg23

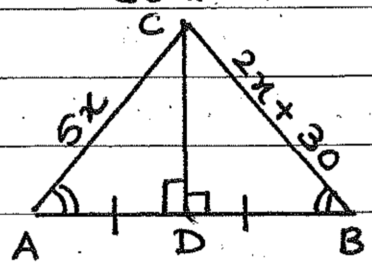


Proof :

1	$\angle DMB = 1 + x$	Angle Add^n
2	$\angle CMA = 2 + x$	prop .
3	$\angle DMB \cong \angle CMA$	
4	$\Delta DMB \cong \Delta CMA$	ASA Test
5	$\overline{DB} \cong \overline{CA}$	cpctc

Summer Review. (Level 8)

Pg 23 Column 2



Solution

1 $\triangle ADC \cong \triangle BDC$ — ASA Test

2 $AC \cong BC$ — cpctc

3 $5x = 2x+30$

$3x = 30$

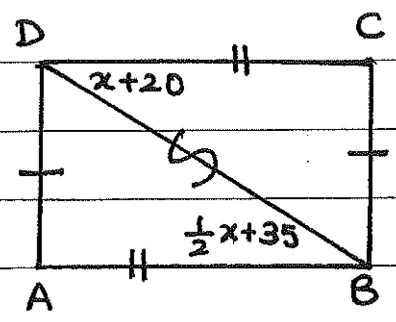
$\boxed{x = 10}$

4 $AC = 5 \times 10$

$\boxed{AC = 50}$

$\boxed{BC = 50}$

Pg 24



1 $\triangle ADB \cong CBD$ — SSS Test

2 $\angle ABD \cong \angle CDB$ — cpctc

Pg 24 Continued

$x+20 = \frac{1}{2}x+35$

$\frac{1}{2}x = 15$

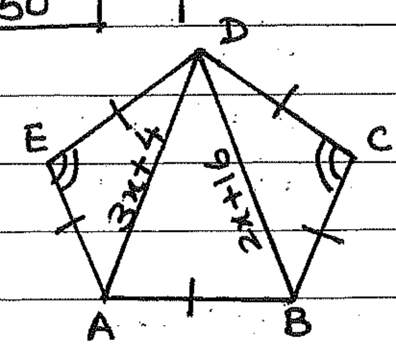
$\boxed{x = 30}$

$\angle CDB = x+20$

$\boxed{\angle CDB = 50^\circ}$

$\boxed{\angle ABD = 50^\circ}$

Pg 24



1 $\triangle AED \cong \triangle BCD$ — SAS Test

2 $\overline{AD} \cong \overline{BD}$ — cpctc

$3x+4 = 2x+16$

$\boxed{x = 12}$

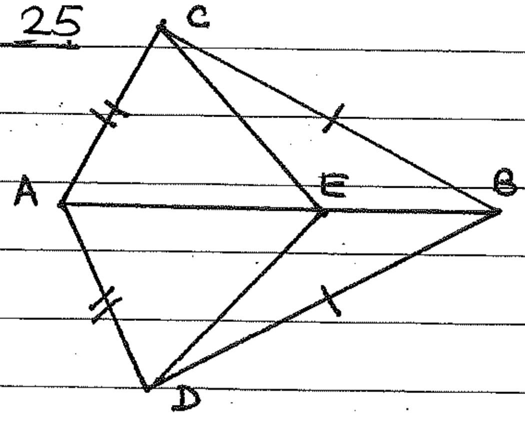
3 $AC = 3 \times 12 + 4$

$\boxed{AC = 40}$

$\boxed{BD = 40}$

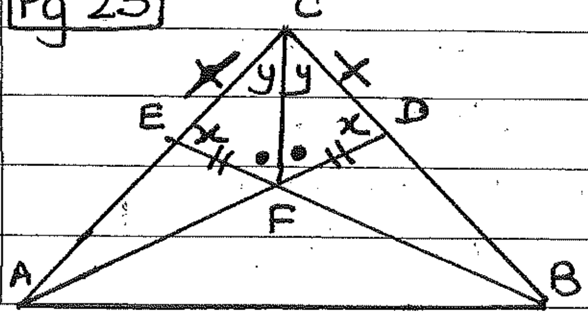
Summer Review (Level 8)

Pg 25



1	$\triangle ACB \cong \triangle ADB$	SSS Test
2	$\angle CAB \cong \angle DAB$	cpct c
3	In $\triangle CAE$ & $\triangle DAE$	
a	$\overline{AC} \cong \overline{AD}$	given
b	$\angle CAE \cong \angle DAE$	St 2
c	$\overline{AE} \cong \overline{AE}$	Reflexivity
4	$\triangle CAE \cong \triangle DAE$	SAS Test
5	$\overline{CE} \cong \overline{DE}$	cpctc

Pg 25



Proof

1	$\overline{CF} \cong \overline{CF}$	Reflexivity
2	$\triangle EFC \cong \triangle DFC$	SAS Test
3	$\angle CEF \cong \angle CDF$ (x)	cpct c
4	$CE \cong CD$	cpct c
5	$\boxed{\angle ECF \cong \angle DCF} = y$	cpct c
6	$\triangle ECB \cong \triangle DCA$	ASA Test
7	$\boxed{\overline{BC} \cong \overline{AC}}$	cpct c

Summer Packet (Level 8)

Pg 26

1. $\frac{PR}{PX} = \frac{a}{3a} = \frac{1}{3}$

$\frac{RT}{XS} = \frac{2b}{3b} = \frac{2}{3}$

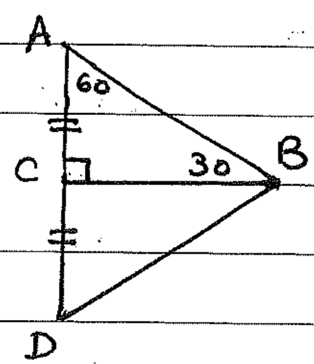
$\because \frac{PR}{PX} \neq \frac{PT}{XS}$

$\Delta PRT \not\sim \Delta PXS$

(Not Similar)

2. To Prove

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



Extend Ray AC and

Draw $CD = AC$

Join BD

$\Delta ACB \cong \Delta DCB$

(SAS Test)

$\angle D = 60^\circ$

ΔABD is equilateral

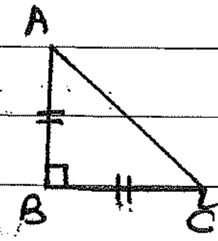
Pg 26 Continued

$AC = \frac{1}{2}(AD)$

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

$\because \boxed{AD = AB}$

3.



To Prove

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

Proof

Let $AB = BC = x$

By Pythagorus Th^m

$x^2 + x^2 = AC^2$

$2x^2 = AC^2$

$AC = \sqrt{2}x$

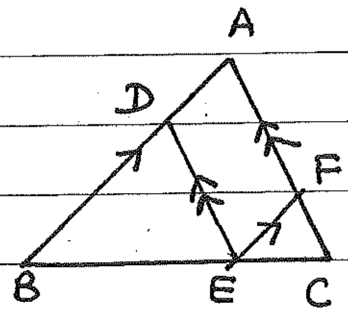
$x = \cancel{1/2}(AC)$

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

Summer Review (Level 8)

Pg 27

(1)



P.T: $\frac{AD}{DB} \times \frac{AF}{FC} = 1$

Proof:

$\Delta ABC \sim \Delta DBE$

$\Delta ABC \sim \Delta FEC$

By Basic Proporhonatily theorm

$\frac{BD}{DA} = \frac{BE}{EC}$ and

$\frac{CF}{FA} = \frac{CE}{EB}$

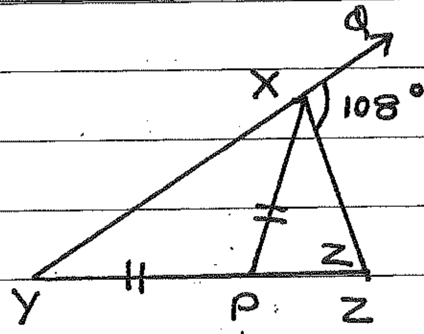
Multiplying we get

$\frac{BD}{DA} \times \frac{CF}{FA} = \frac{(BE)}{(EC)} \times \frac{(CE)}{(EB)}$

$\frac{(BD)(CF)}{(DA)(FA)} = 1$

Hence $\boxed{\frac{(AD)}{(DB)} \times \frac{(AF)}{(FC)} = 1}$

Pg 27



$\angle YXZ = 180^\circ - 108^\circ$

$= 72^\circ$

$\frac{\angle YXP}{\angle ZXP} = \frac{3}{1}$

each part $= \frac{72}{4}$

$= 18^\circ$

$\angle YXP = 3 \times 18^\circ = 54^\circ$

$\angle ZXP = 18^\circ$

$\angle XYP = 54^\circ$

$\angle Z = 180^\circ - (54+54)^\circ$

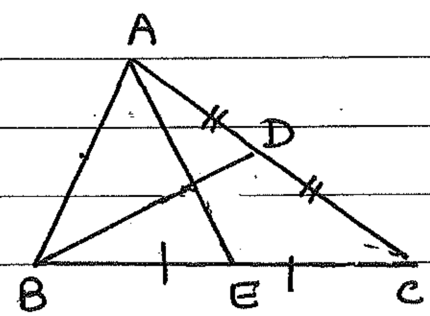
$= 180^\circ - 108^\circ$

$= 72^\circ$

$\boxed{\angle Z = 72^\circ}$

Summer Review (Level 8)

Pg 28 Column 1

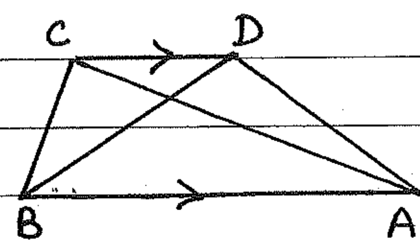


$A(\triangle ABE) = \frac{1}{2} A(\triangle ABC)$

$A(\triangle CBD) = \frac{1}{2} A(\triangle ABC)$

$\boxed{A(\triangle ABE) = A(\triangle CBD)}$

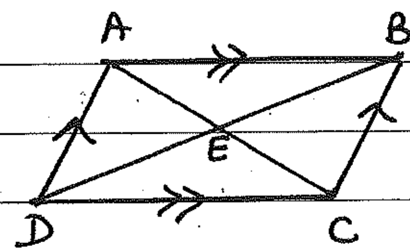
Pg 28 Column 2



$\triangle ACD$ and $\triangle BCD$ are $\triangle$'s with same base ($\overline{CD}$) and equal heights

$A(\triangle ACD) = A(\triangle BCD)$

Pg 29 Column 1



$\triangle AED \cong \triangle CEB$

$\triangle AEB \cong \triangle CED$

Diagonals of a llgm bisect each other

Hence $AE = EC$

$DE = EB$

$A(\triangle ADC) = \frac{1}{2} A(\square ABCD)$

$A(\triangle ADC) = A(\triangle ADE) + A(\triangle CDE)$

but $\triangle ADE$ and $\triangle CDE$ have equal bases and same height

Hence

$A(\triangle ADE) = A(\triangle CDE = \frac{1}{2} A(\triangle ADC)$

Summer Review (Level 8)

(Contd)

$\boxed{\text{Pg 29}}$ Column 1

$A(\triangle ADE) = \frac{1}{2} A(\square ABCD)$

Similarly all other 3 $\triangle$'s have area $\frac{1}{4}$ Area $(\square ABCD)$

Hence proved

$\boxed{\text{Pg 29}}$ Column 2

$A(\triangle AMD) = A(\triangle CMD)$

b) $A(\triangle AMB) = A(\triangle CMB)$

$\triangle$'s with equal bases and same ht

$A(\triangle AMD) + A(\triangle AMB)$

$= A(\triangle CMD) + A(\triangle CMB)$

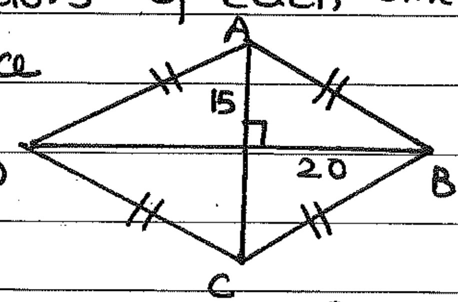
Hence

$A(\square ABMD) = A(\square CBMD)$

$\boxed{\text{Pg 30}}$

a) Diagonals of a rhombus are $\perp$ bisectors of each other

Hence

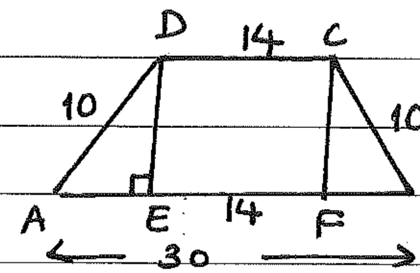


$AB^2 = (15)^2 + (20)^2$

$AB = 25$

Perimeter (Rhombus) $= \boxed{100}$

b)



$\triangle ADE \cong \triangle BCF$ (hyp Leg)

$AE = FB$

$AF = FB = \frac{1}{2}(30-14)$

$AF = FB = 8$

Summer Review (Level 8)

Pg 30 (Contd)

b) In Δ AED

$DE^2 = AD^2 - AE^2$

$= (10+8)(10-8)$

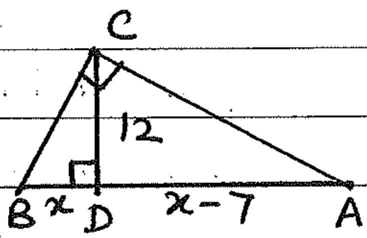
$= 18 \times 2$

$DE = 6$

ht (Trap) = $\boxed{6}$

Pg 31

a)



$\Delta CBD \sim \Delta ACD$

(AA Test)

$\frac{CB}{AC} = \boxed{\frac{BD}{CD} = \frac{CD}{AD}}$

$(CD)^2 = (BD)(AD)$

$(12)^2 = x(x-7)$

$144 = x^2 - 7x$

$x^2 - 7x - 144 = 0$

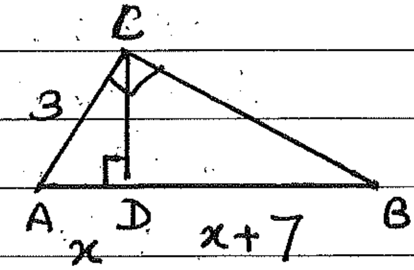
$(x-16)(x+9) = 0$

Pg 31 contd.

$x = 16$

$\boxed{\begin{aligned} BD &= 16 \\ AD &= 9 \end{aligned}}$

(b)



In Δ ACD

$(CD)^2 = (3)^2 - (x)^2$

$(CD)^2 = 9 - x^2$

$(CD)^2 = (AD)(DB)$

$= x(x+7)$

$9 - x^2 = x^2 + 7x$

$9 = 7x + 2x^2$

$2x^2 + 7x - 9 = 0$

$2x^2 + 9x - 2x - 9 = 0$

$x(2x+9) - 1(2x+9) = 0$

$(2x+9)(x-1) = 0$

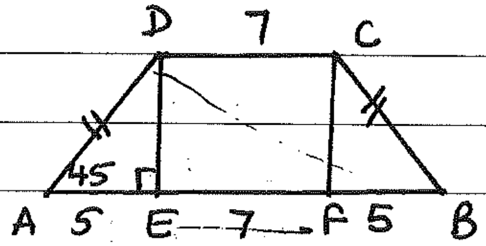
$x = 1$

$\boxed{\begin{aligned} AD &= 1 \\ DB &= 8 \end{aligned}}$

Summer Review (Level 8)

Pg 32

a)



$AE = \frac{1}{2}(17-7) = 5$

In $\triangle ADF$

$DE^2 = 5 \times 7$

$(DE)^2 = 35$

In $\triangle DEB$

$(DE)^2 + EB^2 = (BD)^2$

$35 + (12)^2 = DB^2$

$35 + 144 = DB^2$

$(BD)^2 = 179$

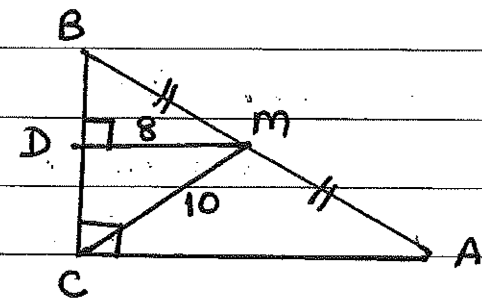
$(BD) = \sqrt{179}$

$\approx \boxed{13.2}$

(:

Pg 32 Contd

b)



$DC^2 = 10^2 - 8^2$

$DC^2 = 100 - 64$

$\boxed{DC = 6}$

$BC = 2 \times 6 = \boxed{12}$

$(cm)^2 = (BM)(MA)$

$100 = (x)(x)$

$x = 10$

$BM = MA = MC = 10$

$(AC)^2 = AB^2 - BC^2$

$= (20)^2 - 144$

$= 400 - 144$

$AC^2 = 256$

$AC = 16$

$P(\triangle) = 16 + 20 + 12$

$= \boxed{48}$

Summer Review (Level 8)

Pg 33 Column 1

11) $40xy + 30x - 100y - 75$

$= 10x(4y+3) - 25(4y+3)$

$= \boxed{(4y+3)(10x-25)}$

13) $192x^2y + 72x^3 - 24xry - 9rx^2$

$= 32x^2(8y+3x) - 3rx(8y+3x)$

$= (32x^2 - 3rx)(8y+3x)$

$= \boxed{x(32x-3r)(8y+3x)}$

15) $140ab - 60a^2 + 168b - 72a$

$= 20a(7b-3a) + 24(7b-3a)$

Pg 33 Column 1

15 $= (20a+24)(7b-3a)$

$= \boxed{4(5a+6)(7b-3a)}$

17) $8x[2xc + yd - 2xd - yc]$

$= 8x[2xc - 2xd + yd - yc]$

$= 8x[2x(c-d) - y(c-d)]$

$= \boxed{8x(c-d)(2x-y)}$

19) $5x[21uv + 12v - 14u - 18v^2]$

$\cancel{= 5x[3v(7u+4)}$

$5x[21uv - 18v^2 - 14u + 12v]$

Summer Review (Level 8)

Pg 33 Contd

19) $5x\left[3v(7u-6v) - 2(7u-6v)\right]$

$= \boxed{5x(7u-6v)(3v-u)}$

Pg 33 Column 2

12)

$75a^2c - 45a^2d - 30bc + 18bd$

$3\left[25a^2c - 15a^2d - 10bc + 6bd\right]$

$= 3\left[5a^2(5c-3d) - 2b(5c-3d)\right]$

$= \boxed{3(5c-3d)(5a^2-2b)}$

Pg 33 Contd

Column 2

14) $90au - 36av - 150yu + 60yv$

$18a(5u-2v) - 30y(5u-2v)$

$(18a-30y)(5u-2v)$

$\boxed{6(3a-5y)(5u-2v)}$

16) $105ab - 90a - 21b + 18$

$15a(7b-6) - 3(7b-6)$

$(15a-3)(7b-6)$

$\boxed{3(5a-1)(7b-6)}$

Q18, 20 (Not done)

26)	The ski club with ten members is to choose three officers captain, co-captain & secretary, how many ways can those offices be filled? (order matters) $_{10}P_3 = \frac{10!}{(10-3)!} = \frac{10!}{7!} = 10\times9\times8$ $\boxed{720 \text{ ways}}$
27)	You just bought five new books to read. You want to take two of them with you on vacation. In how many ways can you choose two books to take? $_5C_2 = \frac{5!}{(5-2)!\,2!} = \frac{5!}{3!\,2!} = \frac{5\times4}{2\times1}$ $\boxed{10 \text{ ways}}$
28)	Larry has 12 different shirts to pick from for vacation. If he needs to pick three of them, how many different combinations are there? $_{12}C_3 = \frac{12!}{(12-3)!\,3!} = \frac{12\times11\times10}{3\times2}$ $\boxed{220}$
29)	Randy has to pick two people to work with out of 15. How many different groups can he pick? $_{15}C_2 = \frac{15!}{(15-2)!\,2!} = \frac{15!}{13!\,2!} = \frac{15\times14}{2}$ $\boxed{105 \text{ groups}}$
30)	There are eighteen astronauts trying to go on a mission to Mars. However, there are only four seats on the rocket. How many different groups of four can go on the rocket? $_{18}C_4 = \frac{18!}{(18-4)!\,4!} = \frac{18\times17\times16\times15}{4\times3\times2}$ $\boxed{3060 \text{ groups}}$
	Rough work space

8/-Pg 34

31) Suppose that first, second, and third-place winners of a contest are to be selected from eight students who entered. In how many ways can the winners be chosen?

$${}_{8}P_{3} = \frac{8!}{(8-3)!} = 8 \times 7 \times 6$$

$\boxed{336 \text{ ways}}$

32) A basket contains five different pieces of fruit. If three people each choose one piece, in how many different ways can they make their choices? - All 5 fruits are different.

Order matters) ${}_{5}P_{3} = \frac{5!}{(5-3)!} = 5 \times 4 \times 3$

$\boxed{60 \text{ ways}}$

33) How many different ways can you frame two out of five pictures in different frames?

$${}_{5}P_{2} = \frac{5!}{(5-2)!} = 5 \times 4$$

$\boxed{20 \text{ ways}}$

34) How many different arrangements of four books on a shelf could you make from eight books?

$${}_{8}P_{4} = \frac{8!}{(8-4)!} = \frac{8 \times 7 \times 6 \times 5}{1}$$

$\boxed{1{,}680 \text{ ways}}$

35) You are posing for a picture with seven people in it altogether. In my different orders can everyone stand?

$$7! = 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1$$

(This problem is not as the earlier questions)

$\boxed{5040 \text{ ways}}$

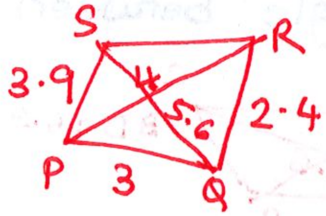
36) **Describe the difference between a permutation and a combination.**

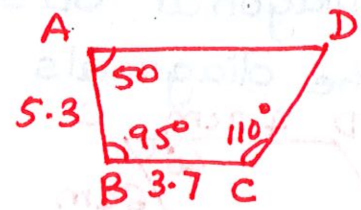
permutation	**combination**
Order matters	Order does not matter

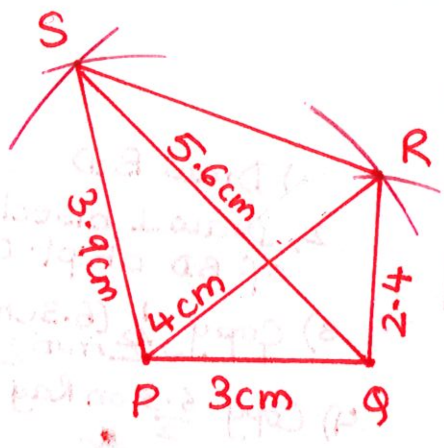
8/Pg 35

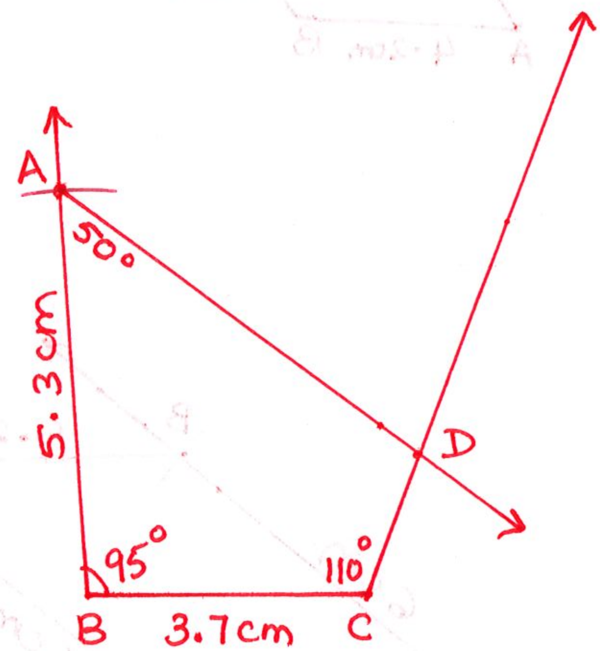
(40) a) Construct □ PQRS $PQ = 3cm$, $QR = 2.4cm$, $PS = 3.9cm$, $PR = 4cm$, $QS = 5.6cm$

b) Construct □ ABCD such that $AB = 5.3cm$, $BC = 3.7cm$, $\angle A = 50°$, $\angle B = 95°$, $\angle C = 110°$









1) Draw $\overline{PQ} = 3cm$
2) $\overline{QR} = 2.4cm$
3) $\overline{PR} = 4cm$
4) $\overline{QS} = 5.6cm$
5) $\overline{PS} = 3.9cm$

□PQRS is the quad

1) $\overline{BC} = 3.7cm$
2) $\angle B = 95°$
3) $\angle C = 110°$
4) $BA = 5.3 cm$
5) $\angle A = 50°$
6) □ABCD

8 - Pg 36

(41)

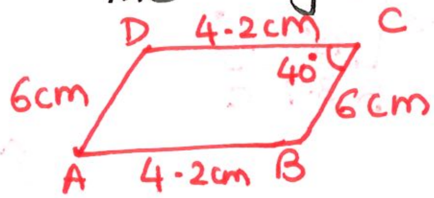
a) Construct Parallelogram ABCD such that

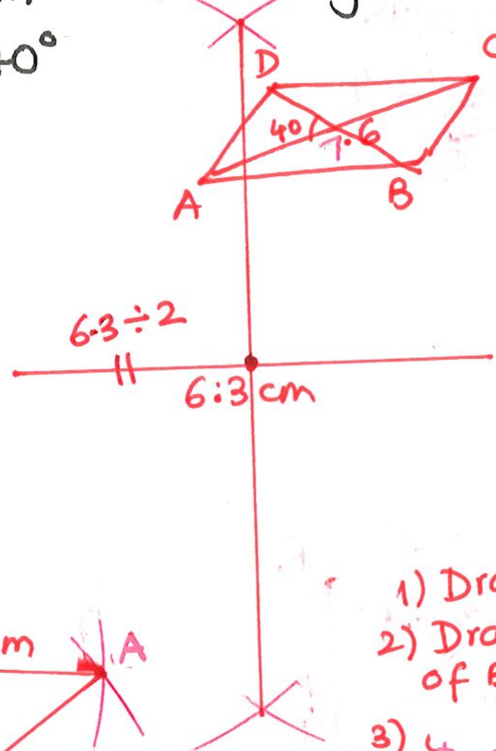
BC = 6cm , CD = 4.2cm , ∠C = 40°.

b) Construct Parallelogram ABCD , diagonal AC = 7.6cm

Diagonal BD = 6.3cm The angle between

the diagonals is 40°





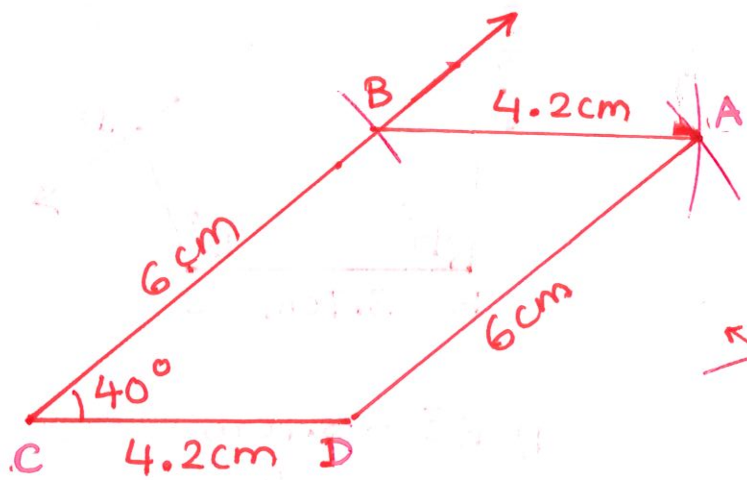
BD = 6.3

1) Draw BD

2) Draw ⊥ bisector of BD at pt O

3) Draw ∠AOB = 40° $\overleftrightarrow{BD}$

4) Copy $\frac{6.3}{2}$ cm



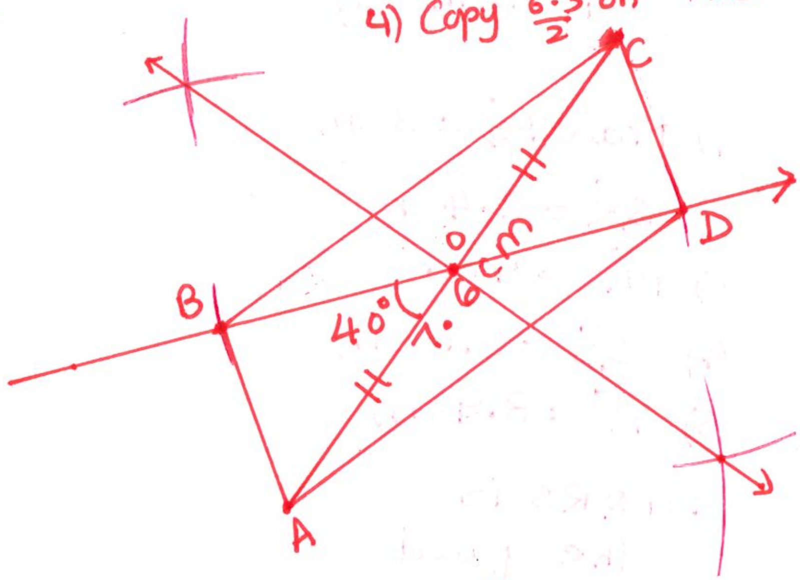
1) $\overline{CD}$ = 4.2cm

2) ∠C = 40°

3) CB = 6cm

4) AB = 4.2

5) DA = 6cm

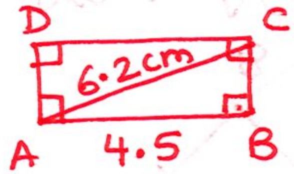


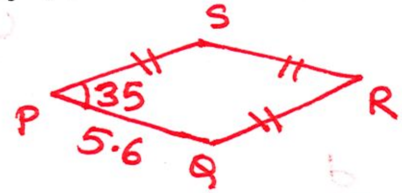
▱ABCD is a llgm

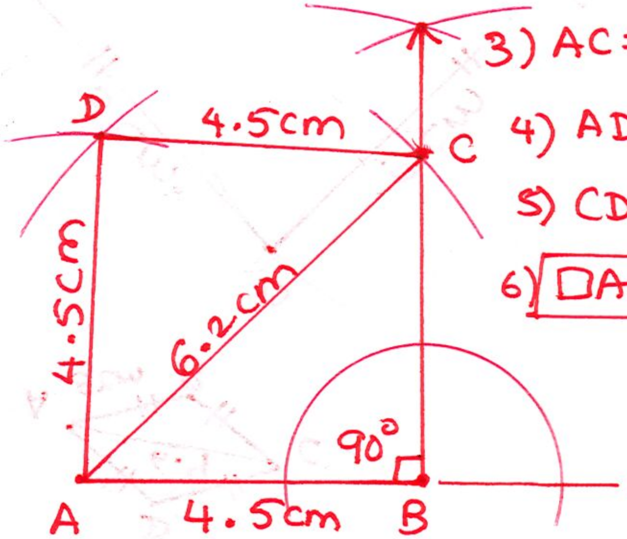
(42)

a) Construct Rectangle ABCD such that AB = 4.5cm, diagonal AC = 6.2cm

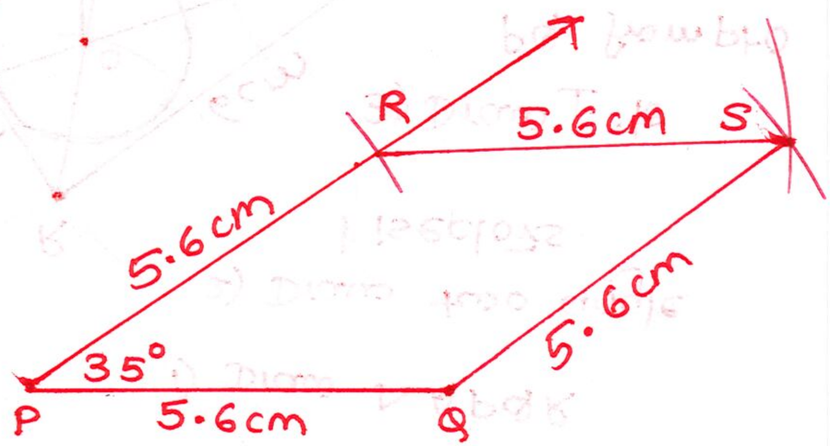
b) Construct Rhombus PQRS such that PQ = 5.6cm, $\angle P = 35^\circ$







1) AB = 4.5cm
2) $\angle B = 90^\circ$
3) AC = 6.2cm
4) AD = 4.5cm
5) CD = 4.5cm
6) $\boxed{\square ABCD}$



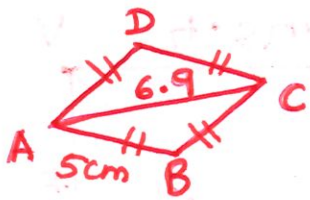
1) Draw $\overline{PQ}$ = 5.6cm
2) $\angle P = 35^\circ$
3) Draw PR = 5.6cm
4) RS = 5.6cm
5) QS = 5.6cm
6) $\boxed{\square PQRS}$

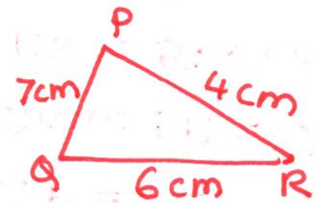
8 - Pg 38

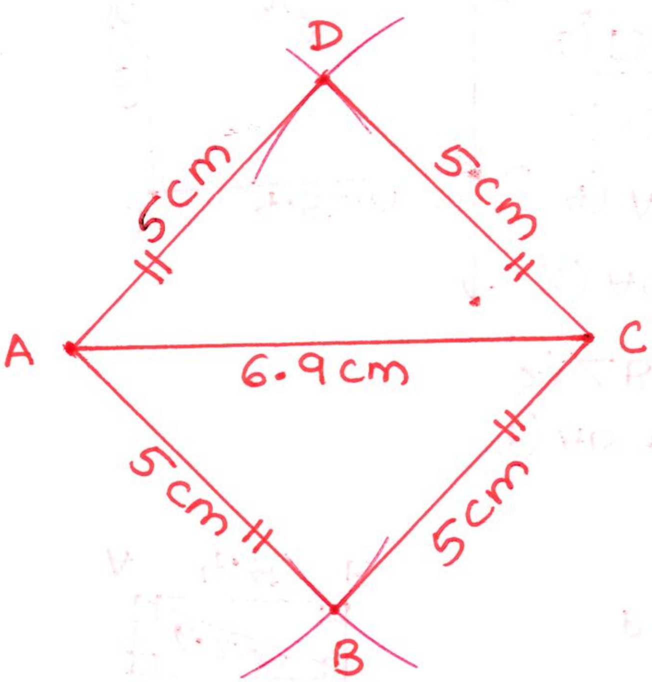
43)

a) Construct a rhombus ABCD, AB = 5cm, diagonal AC = 6.9cm

b) Draw Δ PQR, PQ = 7cm, QR = 6cm, PR = 4cm, Draw the incircle to the triangle

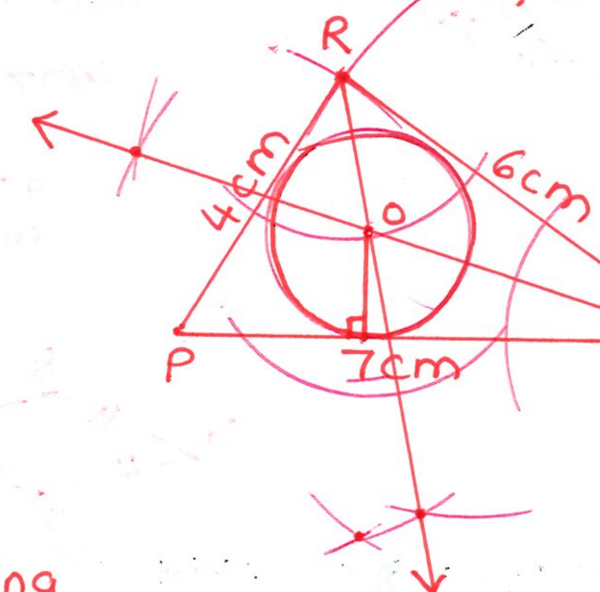






1) Draw AC = 6.9cm

2) Then Draw the remaining Sides = 5cm



1) Draw Δ PQR

2) Draw two angle biseclors

3) Draw $\perp$ to PQ from pto

4) Draw incircle

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(45)

Solve

a) $(3x+2y-4)\ (x-y+2)$

$= 3x(x-y+2) + 2y(x-y+2) - 4(x-y+2)$

$= 3x^2 - 3xy + 6x - 2y^2 + 4y$

$+2xy - 4x \qquad + 4y - 8$

$\boxed{3x^2 - 2y^2 - 1xy + 2x + 8y - 8}$

b) $(x^2 - 5x + 8)\ (x^2 + 2x - 3)$

$= x^2(x^2+2x-3) - 5x(x^2+2x-3) + 8(x^2+2x-3)$

$= x^4 + 2x^3 - 3x^2$

$-5x^3 - 10x^2 + 15x$

$+8x^2 + 16x - 24$

$\boxed{x^4 - 3x^3 - 5x^2 + 31x - 24}$

c) $(x^2 - 5x - 8)\ \ (x^2 + 2x - 3)$

$= x^2(x^2+2x-3) - 5x(x^2+2x-3) - 8(x^2+2x-3)$

$= x^4 + 2x^3 - 3x^2$

$-5x^3 - 10x^2 + 15x$

$-8x^2 - 16x + 24$

$\boxed{x^4 - 3x^3 - 21x^2 - x + 24}$

(44)

If $x = 2a^2 + 3b^2 - 5ab$, $y = b^2 - 3a^2 + 7ab$ and $z = 6a^2 - b^2 + ab$ Find the value of

a) $\boxed{2x + y - 3z}$

$= 2(2a^2 + 3b^2 - 5ab) + (b^2 - 3a^2 + 7ab) - 3(6a^2 - b^2 + ab)$

$= 4a^2 + 6b^2 - 10ab$

$-3a^2 + 1b^2 - 7ab$

$-18a^2 + 3b^2 - 3ab$

$\boxed{-17a^2 + 10b^2 - 6ab}$

b) $\boxed{3(x - y) + z}$

$= 3[(2a^2 + 3b^2 - 5ab) - (b^2 - 3a^2 + 7ab)] + [(6a^2 - 1b^2 + 1ab]$

$= 3[2a^2 + 3b^2 - 5ab + 3a^2 - 1b^2 - 7ab] + [6a^2 - 1b^2 + 1ab]$

$= 3(5a^2 + 2b^2 - 12ab) + 6a^2 - 1b^2 + 1ab$

$= 15a^2 + 6b^2 - 36ab + 6a^2 - 1b^2 + 1ab$

$\boxed{21a^2 + 5b^2 - 35ab}$

Answers:

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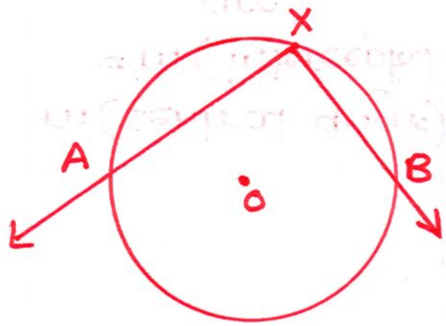
Circle Properties (Continued Page 5) – Represent the properties using figures

C1 | C2

a)

The measure of an angle inscribed in a semicircle is 90 degrees.

$m\angle AXB = 90^\circ$

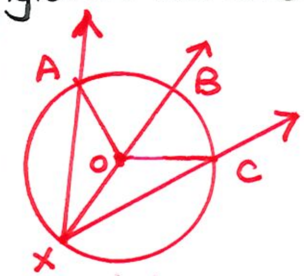


In a circle or congruent circles, if inscribed angles are congruent, then the central angles are also congruent.

If $\angle AXB = \angle CXB$

Then

$\angle AOB \cong \angle COB$

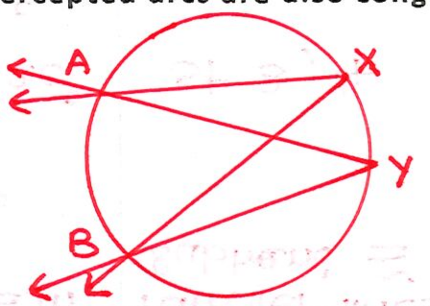


b)

In a circle or congruent circles, if inscribed angles are congruent, then the intercepted arcs are also congruent.

$m\angle AXB =$

$m\angle AYB$

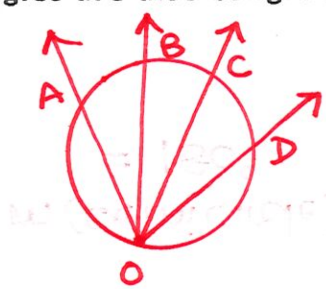


In a circle or congruent circles, if intercepted arcs are congruent, then the inscribed angles are also congruent.

If $\overset{\frown}{AB} \cong \overset{\frown}{CD}$

then

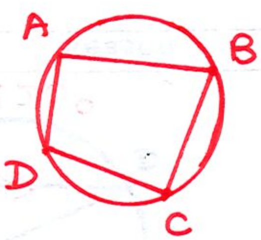
$\angle AOB \cong \angle COD$



Opposite angles of a cyclic quadrilateral are supplementary

$\angle A + \angle C = 180^\circ$

$\angle B + \angle D = 180^\circ$

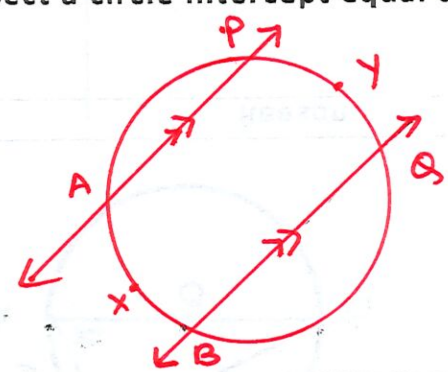


Parallel lines which intersect a circle intercept equal arcs on the circle.

If $\overline{AP} \parallel BQ$

Then

$\overset{\frown}{AXB} \cong \overset{\frown}{PYQ}$



2/8 - Pg 42

a)

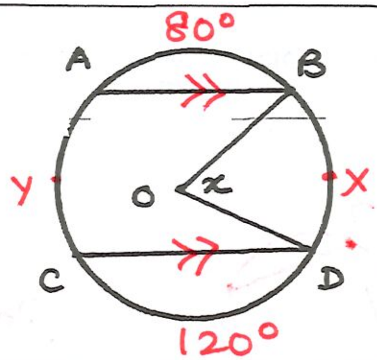
C1

Given : $AB \parallel CD$

$\widehat{AB} = 80^\circ$

$\widehat{CD} = 120^\circ$

find : x



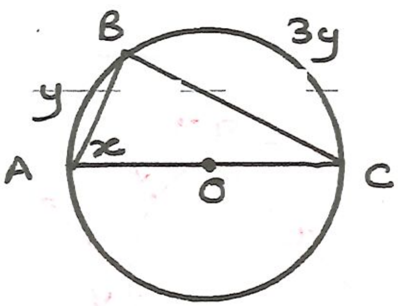
Statement	Reason
1. $AB \parallel CD$	Given
2. $\widehat{AYC} \cong \widehat{BXD} = m$	Parallel lines Subtend $\cong$ arcs
3. $m(\odot) = 360^\circ$	
4. $m + m + 80 + 120^\circ = 360^\circ$ $2m + 200 = 360^\circ$ $2m = 160$ $m = 80^\circ$	St 3, 4
5. $m\angle BOD = 80^\circ$ $\boxed{x = 80^\circ}$	m(central angle) = m(intercepted arc)

C2

Given : $\overline{AOC}$ is the diameter.

$\widehat{AB} = y$, $\widehat{BC} = 3y$

find : x, y



Statement	Reason
1. $\widehat{ABC}$ is a semicircle $y + 3y = 180^\circ$ $4y = 180^\circ$ $y = 45^\circ$	m(semicircle) = 180°
2. $m(\text{arc } \widehat{BC}) = 2(m\angle BAC)$ $3y = 2(x)$ $135 = 2(x)$ $x = 67.5^\circ$ $\boxed{x = 67.5^\circ}$ $\boxed{y = 45^\circ}$	inscribed angle Th^m

(2B), 8/ Pg 43