GRADE 9 | **MATHEMATICS** | **November**
TIME : 2 HOURS | | **TOTAL: 100**

MEMO

SECTION A : ALGEBRA [50]

QUESTION 1

1.1. Given the expression: $2x^4 + 7x - 3x^3 - 2 + 4x^2$

(a) Write the expression in descending powers of x. (1)

$2x^4 - 3x^3 + 4x^2 + 7x - 2$ ✓

Hence, answer the questions:

(b) How many terms does the expression consist of? 5 ✓ (1)

(c) What is the exponent of x in the third term? 2 ✓ (1)

(d) Write down the coefficient of x^3. -3 ✓ (1)

(e) Write down the constant term. -2 ✓ (1)

(f) Calculate the value of the expression if $x = 2$ (5)

$2x^4 - 3x^3 + 4x^2 + 7x - 2$

$= 2(2)^4 - 3(2)^3 + 4(2)^2 + 7(2) - 2$ ✓

$= 2(16) - 3(8) + 4(4) + 14 - 2$ ✓ ✓

$= 32 - 24 + 16 + 14 - 2 = 36$ ✓

1.2. ADDITION

Add the following expressions:

(a) $3a + 5b - 7c$
$-8a - 9b + 2c$

$-5a - 4b - 5c$ ✓ ✓ ✓

(3)

(b) Arrange the following expression in descending powers of a and then add the expressions.

$-5a + 8a^3 + 14 + 7a^2$; $5a^2 + 6a$; $-9a^3 - 11a - 9 + 10a^2$ (4)

$8a^3 + 7a^2 - 5a + 14$ ✓

$+ 5a^2 + 6a$ ✓

$-9a^3 + 10a^2 - 11a - 9$ ✓

$-1a^3 + 22a^2 - 10a + 5$ ✓

1.3. SUBTRACTION

Subtract the following expressions:

(a) $5a - 6b + 7c$
$9a + 8b - 2c$ (3)

✓ ✓ ✓

$-4a - 14b + 9c$

(b) Subtract $3x^2 + 4x - 9$ from $7x^2 + 5x + 3$ (4)

$7x^2 + 5x + 3$ ✓

$- 3x^2 + 4x + 9$ ✓

$4x^2 - x + 12$ ✓✓✓

or

$(7x^2 + 5x + 3) - 1(3x^2 + 4x - 9)$ ✓

$= 7x^2 + 5x + 3 - 3x^2 - 4x + 9$

$= 4x^2 + x + 12$ ✓✓✓

1.4. MULTIPLICATION

Find the product of the following:

(a) $2a(4a + 7)$ (2)

$= 8a^2 + 14a$

(b) $-6a^2(3ab - 2bc)$ (2)

$= -18a^3b + 12a^2bc$

(c) $(y - 3)(y + 2)$ (3)

$= y^2 + 2y - 3y - 6$

$= y^2 - y - 6$

(d) $(2x - 3)(3x - 4)$ (3)

$= 6x^2 - 8x - 9x + 12$

$= 6x^2 - 17x + 12$

(e) $(3x - 2y)(3x + 2y)$ (2)

$= 9x^2 + 6xy - 6xy - 4y^2$

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

1.5. EQUATIONS

Solve the following equations:

(a) $x + 24 = 40$ (2)

$x = 40 - 24$

$\therefore x = 16$

(b) $-14a = 56$ (2)

$\frac{-14a}{-14} = \frac{56}{-14}$

$\therefore a = -4$

(c) $5(2x - 3) = 3(2x - 9)$ (5)

$10x - 15 = 6x - 27$

$10x - 6x = -27 + 15$

$4x = -12$

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

$x = -3$

(d) $\frac{a}{3} - \frac{a+1}{2} = \frac{2}{1}$ (5)

$= 6$

$\frac{a}{3} \times \frac{2}{1} - \frac{(a+1)}{2} \times \frac{3}{1} = \frac{2}{1} \times \frac{6}{1}$

$2a - 3(a+1) = 12$

$2a - 3a - 3 = 12$

$-a = 12 + 3$

$-a = 15$

$a = -15$

SECTION B
GEOMETRY [35]

QUESTION 2

2.1. Complete:

(a) An angle between 180° and 360° is referred to as a/~~an~~ reflex ∠. (1)

(b) The sum of complementary angles is equal to 90°. (1)

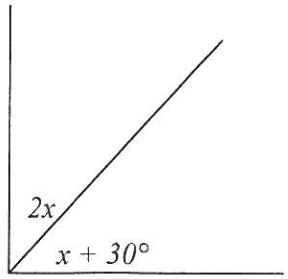
(c) An isosceles triangle has two equal sides. (1)

(d) The sum of the interior angles of a triangle is 180°. (1)

(e) If 2 lines intersect one another, the vertical/opposite angles will be equal. (1)

2.2. Calculate, with reasons, the values of the unknown angles:

(a) (3)



$2x + x + 30^\circ = 90^\circ$

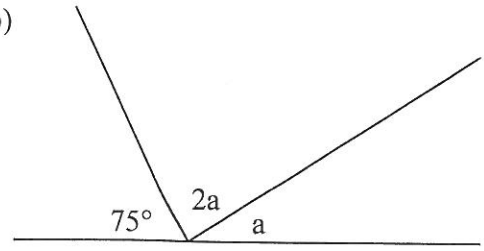
$3x = 90^\circ - 30^\circ$

$3x = 60^\circ$

$x = \frac{60^\circ}{3} = 20^\circ$

[Complementary $\angle^s$]

(b) (3)



$75^\circ + 2a + a = 180^\circ$

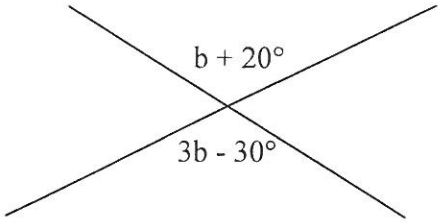
$3a = 180^\circ - 75^\circ$

$3a = 105^\circ$

$a = \frac{105^\circ}{3} = 35^\circ$

[Adj $\angle^s$ on str. line]

(c) (3)



$b + 20^\circ = 3b - 30^\circ$

$20^\circ + 30^\circ = 3b - b$

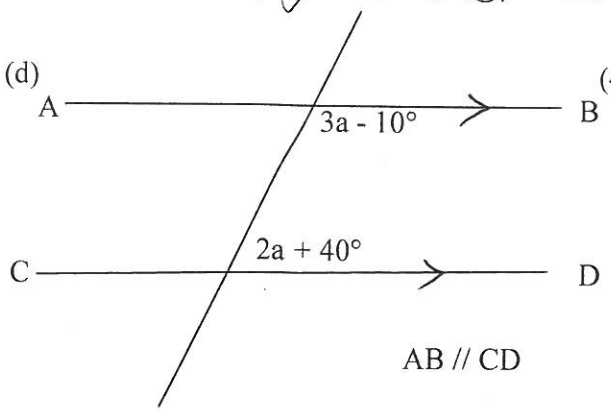
$50^\circ = 2b$

$\therefore b = \frac{50^\circ}{2}$

$\therefore b = 25^\circ$

[Vertically opp $\angle^s$]

(d) (4)



AB // CD

$3a - 10^\circ + 2a + 40^\circ = 180^\circ$

$5a + 30^\circ = 180^\circ$

$5a = 180^\circ - 30^\circ$

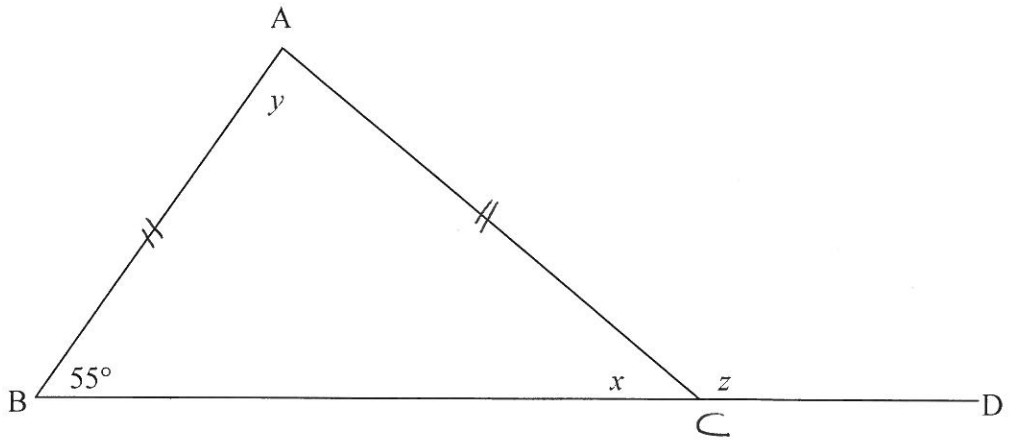
$5a = 150^\circ$

$a = \frac{150^\circ}{5}$

$a = 30^\circ$

[co-inter. $\angle^s$; AB // CD]

(e) In triangle ABC: BC is extended to D. If AB = AC and B = 55°, calculate with reasons, the values of x, y and z. (7)



$x = 55°$ ✓ [$\angle$s opp. equal ✓sides]

$55° + x + y = 180°$ [int. $\angle$s ✓ of $\triangle$]

$55° + 55° + y = 180°$

$y = 180° - 55° - 55°$

$\therefore y = 70°$ ✓

$x + z = 180°$ [$\angle$s on ~~str.~~ line]

$55° + z = 180°$

$\therefore z = 125°$ ✓

or $z = y + 55°$ [ext. $\angle$ of $\triangle$]

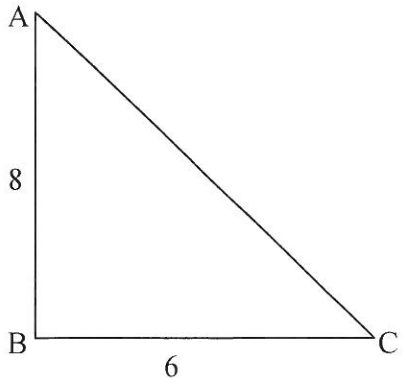
$\therefore z = 70° + 55°$

$\therefore z = 125°$

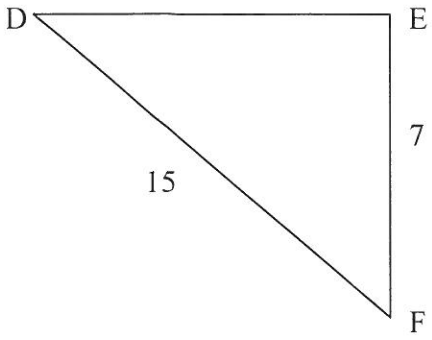
2.3. PYTHAGORAS

Calculate the values of the unknown sides:

(a) (5)



(b) (5)



$AC^2 = AB^2 + BC^2$ [Pythagoras]

$AC^2 = (8)^2 + (6)^2$

$AC^2 = 64 + 36$

$AC^2 = 100$

$AC = \sqrt{100}$

$AC = 10$

$DF^2 = DE^2 + EF^2$

$(15)^2 = DE^2 + (7)^2$

$225 = DE^2 + 49$

$225 - 49 = DE^2$

$176 = DE^2$

$\therefore DE^2 = \sqrt{176}$

$DE \approx 13,3$

SECTION C
STATISTICS [15]

QUESTION 3

The following is a summary of the number of boy's and men's shirts (for the different sizes) sold by a clothing store for the two days before Christmas.

30	18	22	40	42	20	24	34	26	42	36	32	40	32	18	38
36	42	44	30	34	32	26	32	38	36	28	20	42	32	34	

3.1. Answer the following questions:

(a) Arrange the data in ascending order. (1)

18 18 20 20 22 24 26 26 28 30

30 32 32 32 32 32 34 34 34 36

36 36 38 38 40 40 42 42 42 42 44

(b) Determine the mode of the data. (1)

32

(c) Determine the median of the data. (1)

32

(d) Calculate the mean for this data. (Round off to one decimal.) (2)

$\text{Mean} = \frac{1000}{31}$

$\approx 32,3$

(e) Determine the range of the data. (2)

$\text{Range} = 44 - 18$

$= 26$

3.2. Redraw the frequency table and complete the table. Use the data in 3.1. (4)

Class intervals	Tally	Frequency
18 - 25	𝍸 I	6 ✓
26 - 33	𝍸 𝍸	10 ✓
34 - 41	𝍸 𝍸	10 ✓
42 - 49	𝍸	5 ✓

3.3. Present the data in 3.2 as a bar graph. (Scale: X –axis =1cm, Y-axis = 1cm) (4)

