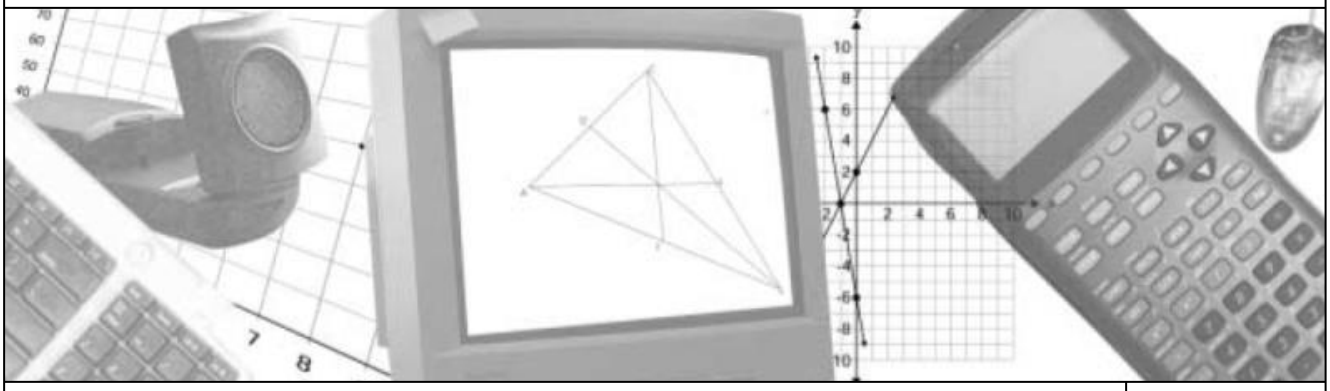


Academic

Grade 9 Assessment of Mathematics

Polynomials and Equations Practice Materials

EQAO
Education Quality and Accountability Office

1 Four students try to solve the equation $5x - 3 = 2x + 9$.

The following table shows part of each student's solution.

Nadine	-12 = 3x
Paul	-3x = 6
Joseph	6 = 3x
Michelle	3x = 12

Which student is correct?

A Nadine

B Paul

C Joseph

D Michelle

$5x-3=2x+9$
$-2x \quad -2x$
$3x-3=9$
$+3 \quad +3$
$3x=12$

2 Which of the following represents the expression $3(2x + 1) – 3(5x – 4)$ in a simplified form?

A –9x – 9

B 9x – 3

C –9x + 15

D –21x – 3

$3(2x+1)-3(5x-4)$
$=6x+3-15x+12$
$=6x-15x+3+12$
$=-9x+15$

3 Eric and Julie are each asked to solve an equation.

I solved $3x = x + 12$. My answer is $x = 6$.

Eric

I solved $3x - 4 = x + 12$. My answer is $x = 8$.

Julie

$3x = x+12$

LS	RS
$3(6)$	$6+12$
$=18$	$=18$

RIGHT

LS = RS

$3x-4 = x+12$

$3(8)-4$	$x+12$
$=24-4$	$=8+12$
$=20$	$=20$

LS = RS
RIGHT

Who has correctly solved his or her equation?

F Eric only

G Julie only

H Both Eric and Julie

J Neither of them

4 Determine the value of x in the following equation:

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

A $-\frac{2}{3}$

B $-\frac{3}{2}$

C $-\frac{9}{2}$

D $\frac{21}{2}$

5 The cost, C, in dollars to print leaflets, n, is given by the formula

$$C = 35 + 0.03n.$$

What is the cost of printing 900 leaflets?

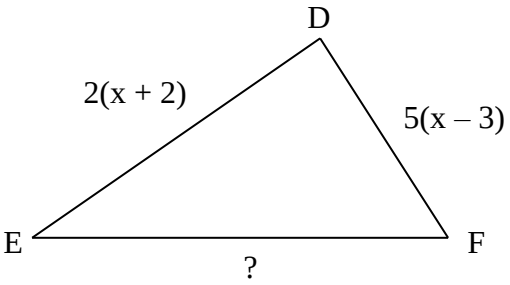
A $27.00

B $35.00

C $37.70

D $62.00

6 The perimeter of triangle DEF is given by the expression 11x – 15.



Which expression shows the correct length of side EF?

A 4x – 4

B 4x – 14

C 7x – 1

D 7x – 11

7 Which value of x satisfies the equation $5 - 2x = 9$?

F $x = -7$

G $x = -2$

H $x = 2$

J $x = 3$

8 Marc's Measurements

Marc wants to investigate the relationship between a person's foot length and their height. He measures the foot length (L) and height (h) of each of the students in his class.

He discovers that the relationship can be represented by the equation $L = \frac{2}{5} + \frac{3}{20}h$.

Determine how tall a person would be if their foot length is **25 cm**.

Show your work.

$L = \frac{2}{5} + \frac{3}{20}h$ ① Sub in 25 for L

$20 \times 25 = {}^{4}\cancel{20}\cdot\frac{2}{\cancel{5}} + {}^{1}\cancel{20}\cdot\frac{3}{\cancel{20}}h$ ② multiply every term by LCD = 20

$500 = 4 \cdot 2 + 1 \cdot 3h$ ③ simplify

$500 = 8 + 3h$ ④ eliminate +8

$-8 \quad -8$

$\frac{492}{3} = \frac{3h}{3}$ ⑤ eliminate 3

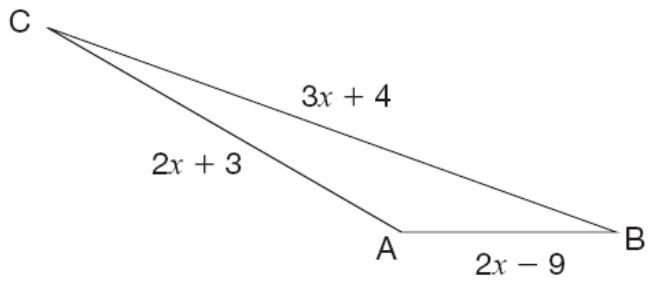
$164 = h$

$h = 164$

∴ The person is 164 cm tall

9 What Side?

The perimeter of the triangle below is **75 m**.



Determine the measure of each side of the triangle.

Show your work.

Sum of all exterior side = Perimeter

Step1 $2x+3 + 3x+4 + 2x-9 = 75$ ① rearrange LS

$2x + 3x + 2x + 3 + 4 - 9 = 75$ ② collect\simplify

$7x - 2 = 75$

$+2 \quad +2$

$\frac{7x}{7} = \frac{77}{7}$

$\boxed{x = 11}$

Step2

Side ① $2x+3$
$= 2(11)+3$
$= 22+3$
$= 25$

Side ② $3x+4$
$= 3(11)+4$
$= 33+4$
$= 37$

Side ③ $2x-9$
$= 2(11)-9$
$= 22-9$
$= 13$

∴ Sides are 13m 25m and 37m

CHECK $13+25+37 = 75$ ✓

10 Measuring Mass

The following table shows an expression for the mass of each of the four members of the Miller family.

Member of the Miller Family	Mass (kg)
Father	4x + 6
Mother	3x – 2
Daughter	2x – 6
Son	x + 7

The total mass of all four members of the Miller family is **255 kg**.

What is the Mother's mass, in kg?

Father + Mother + Daughter + Son = 255

Step 1 $4x+6 + 3x-2 + 2x-6 + x+7 = 255$ ① Rearrange

$4x+3x+2x+x+6-2-6+7 = 255$

$10x+5 = 255$ ② solve for x

$-5 \quad -5$

$\frac{10x}{10} = \frac{250}{10}$

$x = 25$

Step 2 Mother $= 3x-2$ sub in 25 for x

$= 3(25)-2$

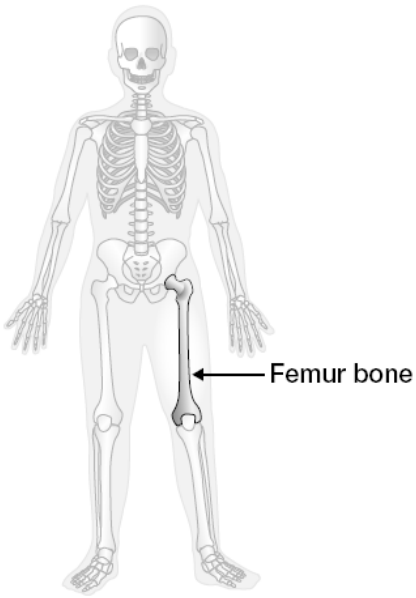
$= 75-2$

$= 73$

∴ She is 73 kg.

11

Bone Business



Scientists find that the height of a person, *h*, in centimeters, is related to the length of the person's femur bone, *f*, in centimeters, according to the following formula:

$$h = 69.09 + 2.24\,f$$

According to the formula, what is the length of the femur in a person who is **178 cm** tall?

Show your work.

$h = 69.09 + 2.24f$ ① sub in 178 for h

$178 = 69.09 + 2.24f$ ② solve for f

$-69.09 \quad -69.09$

$\frac{108.91}{2.24} = \frac{2.24f}{2.24}$

$48.62 \cong f$

∴ The length of femur is approximately 48.62 cm.

12 Which of the following is equivalent to the expression below?

$$-5 + 2(3x - 4) - 1$$

A $-9x + 11$

B $-9x - 5$

C $6x - 10$

D $6x - 14$

13 Issam's father gave him a box of chocolate bars. Solve the following equation to determine how many chocolate bars he received.

$$\frac{n}{3} + 8 = \frac{3}{2}(n-1) + \frac{1}{6}$$

How many chocolate bars did Issam receive?

A 4

B 6

C 8

D 39

14 Temira needs to rent a car. She considers the following price equations, where C is the total cost, in dollars, and n is the number of days.

Company	Equation
Rentway	$C = 20n + 100$
Cheapie's Rentals	$C = 25n + 50$
Cars Cars Cars	$C = 50n$
Drive Away	$C = 15n + 125$

Which company should she choose if she is planning to rent the car for at least 10 days?

F Rentway

G Cheapie's Rentals

H Cars Cars Cars

J Drive Away

15 The maximum number of tickets that can be sold for a school play is 350.

The total profit earned, P, can be determined using the equation $P = 4.50n - 1080$, where n is the total number of tickets sold.

Which of the following statements is true?

A The maximum profit is $1080

B The maximum profit is $1757.

C The total profit is $0 when 240 tickets are sold.

D The total profit is $0 when 350 tickets are sold.

16 The cost of a field trip, *C*, as a function of the number of students on the trip, *n*, is represented by the equation:

$$C = 500 + 15n$$

How many students went on the field trip if the cost was $1025?

A 15875 students

B 102 students

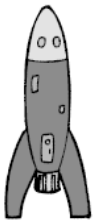
C 69 students

D 35 students

$1025 = 500 + 15n$
$-500 \quad -500$
$\frac{525}{15} = \frac{15n}{15}$
$35 = n$

17 While experimenting with a toy rocket, Dan determines that he can model the rocket's height, *h*, in metres, with respect to time, *t*, in seconds, using the equation

$$h = \frac{1}{2}t^2$$



Which calculation correctly finds the value of *h* when $t = 10$?

a $h = \frac{1}{2} \times 10^2$
$= 5^2$
$= 25$

b $h = \frac{1}{2} \times 10^2$
$= \frac{1}{2} \times 20$
$= 10$

c $h = \frac{1}{2} \times 10^2$
$= \frac{1}{2} \times 100$
$= 50$

d $h = \frac{1}{2} \times 10^2$
$= \frac{1}{4} \times 100$
$= 25$

18 Arlene correctly solved one of the following equations and got an answer of **x = 12**. Which equation did she solve?

A $2x - 3 = 27$

B $\frac{x}{4} + 1 = 47$

C $5x^2 + 6 = 726$

D $3(2x - 5) = 5(x - 1)$

Answers

1] D
2] C
3] H
4] B
5] D
6] A
7] G
8] 164 cm
9] 25 cm, 37 cm, 13 cm (x = 11)
10] 73 kg (x = 25)
11] 48.62 cm
12] D
13] C
14] J
15] C
16] D
17] C
18] C