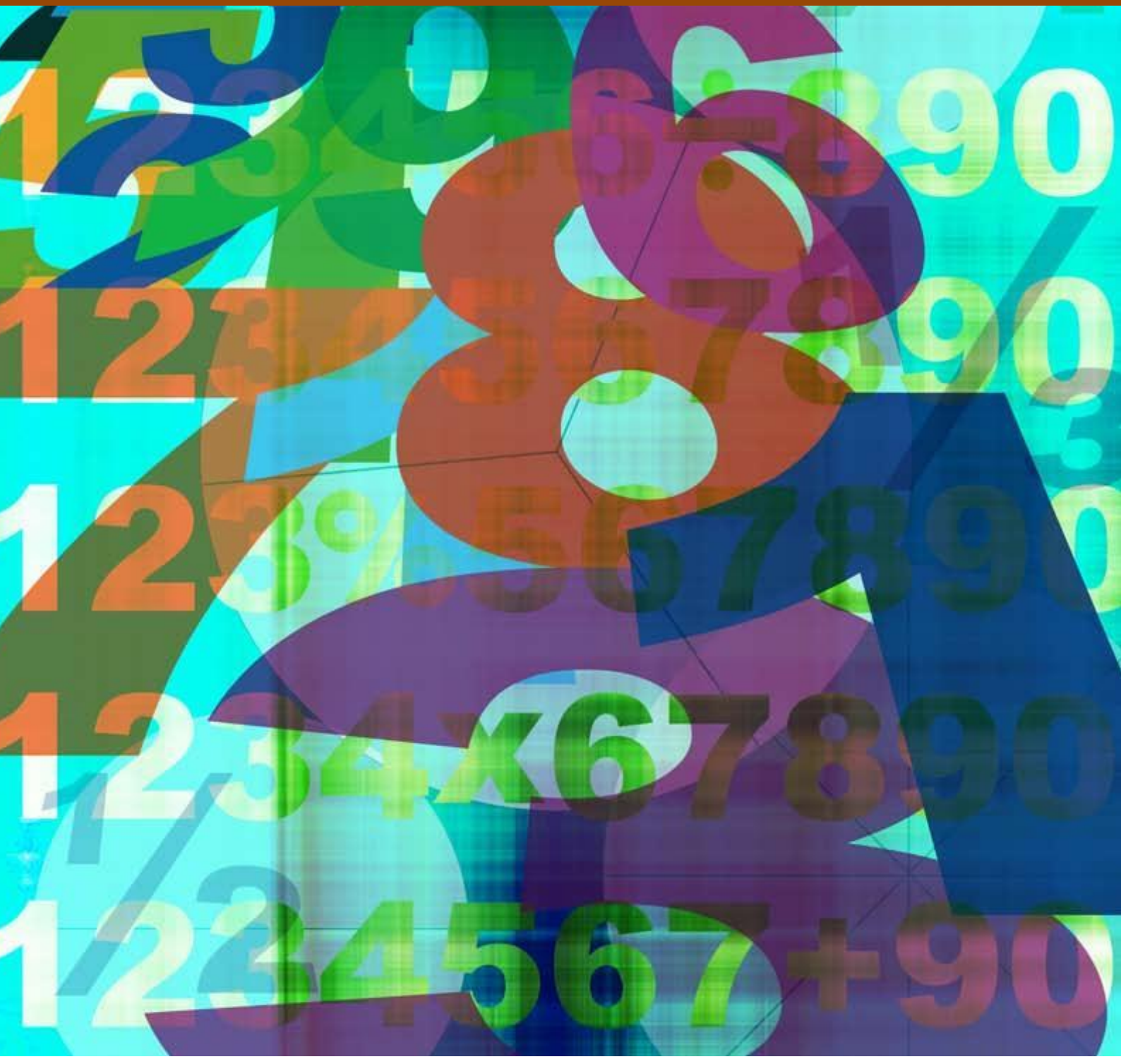
Answers to tasks in Learner Pack

Functional Mathematics

Level 3 Unit 2: Algebra



Functional Mathematics - Level 3 – Unit 2 - Algebra

Acknowledgements - Answers to Learner Pack

Acknowledgements

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Answers # Profits of a business **A1**

Task 1

'Xpect Hair Salon'

Variable to represent the number of owners of the business = k

Algebraic expression to show each owner's profit = $\frac{8{,}400}{k}$

Task 2

'Easy Fit Kitchens'

Variable to represent the number of days the business is open = d

Algebraic expression to show the profit of the business = 80d

Variable = d

Coefficient = 80

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Answers to tasks in Activity A1: Profits of a business

Task 3

'Greenhills Bakery'

Variable to represent the number of days the business is open = g

Algebraic expression to show the profit of the business = 50g + 500

Variable = g
Coefficient = 50
Constant = 500

Practise your skills

What does each variable stand for in the following sequences?

a) 3, 9, 12, a, b, c — a = 15, b = 18, c = 21

b) 3, 5, 7, a, b, c — a = 9, b = 11, c = 13

c) 8, 16, 24, a, b, c — a = 32, b = 40, c = 48

Answers All-Ireland Championships A2

Task 1

Variable representing number of All Irelands Limerick has won = L

Equation that models this problem: L + 9 = 16

Task 2

Variable representing number of All Irelands Kerry has won = K

Equation that models this problem: K – 6 = 27

Task 3

Variable representing number of All Irelands Wexford was won = W

Equation that models this problem: W + 8 = 15

Practise your skills

Variable representing number of units used = U

Equation: B = 14U + 20(31)

B = 14U + 620

Answers The bench press A3

Task 1

To calculate the unknown weight we must isolate the variable.

$x + 16 = 28$

$x + 16 - 16 = 28 - 16$

$x = 12$

The unknown weight is 12kg

Task 2

To calculate the current weight on the left hand side of the bar we must isolate the variable.

$x - 10 = 15$

$x – 10 + 10 = 15 + 10$

$x = 25$

The current weight on the left hand side of the bar is 25kg

Practise your skills

To calculate the amount of votes Mary received from Ireland we must isolate the variable.

$x + 565{,}000 = 780{,}000$

$x + 565{,}000 – 565{,}000 = 780{,}000 – 565{,}000$

$x = 215{,}000$

Therefore, Mary received 215,000 votes from Ireland.

Answers to tasks in Activity A4: How many number 1 hits had Elvis Presley?

Answers Elvis Presley's number 1 hits A4

Task 1

x + 26 = 47

x + 26 - 26 = 47 - 26

x = 21

Elvis had 21 Number 1 hits in the UK.

Task 2

x – 22 = 90

x – 22 + 22 = 90 + 22

x = 112

Elvis had 112 Number 1 hits worldwide.

Practise your skills

x + 17 = 39

x + 17 – 17 = 39 – 17

x = 22

U2 have won 22 Grammy Awards.

Answers to tasks in Activity A5: How wide is that bed?

Answers **How wide is that bed?** **A5**

Task 1

Step 1: Let width = x

Let length = x + 100

Step 2: Form the equation. Represent perimeter in terms of x.

Perimeter = 2(width) + 2(length)

= 2(x) + 2(x + 100)

= 2x + 2x + 200

Perimeter = 4x + 200

Step 3: Fill in remaining information and solve. Perimeter = 560

4x + 200 = 560

4x + 200 – 200 = 560 - 200

4x = 360

x = 90

A single bed is 90 cm wide.

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Answers to tasks in Activity A5: How wide is that bed?

Task 2

Step 1: Let width = x

Let length = x + 55

Step 2: Form the equation. Represent perimeter in terms of x.

Perimeter = 2(width) + 2(length)

= 2(x) + 2(x + 55)

= 2x + 2x + 110

Perimeter = 4x + 110

Step 3: Fill in remaining information and solve. Perimeter = 650

4x + 110 = 650

4x + 110 – 110 = 650 - 110

4x = 540

x = 135

A double bed is 135 cm wide.

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Answers to tasks in Activity A5: How wide is that bed?

Practise your skills

Step 1: Let width = x

Let length = x + 13

Step 2: Form the equation. Represent perimeter in terms of x.

Perimeter = 2(width) + 2(length)

= 2(x) + 2(x + 13)

= 2x + 2x + 26

Perimeter = 4x + 26

Step 3: Fill in remaining information and solve. (Perimeter = 86)

4x + 26 = 86

4x + 26 – 26 = 86 - 26

4x = 60

x = 15

Therefore a basketball court is 15 metres wide.

Answers to tasks in Activity A6: How old is that singer?

Answers How old is that singer? A6

Task 1

Let x = Madonna's age. Then build the equation.

$4x - 12 = 2x + 94$

Solve for x.

$4x - 12 = 2x + 94$

$4x - 2x - 12 + 12 = 2x - 2x + 94 + 12$

$4x - 2x = 94 + 12$

$2x = 106$

$x = 53$

Madonna is 53 years old.

Task 2

Let x = Bruce's age. Then build the equation.

$2x + 6 = 3x - 56$

Solve for x.

$2x + 6 = 3x - 56$

$2x - 2x + 6 + 56 = 3x - 2x - 56 + 56$

$6 + 56 = 3x - 2x$

$62 = x$

Bruce is 62 years old.

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Answers to tasks in Activity A6: How old is that singer?

Task 3

Damien Rice is an Irish singer and songwriter from Co. Kildare. When you add 76 to four times Damien's age, the result is the same as 6 times his age. How old is Damien?

Let x = Damien's age. Then build the equation.

$4x + 76 = 6x$

Solve for x.

$4x + 76 = 6x$

$4x – 4x + 76 = 6x – 4x$

$76 = 2x$

$38 = x$

Damien is 38 years old.

Answers to tasks in Activity A7: How many text messages can I send?

Answers How many text messages? A7

Task 1

$0.12x + 30 \leq 45$

$0.12x + 30 - 30 \leq 45 - 30$

$0.12x \leq 15$

$x \leq 125$

Therefore, Aoife can send 125 text messages per month without being charged extra.

Task 2

$0.09x + 32 \leq 50$

$0.09x + 32 - 32 \leq 50 - 32$

$0.09x \leq 18$

$x \leq 200$

Therefore, Fiona can send 200 text messages per month without being charged extra.

If Fiona exceeds the €10 worth of text messages;

$0.09x + 32 > 50$

Answers to tasks in Activity A8: How much is a ticket?

Answers How much is a ticket? A8

Task 1

2x + 20y = 320

3x + 19y = 315

Step 1: Label the equations A and B.

2x + 20y = 320 [A]

3x + 19y = 315 [B]

Step 2: Get the same coefficients for either x **or** y

If we multiply equation [A] by 3 and equation [B] by 2 then we will have the same x coefficients.

6x + 60y = 960 [A]

6x + 38y = 630 [B]

Step 3: Make sure the chosen coefficients have opposite signs (+ and -).

If we multiply equation [B] by -1 then we will have opposite signs.

6x + 60y = 960 [A]

\- 6x - 38y = - 630 [B]

Answers to tasks in Activity A8: How much is a ticket?

Step 4: Add the two equations together.

$$\begin{array}{rll} & 6x + 60y = 960 & [A] \\ - & \underline{6x - 38y = -630} & [B] \\ & 22y = 330 & \end{array}$$

Step 5: Solve for y.

$22y = 330$

$y = 15$

Step 6: Replace y in either equation to solve for x.

Take, for example equation [A]:

$2x + 20y = 320$

$2x + 20(15) = 320$

$2x + 300 = 320$

$2x + 300 - 300 = 320 - 300$

$2x = 20$

$x = 10$

Therefore:

- the cost of an seated ticket (y) = €15
- the cost of a standing ticket(x) = €10

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Answers to tasks in Activity A8: How much is a ticket?

Task 2

$x + y = 500$

$7x + 9y = 4{,}200$

Step 1: Label the equations A and B.

$$x + y = 500 \quad [A]$$
$$7x + 9y = 4200 \quad [B]$$

Step 2: Get the same coefficients for either x **or** y.

If we multiply equation [A] by 7 then we will have the same x coefficients.

$$7x + 7y = 3{,}500 \quad [A]$$
$$7x + 9y = 4{,}200 \quad [B]$$

Step 3: Make sure the chosen coefficients have opposite signs (+ and -).

If we multiply equation [A] by -1 then we will have opposite signs.

$$-7x - 7y = -3{,}500 \quad [A]$$
$$7x + 9y = 4{,}200 \quad [B]$$

Step 4: Add the two equations together.

$$-7x - 7y = -3{,}500 \quad [A]$$
$$7x + 9y = 4{,}200 \quad [B]$$
$$2y = 700$$

Step 5: Solve for y.

$2y = 700$

$y = 350$

Step 6: Replace y in either equation to solve for x.

$x + y = 500$

$x + 350 = 500$

$x + 350 – 350 = 500 – 350$

$x = 150$

Therefore:

- number of adults (y) = 350
- number of students (x) = 150

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Answers to tasks in Activity A8: How much is a ticket?

Practise your skills

900x + 4y = 3,800

1150x + 2y = 2,600

Step 1: Label the equations A and B.

900x + 4y = 3,800 [A]

1150x + 2y = 2,600 [B]

Step 2: Get the same coefficients for either x **or** y.

If we multiply equation [B] by 2 then we will have the same x coefficients.

900x + 4y = 3,800 [A]

2,300x + 4y = 5,200 [B]

Step 3: Make sure the chosen coefficients have opposite signs (+ and -).

If we multiply equation [A] by -1 then we will have opposite signs.

- 900x - 4y = -3800 [A]

2300x + 4y = 5200 [B]

Step 4: Add the two equations together.

- 900x - 4y = -3800 [A]

2300x + 4y = 5200 [B]

1400x = 1400

Step 5: Solve for y.

1400x = 1400

x = 1

Step 6: Replace x in either equation to solve for y.

Take, for example equation [A]:

900x + 4y = 3800

900(1) + 4y = 3800

900(1) + 4y = 3800

900 - 900 + 4y = 3800 - 900

4y = 2900

y = 725

Therefore:

- There is 1MB in a song.
- There are 725MB in a video.

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