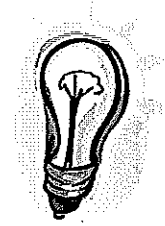# WORKSHEET 1 FURTHER ALGEBRA - CHAPTER 13

WHY DID THE CLASS PUT THEIR HANDS UP WHEN THE LIGHTS WENT OUT?

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1 My little sister Carlotta is 6 years younger than I am. How old is Carlotta when I am:

(a) 8 years ?   (b) 14 years   (c) 22 years   (d y years ?

2 Find the value of each expression for the indicated value of the pronumeral.

(a) Find $(x+5)$ when $x=6; x=8; x=12$

(b) Find $(y-4)$ when $y=12; y=16; y=8$

3 (a) At the supermarket I buy p packets of birthday candles, each containing ten candles. At home I find 4 candles are broken. How many good candles did I get?

(b) When pizzas are delivered they cut them into 8 slices. One day I ordered t pizzas but before I could finish paying for the delivery, 12 pieces had been eaten. How many pieces were left?

4 Find the value of the following expressions for the given value of the pronumeral.

(a) $4y+9$ if $y=3$ (b) $5x-3$ if $x=4$

5 Grandma and Grandpa have $x that they are going to divide evenly amongst the 3 children, with the proviso that each of the grandchildren must put \$1 in their piggybank for savings. How much spending money does each kid get from the gramps?

6 A local music shop is throwing away a whole box containing y CDs. William and Fera bring them home to share with their friends Tom and Aleta. They each decide to give 2 CDs to the neighbours who are having a garage sale. How many does each of them then have?

7 Simplify these expressions

(a) $by \times by^3$ (b) $tx^3 \times t^2 x^4$ (c) $a^3 k^2 \times ak^4$

8 Simplify these expressions

(a) $x^5 \div x^4$ (b) $y^3 \div y$ (c) $8t^8 \div 2t^3$

9 Expand these brackets. (Multiply out the products.)

(a) $3(x-4)$ (b) $6(2x+1)$ (c) $7(2a-3)$

10 Write an algebraic expression for the area of these rectangles in expanded form.

(a) $x+4$ [rectangle] 3

(b) $3y-2$ [rectangle] 4

(c) $\frac{1}{2}x+3$ cm [rectangle] 6

11 Simplify each expression

(a) $5a$ -7-$2a$-4   (b) $ab + 3 + 4ab + 4$ (c) $7x^2 - 5x - 2x^2 + 8x$

12 Expand the brackets and simplify each expression.

(a) $3(y + 2) + 2(y + 1)$ (b) $2(2xy-1) - 3(xy-5)$ (c) $5(t^2 + 2) + 4(t^2 - 5)$

13 Simplify by first converting them to equivalent fractions with a common denominator.

(a) $\dfrac{a}{4} + \dfrac{a}{5}$ (b) $\dfrac{b}{3} - \dfrac{b}{5}$ (c) $\dfrac{a}{12} - \dfrac{a}{9}$

14 Factorise the following by taking out the common factor.

(a) $16b^4 + 8b^2$ (b) $6xt^3 + 4x^2t$ (c) $25a^3 - 5a$

15 Cancel down these fractions by first factorising the numerator.

(a) $\dfrac{6t^2 - 12t}{t}$ (b) $\dfrac{5y^2 + 15y}{5y}$ (c) $\dfrac{10a^2 - 6a}{4a}$

16 Solve the following equations.

(a) $3x + 2 = 23$ (b) $4y - 18 = 22$ (c) $3y + 2 = 41$

17 Use the balance method to solve the following equations.

(a) $\dfrac{2x}{5} = 4$ (b) $\dfrac{3y}{2} = 6$ (c) $\dfrac{3a}{7} = 6$

18 I think of a number, double it and subtract 7. The result is 13. Find the number.

Answers:

A	B	C	D	E	G	H	I	K	L
21 17	b^2y^4 t^3x^7 a^4k^6	$\dfrac{9a}{20}, \dfrac{2b}{15}, \dfrac{-a}{36}$	2 8 16 $y-6$	$\$(\dfrac{x}{3}-1)$	$\dfrac{y}{4}-2$	x y^2 $4t^5$	$8b^2(2b^2 + 1)$ $2xt(3t^2 + 2x)$ $5a(5a^2 - 1)$	$x=7$ $y=10$ $y=13$	$x=10$ $y=4$ $a=14$

M	N	O	R	S	T	U	W
$5y+8$ $xy+13$ $9t^2 - 10$	11, 13, 17 8, 12, 4	$3a-11$ $5ab+7$ $5x^2 + 3x$	$3x-12$ $2x+6$ $14a-21$	$3x+12$ $12y-8$ $3x+18$	$10p-4$ $8t-12$	$6t-12$ $y+3$ $\dfrac{5a-6}{2}$	10

$$\underline{}\ \underline{}\ \underline{}\ \underline{}\ \underline{}\ \underline{}\ \underline{}\quad \underline{}\ \underline{}\ \overset{Y}{\underline{}}\quad \underline{}\ \underline{}\ \underline{}\ \underline{}\ \underline{}\quad \underline{}\ \underline{}\ \underline{}\ \underline{}\ .$$

7 5 13 4 15 10 5   12 4 2   8 4 2 1 10   12 4 16 5

$$\underline{}\ \underline{}\ \underline{}\ \underline{}\ \underline{}\quad \underline{}\ \underline{}\ \underline{}\ \underline{}\ .$$

17 14 6 8 3   18 11 9 16
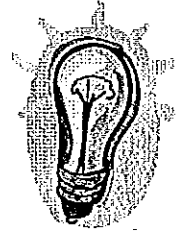
Q7 & Q8 need to be explained. Please ask me!

WORKSHEET 1 FURTHER ALGEBRA - CHAPTER 13

WHY DID THE CLASS PUT THEIR HANDS UP WHEN THE LIGHTS WENT OUT?

1 My little sister Carlotta is 6 years younger than I am. How old is Carlotta when I am:
(a) 8 years ?   (b) 14 years   (c) 22 years   (d y years ?
  2 years ✓   8 years ✓   16 years ✓ $y-6$ years ✓

2 Find the value of each expression for the indicated value of the pronumeral.
(a) Find $(x+5)$ when $x=6; x=8; x=12$ 11; 13; 17 ✓

(b) Find $(y-4)$ when $y=12; y=16; y=8$ 8; 12; 4 ✓

3 (a) At the supermarket I buy 5 p packets of birthday candles, each containing ten candles. At home I find 4 candles are broken. How many good candles did I get? $10p-4$ ✓

(b) When pizzas are delivered they cut them into 8 slices. One day I ordered t pizzas but before I could finish paying for the delivery, 12 pieces had been eaten. How many pieces were left? $8t-12$ ✓

4 Find the value of the following expressions for the given value of the pronumeral.
(a) $4y+9$ if $y=3$ 21 ✓   (b) $5x-3$ if $x=4$ 17 ✓

5 Grandma and Grandpa have $\$x$ that they are going to divide evenly amongst the 3 children, with the proviso that each of the grandchildren must put $1 in their piggybank for savings. How much spending money does each kid get from the gramps? $\$\dfrac{x}{3}-1$ ✓

6 A local music shop is throwing away a whole box containing y CDs. William and Fera bring them home to share with their friends Tom and Aleta. They each decide to give 2 CDs to the neighbours who are having a garage sale. How many does each of them then have? $\dfrac{y-2}{4}$ ✓

7 Simplify these expressions
(a) $by \times by^3$ b^2y^4 (b) $tx^3 \times t^2x^4$ t^3x^7 ✗   (c) $a^3k^2 \times ak^4$ a^4k^6 ✗

8 Simplify these expressions
(a) $x^5 \div x^4$ $\dfrac{x^5}{x^4}=$ (b) $y^3 \div y$ $\dfrac{y^3}{y}$ ✗   (c) $8t^8 \div 2t^3$ $\dfrac{8t^8}{2t^3}$ ✗ Please ask me!

9 Expand these brackets. (Multiply out the products.)
(a) $3(x-4)$ $3x-12$ ✗   (b) $6(2x+1)$ $12x+6$ ✓ (c) $7(2a-3)$ $14a-21$ ✓

10 Write an algebraic expression for the area of these rectangles in expanded form.

(a) $x+4$, 3 $3x+12$ ✓

(b) $3y-2$, 4 $12y-8$ ✓

(c) $\frac{1}{2}x+3$ cm , 6 $3x+18$ cm ✓

11 Simplify each expression

(a) $5a$ -7-2a-4 $3a-11$ ✓   (b) $ab+3+4ab+4$ $5ab+7$ ✓   (c) $7x^2-5x-2x^2+8x$ $5x^2+3x$ ✓

12 Expand the brackets and simplify each expression.

(a) $3(y+2)+2(y+1)$ (b) $2(2xy-1)-3(xy-5)$ (c) $5(t^2+2)+4(t^2-5)$

$5y+8$ ✓ $xy+13$ $9t^2-10$ ✓

13 Simplify by first converting them to equivalent fractions with a common denominator.

(a) $\dfrac{5a}{4}+\dfrac{4a}{5}$ $\dfrac{9a}{20}$ ✓   (b) $\dfrac{5b}{3}-\dfrac{3b}{5}$ $\dfrac{2b}{15}$ ✓   (c) $\dfrac{3a}{12}-\dfrac{4a}{9}$ $\dfrac{-a}{36}$ ✓

14 Factorise the following by taking out the common factor.

(a) $16b^4+8b^2$ (b) $6xt^3+4x^2t$ (c) $25a^3-5a$

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(a) $\dfrac{6t^2-12t}{t}$ (b) $\dfrac{5y^2+15y}{5y}$ (c) $\dfrac{10a^2-6a}{4a}$

16 Solve the following equations.

(a) $3x+2=23$ $x=7$ ✓   (b) $4y-18=22$ $y=10$ ✓   (c) $3y+2=41$ $x=13$ ✓

17 Use the balance method to solve the following equations.

(a) $\dfrac{2x}{5}=4$ $x=10$ ✓   (b) $\dfrac{3y}{2}=6$ $x=4$ ✓   (c) $\dfrac{3a}{7}=6$ $a=14$ ✓

18 I think of a number, double it and subtract 7. The result is 13. Find the number. ⑩

$13+7=20$ ⑩ ✓

Answers:

A	B	C	D	E	G	H	I	K	L
21 17	b^2y^4 t^3x^7 a^4k^6	$\dfrac{9a}{20}, \dfrac{2b}{15}, \dfrac{-a}{36}$	2 8 16 $y-6$	$\$(\dfrac{x}{3}-1)$	$\dfrac{y}{4}-2$	x y^2 $4t^5$	$8b^2(2b^2+1)$ $2xt(3t^2+2x)$ $5a(5a^2-1)$	$x=7$ $y=10$ $y=13$	$x=10$ $y=4$ $a=14$

M	N	O	R	S	T	U	W
$5y+8$ $xy+13$ $9t^2-10$	11, 13, 17 8, 12, 4	$3a-11$ $5ab+7$ $5x^2+3x$	$3x-12$ $2x+6$ $14a-21$	$3x+12$ $12y-8$ $3x+18$	$10p-4$ $8t-12$	$6t-12$ $y+3$ $\dfrac{5a-6}{2}$	10

$$\underline{}\ \underline{}\ \underline{}\ \underline{}\ \underline{}\ \underline{}\ \underline{}\quad \underline{}\ \underline{}\ \overset{Y}{\underline{}}\quad \underline{}\ \underline{}\ \underline{}\ \underline{}\ \underline{}\quad \underline{}\ \underline{}\ \underline{}\ \underline{}$$

7 5 13 4 15 10 5   12 4 2   8 4 2 1 10   12 4 16 5

$$\underline{}\ \underline{}\ \underline{}\ \underline{}\ \underline{}\quad \underline{}\ \underline{}\ \underline{}\ \underline{}$$

17 14 6 8 3   18 11 9 16