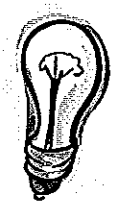
WORKSHEET 1 FURTHER ALGEBRA - CHAPTER 13

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

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) $x+4$ by 3

(b) $3y-2$ by 4

(c) $\frac{1}{2}x+3$ cm by 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) $2(2xy\text{-}1)-3(xy\text{-}5)$ (c) $5(t^2+2)+4(t^2-5)$

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

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

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

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

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	$\frac{9a}{20}, \frac{2b}{15}, \frac{-a}{36}$	2 8 16 $y-6$	$\$(\frac{x}{3}-1)$	$\frac{y}{4}-2$	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 $\frac{5a-6}{2}$	10

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

17 14 6 8 3 18 11 9 16.

WORKSHEET 2 FURTHER ALGEBRA - CHAPTER 13

WHY DID THE GURU REFUSE THE DENTIST'S NEEDLE?

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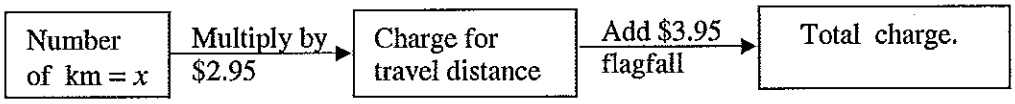
1 Write an algebraic expression to represent each of these quantities.

(a) There were x people in the queue outside the theatre and then 3 more arrived. How many are now in the queue?

(b) For \$25 you get y minutes on the go cart track. So far Aldo has been racing for 30 minutes. How much longer does he have to go?

2 A taxi charges by the km plus a fixed amount called a flagfall. Let the distance travelled on a particular journey be x km.

Here is a flow chart to calculate the total hiring charge.



(a) Write an expression in terms of x for the <u>total</u> charge for travelling x km?

(b) For 5 km, $x = 5$. What is the total charge for 5 km?

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

(a) $3y + 8$ if $y = 4$ (b) $6x - 3$ if $x = 5$ (c) $3a + 11$ if $a = 4$

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

(a) $\frac{y}{4} - 6$ if $y = 8$ (b) $\frac{g}{2} + 7$ if $g = 4$ (c) $\frac{h}{3} - 7$ if $h = 6$

5 Write an algebraic expression to represent these number statements.

(a) I am 4 years younger than the average age of my two sisters. If the sum of their ages is x years, write an expression for my age.

(b) For the sausage sizzle we bought k loaves of bread and it worked out that this just went round 1 piece of bread for each of the 400 sausages. Write an expression for the number of slices of bread in each loaf.

6 Simplify these expressions

(a) $x^2 \times x^7$ (b) $d^2 \times d^3 \times d^4$ (c) $3a^4 \times 5a^2$

7 Simplify these expressions

(a) $15e^7 \div 3e^2$ (b) $12t^5 \div 3t^3$ (c) $16y^4 \div 8y^2$

8 Simplify these expressions

(a) $ax^3 \div ax$ (b) $bx^3 \times b^2x \div bx^2$ (c) $9bh \times 4bh^2 \div 6bh^2$

9 Find the value of these expressions for the given value of the pronumeral.

(a) Find $(x + 5)$ when $x = -2$; $x = -3$; $x = -5$

(b) Find (a) $- 7)$ when $a = -1$; $a = -8$; $a = -6$

(c) Find $(-6 + t)$ when $t = -6$; $t = -2$; $t = -8$

10 Simplify these expressions

(a) $(-3x)\times 2y =$ (b) $(-2a)\times(-5b) =$ (c) $(-3a)\times(-2y)\times(-5t) =$

11 At the newsagent Focal magazine was \$2 less than Horror. Horror was \$4 less than Beautiful. Horror was selling at $\$b$. They sold 6 Horror magazines, 4 Focal magazines and 7 Beautiful magazines.

(a) Write down an expression for the total cost of the Focal magazines.

(b) Write down an expression for the total cost of the Beautiful magazines.

(c) Write an expression for the cost of all the magazines sold.

12 Expand these brackets.

(a) $y(y + 2)$ (b) $2x(x - 3)$ (c) $5t^2(2t+1) =$

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

(a) $\frac{x}{2}+\frac{3x}{4}$ (b) $\frac{2y}{3}-\frac{2y}{5}$ (c) $\frac{3c}{5}+\frac{4c}{7}$

14 By substituting some values, select which one of these answers is the correct one.

(a) $2x+5+3x-2 =$ A $5x-7$ B $5x+3$ C $5x-3$

(b) $3(2y+2)+2(3y-4) =$ A $12y+2$ B $12y+14$ C $12y-2$

15 Solve the following equations.

(a) $6a-7=23$ (b) $2y-11=33$ (c) $5x-13=22$

16 Quick swap are offering a new CD for any 5 traded in plus \$8 or you can just buy it for \$28. Form an equation and solve it to find the value of a traded CD.

Answers:

A	C	D	E	G	H	I	L	M	N
20 27 23	x^9 d^9 $15a^6$	\$ $4b$-8 \$ $7b+28$ \$$17b+20$	$5e^5$ $4t^2$ $2y^2$	2.95x+3.95 \$18.70	$-6xy$ $10ab$ $-30ayt$	5 22 7	y^2+2y $2x^2-6x$ $10t^3+5t^2$	-4 9 -5	x^2 b^2x^2 $6bh$

O	R	S	T	W	Y
$5x+3$ $12y-2$	$5x+8=28$ \$4	$x+3$ $y-30$	$\frac{10x}{8}, \frac{4y}{15}, \frac{41c}{35}$	$\frac{x}{2}-4$ $\frac{400}{k}$	3, 2 ,0 –8, –15, –13 –12, –8, –14

10 7 5 3 1 13 16 9 15 8 2 13 14 13 16 3 8 1 6 7 8 11

11 7 8 13 3 12 4 7 13 15 6 3 13 15 14 8

WORKSHEET 3 FURTHER ALGEBRA - CHAPTER 13

WHAT DID ONE LION SAY TO ANOTHER WHILE EATING A CLOWN?

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1 Write an algebraic expression to represent each of these numbers.
(a) 6 more than x. (b) k less than 6 (c) t more than 3

2 Write an algebraic expression in its simplest form to represent these products.
(a) $\frac{3}{4}\times t$ (b) $a\times\frac{5}{4}$ (c) $x\times\frac{3}{5}$

3 Find the value of the following expressions for the given value of the pronumeral.
(a) $4+5a$ if $a=3$ (b) $9-2x$ if $x=3$ (c) $8+7t$ if $t=4$

4 Write an algebraic expression in its simplest form to represent these products.
(a) $x\times 2\frac{1}{2}$ (b) $y\times 3\frac{2}{3}$ (c) $2\frac{2}{3}\times t$

5 (a) I think of a number n. I divide it by 5. Now I subtract 3. Write an expression for the result in terms of n

(b) I own 5 films on DVD and then I spend $\$y$ at the video store to hire some more DVDs at \$5 each. How many DVDs do I now have to choose from?

(c) My brother is 4 years older than I am. I am 2 years younger than my sister. If my brother is x years old now, how old will my sister be next year?

6 Evaluate these expressions for the given values of the pronumerals.
(a) $3xy$ if $x=2; y=6$
(b) $6xyz$ if $x=\frac{1}{3}; y=\frac{1}{2}; z=9$
(c) $3m^2n$ if $m=4; n=5$

7 Write these expressions without the brackets.
(a) $(x^4y^5)^2$ (b) $(3y^2)^3$ (c) $(2a^3b^5)^4$

8 Expand these brackets.
(a) $-4(3x+5)$ (b) $-3(3x-1)$ (c) $-8\left(\frac{3}{4}y-2\right)$

9 Find the value of these expressions for the given value of the pronumeral.
(a) Find $(2x+3)$ when $x=-1$; $x=-2$; $x=-10$
(b) Find $(3y-5)$ when $y=-1$; $y=-2$; $y=-6$
(c) Find $(-4+k)$ when $k=-5$; $k=-3$; $k=-7$

10 Expand these brackets.
(a) $2k(3k+1)$ (b) $3f^2(2f+3)=$ (c) $6p^3(2p^2+p)=$

11 Cancel the following fractions to their lowest terms.

(a) $\frac{30fg}{5f}$ (b) $\frac{25x^3y}{20xy^2}$ (c) $\frac{15ax}{5ax^2}$

12 Factorise the following by taking out the common factor.

(a) $3t^2+12t$ (b) $8at^3+6a^2t$ (c) $36b^4-24b^2$

13 Cancel down these fractions where possible, by first factorising the numerator.

(a) $\frac{3xy+6ay}{3y}$ (b) $\frac{25kt-35k^2t}{5kt}$ (c) $\frac{15ba^3+10ba}{5ba}$

14 By substituting x= 1 into these expressions, state which two are equivalent.

A x^3+1 B $(x+1)(x^2-x+1)$ C $(x+1)(x^2+x+1)$

15 Solve the following equations.

(a) $2t-18=24$ (b) $3x+2=71$ (c) $5k-12=48$

16 On my bookshelves in the study I can fit a certain number of books on each shelf as well as 24 on top with bookends. If I have 8 shelves and 216 books, how many books do I fit on each shelf? Form an equation and solve it to answer this question.

Answers:

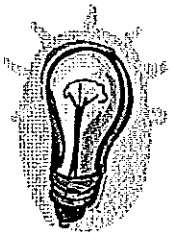
A	C	D	E	F	H	I	K	N
19 3 36	$x+6$ $3-k$ $3+t$	$-12x-20$ $-9x-3$ $-6y+16$	x^8y^{10} $27y^6$ $16a^{12}b^{20}$	$3t(t+4)$ $2at(4t^2+3a)$ $12b^2(3b^2-2)$	$\frac{n}{5}-3$ $\frac{y}{5}+5$ $x-1$	36 9 240	$6k^2+2k$ $6f^3+9f^2$ $12p^5+6p^4$	A and B

R	S	T	U	W	Y	O
1, –1, –17 –8, –11, –23 –9, –7, –11	$6g$ $\frac{5x^2}{4y}$ $\frac{3}{x}$	$\frac{3t}{4}, \frac{5a}{4}, \frac{3x}{5}$	$t=21$ $x=21$ $k=12$	$x+2a$ $5-7k$ $3a^2+2$	$\frac{5x}{2}, \frac{11y}{3}, \frac{8t}{3}$	$8x+24=216$

13 5 3 2 8 16 4 16 15 9 7 1 10 16 14 ?

8 16 7 11 2 5 6 11 2 3 11 2 7 12 15 14 14 4 2 16 4 16 15

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 ? 2 ✓ (b) 14 years 8 ✓ (c) 22 years 16 ✓ (d y years ? $y-6$ ✓

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 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 ✓

30

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? $\frac{x}{3}-1$ ✓

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? $\frac{y}{4}-2$

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

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

(a) $3(x-4)$ $3x-4$ ✓ (b) $6(2x+1)$ $12x+6$ $6\times2\times x+1$ (c) $7(2a-3)$ $14a-21$ $7\times2\times a-3$

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

(a) $x+4$ by 3 — $3x+12$ ✓

(b) $3y-2$ by 4 — $12y-8$ ✓

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

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) $3(y+2)+2(y+1)$ 5y+8 (b) $2(2xy-1)-3(xy-5)$ xy+13 (c) $5(t^2+2)+4(t^2-5)$ $9t^2-10$

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

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

14 Factorise the following by taking out the common factor.

(a) $16b^4+8b^2$ $8b^2(2b^2+1)$ (b) $6xt^3+4x^2t$ $2xt(3t^2+2x)$ (c) $25a^3-5a$ $5a(5a^2-1)$

15 Cancel down these fractions by first factorising the numerator.

(a) $\frac{6t^2-12t}{t}$ 6t-12 (b) $\frac{5y^2+15y}{5y}$ y+3 (c) $\frac{10a^2-6a}{4a}$ $\frac{5a-6}{2}$

16 Solve the following equations.

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

17 Use the balance method to solve the following equations.

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

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

Answers:

A	B	C	D	E	G	H	I	K	L
21 17	b^2y^4 t^3x^7 a^4k^6	$\frac{9a}{20}, \frac{2b}{15}, \frac{-a}{36}$	2 8 16 $y-6$	$\$(\frac{x}{3}-1)$	$\frac{y}{4}-2$	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	$3a-11$ $5ab+7$ $5x^2+3x$	$3x-12$ $2x+6$ $14a-21$	$3x+12$ $12y-8$ $3x+18$	$10p-4$ $8t-12$	$6t-12$ $y+3$ $\frac{5a-6}{2}$	10

B E C A U S E M A N Y H A N D S M A K E
7 5 13 4 15 10 5 12 4 2 8 4 2 1 10 12 4 16 5

L I G H T W O R K
17 14 6 8 3 18 11 9 16

WORKSHEET 2 FURTHER ALGEBRA - CHAPTER 13

WHY DID THE GURU REFUSE THE DENTIST'S NEEDLE?

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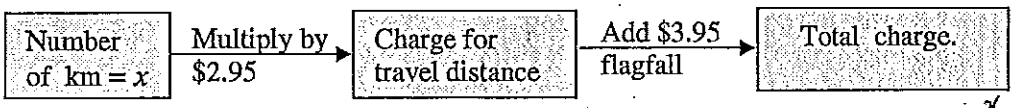
1 Write an algebraic expression to represent each of these quantities.

(a) There were x people in the queue outside the theatre and then 3 more arrived. How many are now in the queue? $x+3$ ✓

(b) For \$25 you get y minutes on the go cart track. So far Aldo has been racing for 30 minutes. How much longer does he have to go? $y-30$ ✓

2 A taxi charges by the km plus a fixed amount called a flagfall. Let the distance travelled on a particular journey be x km.

Here is a flow chart to calculate the total hiring charge.



(a) Write an expression in terms of x for the total charge for travelling x km? $2.95x+3.95$

(b) For 5 km, $x = 5$. What is the total charge for 5 km? \$18.70 ✓

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

(a) $3y + 8$ if $y = 4$ 20 ✓ (b) $6x - 3$ if $x = 5$ 27 ✓ (c) $3a + 11$ if $a = 4$ 23 ✓

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

(a) $\frac{y}{4} - 6$ if $y = 8$ -4 ✓ (b) $\frac{g}{2} + 7$ if $g = 4$ 9 ✗ (c) $\frac{h}{3} - 7$ if $h = 6$ -5 ✓

5 Write an algebraic expression to represent these number statements.

(a) I am 4 years younger than the average age of my two sisters. If the sum of their ages is x years, write an expression for my age. $\frac{x}{2} - 4$ ✓

(b) For the sausage sizzle we bought k loaves of bread and it worked out that this just went round 1 piece of bread for each of the 400 sausages. Write an expression for the number of slices of bread in each loaf. $400k$ ✓

6 Simplify these expressions

(a) $x^2 \times x^7$ x^9 ✓ (b) $d^2 \times d^3 \times d^4$ d^9 ✓ (c) $3a^4 \times 5a^2$ $15a^6$ ✓

7 Simplify these expressions

(a) $15e^7 \div 3e^2$ $5e^5$ ✓ (b) $12t^5 \div 3t^3$ $4t^2$ ✓ (c) $16y^4 \div 8y^2$ $2y^2$ ✓

8 Simplify these expressions

(a) $ax^3 \div ax$ x^2 ✓ (b) $bx^3 \times b^2x \div bx^2$ b^2x^2 ✓ (c) $9bh \times 4bh^2 \div 6bh^2$ $6bh$ ✓

9 Find the value of these expressions for the given value of the pronumeral.

(a) Find $(x + 5)$ when $x = -2$; $x = -3$; $x = -5$ 3, 2, 0 ✓

(b) Find $(a - 7)$ when $a = -1$; $a = -8$; $a = -6$ -8, -15, -13 ✓

(c) Find $(-6 + t)$ when $t = -6$; $t = -2$; $t = -8$ -12, -8, -14 ✓

10 Simplify these expressions

(a) $(-3x)\times 2y =$ $-6xy$ ✓ (b) $(-2a)\times(-5b) =$ $10ab$ ✓ (c) $(-3a)\times(-2y)\times(-5t) =$ $-30ayt$ ✓

11 At the newsagent Focal magazine was \$2 less than Horror. Horror was \$4 less than Beautiful. Horror was selling at \$*b*. They sold 6 Horror magazines, 4 Focal magazines and 7 Beautiful magazines.

(a) Write down an expression for the total cost of the Focal magazines. $4b-8$ ✓

(b) Write down an expression for the total cost of the Beautiful magazines. $7b+28$ ✓

(c) Write an expression for the cost of all the magazines sold. $17b+20$ ✓

12 Expand these brackets.

(a) $y(y+2)$ y^2+2y ✓ (b) $2x(x-3)$ $2x^2-6x$ (c) $5t^2(2t+1) = 10t^3+5t^2$

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

(a) $\frac{x}{2}+\frac{3x}{4}$ $\frac{10x}{8}$ ✓ (b) $\frac{2y}{3}-\frac{2y}{5}$ $\frac{4y}{15}$ ✓ (c) $\frac{3c}{5}+\frac{4c}{7}$ $\frac{41c}{35}$ ✓

14 By substituting some values, select which one of these answers is the correct one.

(a) $2x+5+3x-2 =$ A $5x-7$ B $5x+3$ ✓ C $5x-3$

(b) $3(2y+2)+2(3y-4) =$ A $12y+2$ B $12y+14$ C $12y-2$ ✓

15 Solve the following equations.

(a) $6a-7=23$ 5 ✓ (b) $2y-11=33$ 22 ✓ (c) $5x-13=22$ 7 ✓

16 Quick swap are offering a new CD for any 5 traded in plus \$8 or you can just buy it for \$28.

Form an equation and solve it to find the value of a traded CD. $5x+8=28$ ✓ \$4 ✓

Answers:

A	C	D	E	G	H	I	L	M	N
20 27 23	x^9 d^9 $15a^6$	\$ $4b-8$ \$ $7b+28$ \$ $17b+20$	$5e^5$ $4t^2$ $2y^2$	$2.95x+3.95$ \$18.70	$-6xy$ $10ab$ $-30ayt$	5 22 7	y^2+2y $2x^2-6x$ $10t^3+5t^2$	-4 9 -5	x^2 b^2x^2 $6bh$

O	R	S	T	W	Y
$5x+3$ $12y-2$	$5x+8=28$ \$4	$x+3$ $y-30$	$\frac{10x}{8}, \frac{4y}{15}, \frac{41c}{35}$	$\frac{x}{2}-4$ $\frac{400}{k}$	3, 2, 0 −8, −15, −13 −12, −8, −14

HE WAS TRYING TO TRANSCEND

10 7 5 3 1 13 16 9 15 8 2 13 14 13 16 3 8 1 6 7 8 11

DENTAL MEDITATION

11 7 8 13 3 12 4 7 13 15 6 3 13 15 14 8

WORKSHEET 3 FURTHER ALGEBRA - CHAPTER 13

WHAT DID ONE LION SAY TO ANOTHER WHILE EATING A CLOWN?

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1 Write an algebraic expression to represent each of these numbers.

(a) 6 more than x. $x+6$ ✓ (b) k less than 6 $k-6$ ✓ (c) t more than 3 $3+t$ ✓

2 Write an algebraic expression in its simplest form to represent these products.

(a) $\frac{3}{4}\times t$ $\frac{3t}{4}$ (b) $a\times\frac{5}{4}$ $\frac{5a}{4}$ ✓ (c) $x\times\frac{3}{5}$ $\frac{3x}{5}$ ✓

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

(a) $4+5a$ if $a=3$ 19 ✓ (b) $9-2x$ if $x=3$ 3 ✓ (c) $8+7t$ if $t=4$ 36 ✓

4 Write an algebraic expression in its simplest form to represent these products.

(a) $x\times 2\frac{1}{2}$ $\frac{5x}{2}$ (b) $y\times 3\frac{2}{3}$ $\frac{11y}{3}$ (c) $2\frac{2}{3}\times t$ $\frac{8t}{3}$ ✓

✓ **5** (a) I think of a number n. I divide it by 5. Now I subtract 3. Write an expression for the result in terms of n $\frac{n}{5}-3$ ✓

(b) I own 5 films on DVD and then I spend \$$y$ at the video store to hire some more DVDs at \$5 each. How many DVDs do I now have to choose from? $\frac{y}{5}+5$ ✓

(c) My brother is 4 years older than I am. I am 2 years younger than my sister. If my brother is x years old now, how old will my sister be next year? $x-1$ ✓

✓ **6** Evaluate these expressions for the given values of the pronumerals.

(a) $3xy$ if $x=2; y=6$ 36 ✓

(b) $6xyz$ if $x=\frac{1}{3}; y=\frac{1}{2}; z=9$ 9 ✓

(c) $3m^2n$ if $m=4; n=5$ 240 ✓

✓ **7** Write these expressions without the brackets.

(a) $(x^4y^5)^2$ x^8y^{10} ✓ (b) $(3y^2)^3$ $27y^6$ ✓ (c) $(2a^3b^5)^4$ $16a^{12}b^{20}$ ✓

8 Expand these brackets.

✓ (a) $-4(3x+5)$ $-12x-20$ ✓ (b) $-3(3x-1)$ $-9x+3$ (c) $-8\left(\frac{3}{4}y-2\right)$ $-6y+16$ ✓

9 Find the value of these expressions for the given value of the pronumeral.

(a) Find $(2x+3)$ when $x=-1$; $x=-2$; $x=-10$ $1, -1, -17$ ✓

(b) Find $(3y-5)$ when $y=-1$; $y=-2$; $y=-6$ $-8, -11, -23$ ✓

(c) Find $(-4+k)$ when $k=-5$; $k=-3$; $k=-7$ $-9, -7, -11$ ✓

✓ **10** Expand these brackets.

(a) $2k(3k+1)$ $6k^2+2k$ ✓ (b) $3f^2(2f+3)=$ $6f^3+9f^2$ ✓ (c) $6p^3(2p^2+p)=$ $12p^5+6p^4$ ✓

11 Cancel the following fractions to their lowest terms.

(a) $\frac{30fg}{5f}$ $6g$ ✓   (b) $\frac{25x^3y}{20xy^2}$ $\frac{5x^2}{4y}$ ✓   (c) $\frac{15ax}{5ax^2}$ $\frac{3}{x}$ ✓

12 Factorise the following by taking out the common factor.

(a) $3t^2 + 12t$ $3t(t+4)$ ✓   (b) $8at^3 + 6a^2t$ $2at(4t^2+3a)$ ✓   (c) $36b^4 - 24b^2$ $12b^2(3b^2-2)$ ✓

13 Cancel down these fractions where possible, by first factorising the numerator.

(a) $\frac{3xy+6ay}{3y}$ $x+2a$ ✓   (b) $\frac{25kt-35k^2t}{5kt}$ $5-7k$ ✓   (c) $\frac{15ba^3+10ba}{5ba}$ $3a^2+2$ ✓

14 By substituting x=1 into these expressions, state which two are equivalent.

A x^3+1 ✓   B $(x+1)(x^2-x+1)$ ✓   C $(x+1)(x^2+x+1)$

15 Solve the following equations.

(a) $2t-18=24$ $t=21$ ✓   (b) $3x+2=71$ $x=21$ ✓   (c) $5k-12=48$ $k=12$ ✓

16 On my bookshelves in the study I can fit a certain number of books on each shelf as well as 24 on top with bookends. If I have 8 shelves and 216 books, how many books do I fit on each shelf? Form an equation and solve it to answer this question.

$8x+24=216$ ✓

Answers:

A	C	D	E	F	H	I	K	N
19 3 36	x+6 3–k 3+t	–12x–20 –9x–3 –6y+16	x^8y^{10} $27y^6$ $16a^{12}b^{20}$	$3t(t+4)$ $2at(4t^2+3a)$ $12b^2(3b^2-2)$	$\frac{n}{5}-3$ $\frac{y}{5}+5$ x–1	36 9 240	$6k^2+2k$ $6f^3+9f^2$ $12p^5+6p^4$	A and B

R	S	T	U	W	Y	O
1, –1, –17 –8, –11, –23 –9, –7, –11	6g $\frac{5x^2}{4y}$ $\frac{3}{x}$	$\frac{3t}{4}, \frac{5a}{4}, \frac{3x}{5}$	t=21 x=21 k=12	x+2a 5–7k $3a^2+2$	$\frac{5x}{2}, \frac{11y}{3}, \frac{8t}{3}$	8x+24=216

WHAT DO YOU RECKON
13 5 3 2   8 16   4 16 15   9 7 1 10 16 14

DOES THIS TASTE FUNNY TO YOU
8 16 7 11   2 5 6 11   2 3 11 2 7   12 15 14 14 4   2 16   4 16 15