Unit 3 Lesson 3 Equivalent expressions

Algebra 1

NAME Key

DATE

The Crystal Falls recreation department is planning a 10K run for next summer. The costs for the race are as follows.

$500 for security and race monitors

$250 for advertising

$150 for medals and trophies

$6 per person for a T-Shirt

$0.75 per runner for bottled water

a) Let n represent the number of runners in the race. Write two equivalent expressions for the total cost of the race. Make one of your expressions show the breakdown of the costs and the other the shortest form that shows that total cost.

Cost: $6n + 0.75n + 150 + 250 + 500$

$6.75n + 900$

b) The entry fee for the race is $15 per runner. Write an expression to represent the income.

$15n$

c) Write two equivalent expressions that indicate the profit that will be made on the race.

Profit: $15n - (6.75n + 900)$

$8.25n - 900$

d) Explain how you could test the equivalence of your expressions in part c using tables and graphs.

Put into Y_1 and Y_2 and look for $Y_1 = Y_2$ for every x.

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For each of the following expressions, write an equivalent expression that is as short as possible.

a. $3x + 5 + 8x$

$11x + 5$

b. $7 + 3x + 12 + 9x$

$12x + 19$

c. $8(5 + 2x) - 36$

$40 + 16x - 36$

$4 + 16x$

d. $2(5x + 6) + 3 + 4x$

$10x + 12 + 3 + 4x$

$14x + 15$

e. $\frac{10x - 40}{5}$

$2x - 8$

f. $5x + 7 - 3x + 12$

$2x + 19$

g. $3x + 7 - 4(3x - 6)$

$3x + 7 - 12x + 24$

$-9x + 31$

h. $-7x + 13 + \frac{12x - 4}{4}$

$-7x + 13 + 3x - 1$

$-4x + 12$

For each of the following expressions, combine like terms and then write in factored form.

a. $6x + 5 + 9x$

SHORTEST $15x + 5$

FACTORED $5(3x + 1)$

b. $20 + 6x + 4 + 10x$

SHORTEST $24 + 16x$

$4(6 + 4x)$

FACTORED $8(3 + 2x)$

c. $32 + 20x$

SHORTEST $32 + 20x$

$2(16 + 10x)$

FACTORED $4(8 + 5x)$

d. $13x + 6 - (2 - 3x)$

$13x + 6 - 2 + 3x$

SHORTEST $16x + 4$

$2(8x + 2)$

FACTORED $4(4x + 1)$