Algebra 1 Unit 1 worksheet: Interpreting the parts of an expression

Name _____ Date _____ Period _____

1. For each expression, say what the last step is when it is worked out in the order of operations, and so whether it is a sum, a product, a quotient or a power. Then name its top-level parts as asked.

(a) $\dfrac{x+3}{2x}$: name the numerator and the denominator.

(b) $(2x-1)^3$: name the base and the exponent.

(c) $x^2 - 4(x+1)$: name the terms, and the factors of the second term.

(d) $6x^2(x-7)$: name the factors.

2. A pump empties a water tank. After t minutes of pumping, the water left in the tank is $1900 - 25t$ liters.

(a) Say what 1900, 25 and $25t$ each stand for, with their units.

(b) How much water is left after 35 minutes?

(c) After how many minutes is the tank empty?

(d) For which values of t does the expression describe the tank?

3. After 5 tests, Hannah's mean score is 74. If Hannah scores x on the next test, the new mean will be

$$\frac{5 \cdot 74 + x}{6}$$

(a) What does $5 \cdot 74$ stand for? Why is it in the numerator rather than just 74?

(b) What do the whole numerator and the denominator 6 stand for?

(c) What score on the next test makes the new mean exactly 77?

Free sample from math.wiki for classroom use. Do not post. math.wiki

4. Hannah books a party room. The room costs 300 dollars to rent, and food costs 10 dollars a guest. With n guests sharing the whole bill equally, each guest pays

$$\frac{300 + 10n}{n}$$

dollars.

(a) What do the numerator, the denominator and the term $10n$ stand for?

(b) How much does each guest pay when 20 guests come?

(c) Explain from the parts of the expression why each guest always pays more than 10 dollars, however many come.

5. A theater finds that when a ticket costs p dollars, it sells $380 - 8p$ tickets for a show. So the money it takes from ticket sales is

$$p(380 - 8p)$$

dollars.

(a) Is this a sum or a product at the top level? Say what each top-level part stands for.

(b) In the parentheses, what do 380 and 8 mean?

(c) How many tickets are sold, and how much money is taken, when tickets cost 10 dollars?

6. Owen looks at $4 - (x - 3)^2$ and writes: "A square is never negative, so the smallest value of this expression is 4."

(a) What is wrong with Owen's reasoning? What does the fact about squares really tell you about this expression?

(b) Find a value of x that makes the expression less than -100.

(c) Does the expression have a smallest value? Explain.

7. (a) Without multiplying anything out, explain why

$$(x + 2)(x + 5) - (x + 2)(x + 3) = 2(x + 2)$$

for every real number x. (Hint: read the sum in parentheses, $x + 2$, as one number.)

(b) Use part (a) to find the value of $(x + 2)(x + 5) - (x + 2)(x + 3)$ when $x = 98$, with no long multiplication.

Free sample from math.wiki for classroom use. Do not post. math.wiki

8. Without trying values, use the structure of each expression to decide whether it is always positive, always negative, never positive, never negative, or can take both signs. Where it can equal 0, say for which x.

(a) $-(x+1)^2$

(b) $(x-3)^2+1$

(c) $\dfrac{-5}{x^2+1}$

(d) $x^2(x^2+4)$

(e) $(x-2)^2-1$

Free sample from math.wiki for classroom use. Do not post. math.wiki