

Reading the Structure of Expressions

Grade 9 – Algebra 1 math · Worksheet · Standards: A-SSE.A.1a, A-SSE.A.1b, N-RN.B.3

Name: _____ Date: _____ Class: _____

These problems train reading expressions piece by piece: naming terms, factors and coefficients, and interpreting parts in contexts such as rentals, savings and growth. They cover standards A-SSE.A.1a and A-SSE.A.1b. Later problems use the rational and irrational number rules from N-RN.B.3, and the final six are multi-step situations with compound growth, geometry and plans to compare.

Standards: A-SSE.A.1a, A-SSE.A.1b, N-RN.B.3 · **Level:** Grade 9 Algebra 1

Problem 1 Count the terms (easy)

List the terms of $6x^2 - 4x + 9$, and state how many there are.

$$6x^2$$

term
coefficient 6

$$-4x$$

term
coefficient -4

$$+9$$

constant term
no variable

Three terms: two with variables and one constant.

Problem 2 Coefficients and constant (easy)

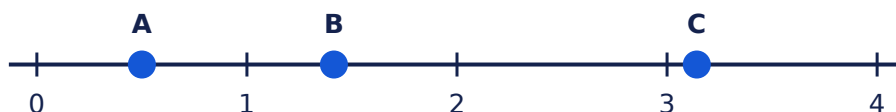
In $8a - 5b + 2$, find the coefficient of each variable term and the constant term.

Problem 3 Factors of a term (easy)

List all the factors of the term $7xy$.

Problem 4 Classify points on a line (easy)

Points A, B and C on the number line are $1/2$, $\sqrt{2}$ and π . Which are irrational? Explain.



Point A is $1/2$, B is $\sqrt{2}$ and C is π .

Problem 5 Factors of a product (easy)

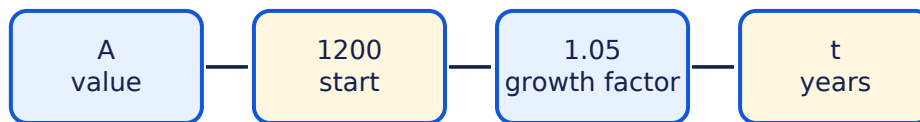
How many factors does $2(x + 5)(x - 1)$ have? Name them.

Problem 6 Gym membership (medium)

The monthly cost of a gym is $C = 35m + 20$, where m is the number of months. What do 35 and 20 represent?

Problem 7 Interpret an exponential (medium)

A savings account holds $A = 1200(1.05)^t$ dollars after t years. Interpret 1200 and 1.05.



$$A = 1200(1.05)^t$$

Problem 8 Factored view (medium)

A club buys 4 tickets for each of $n + 3$ people at a fair. The total number of tickets is $4(n + 3)$. Explain what the factor $(n + 3)$ stands for, and what 4 stands for.

Problem 9 Rational plus irrational (medium)

Is $5 + \sqrt{3}$ rational or irrational? Explain your reasoning.

Problem 10 Rational times irrational (medium)

Is $(2/3) \cdot \sqrt{5}$ rational or irrational? Explain.

Problem 11 Two irrationals, rational sum (medium)

Show that the sum of two irrational numbers can be rational by using $\sqrt{7}$ and $3 - \sqrt{7}$.

Problem 12 Product of two roots (medium)

Is $\sqrt{2} \cdot \sqrt{8}$ rational? Simplify to decide.

Problem 13 Draining tank (medium)

A tank holds 80 gallons and drains 6 gallons each minute. The amount left after t minutes is $80 - 6t$. Interpret each term, then find the amount left when $t = 5$.

Problem 14 Evaluate a growth expression (medium)

Evaluate $800(1.03)^2$ and interpret the result as dollars in an account that earns 3% per year.

Problem 15 Savings account (hard)

Use $A = P(1 + r)^n$ with $P = 2,500$, $r = 0.04$ and $n = 3$. Find A to the nearest cent and name the growth factor.

Problem 16 Bike rental plans (hard)

Shop A charges $15 + 6h$ dollars and Shop B charges $3 + 8h$ dollars for h hours. (a) Which shop has the higher fixed fee? (b) Which charges more per hour? (c) Find the cost at each shop for 4 hours.

Problem 17 Garden perimeter (hard)

A garden has width w feet and length $w + 8$ feet. Write the perimeter as $2(w + w + 8)$, simplify it, and interpret $4w$ and 16. Then find the perimeter when $w = 6$.



A garden with width w and length $w + 8$ (feet).

Problem 18 Circular pond (hard)

A pond has radius 2.5 meters. The circumference is $2\pi(2.5)$ and the area is $\pi(2.5)^2$. Rewrite each as a multiple of π , decide whether each is rational, and give approximations to the nearest hundredth.

Problem 19 Car value (hard)

A car's value is $V = 24,000(0.85)^t$ dollars after t years. (a) What percent does the value lose each year? (b) Find the value after 3 years.

Problem 20 Compare two accounts (hard)

Account A pays 1.5% every six months, so $A = 1,000(1.015)^8$ after 4 years. Account B pays 3% each year, so $B = 1,000(1.03)^4$ after 4 years. Find both amounts to the nearest cent and say which is larger and by how much.