Placement Test Preparation Problems

Pre-Algebra

(1) Ratios and Proportions

(A) A cookie recipe calls for 2½ cups of flour and 1 cup of sugar. Suzanne has 1½ cups of sugar and she wants to use all of it to make as many cookies as possible. How much flour should she use?

(B) A 10-ounce box of YumYum pancake mix costs $1.50. The larger, 25-ounce, box costs $3.50. Which box costs more per ounce and by how much?

(2) Calculations, Absolute Value, Signed Numbers, and Scientific Notation

(A) Find $5.8 - 2.3 + 0.6$.

(B) Find $\dfrac{48.72}{7.9+8.9}$.

(C) $-2(3-4)-(5-8)$

(D) The temperature at noon on Tuesday was 16°F. This was 21°F warmer than the low temperature the previous Monday night. What was the low temperature Monday night?

(E) Temperature changes were recorded each hour starting at 3:00 p.m. They were: -2°F, +6°F, +7°F, -8°F, -2°F, and -6°F. What was the temperature at 2:00 p.m. if it was 56°F at 8:00 p.m.?

(F) Find $|-4|+|-5+2|-|-5|$.

(G) Write 6.3×10^{-4} in standard form.

(H) Find $(20{,}000)^4$ in scientific notation.

(3) Finance

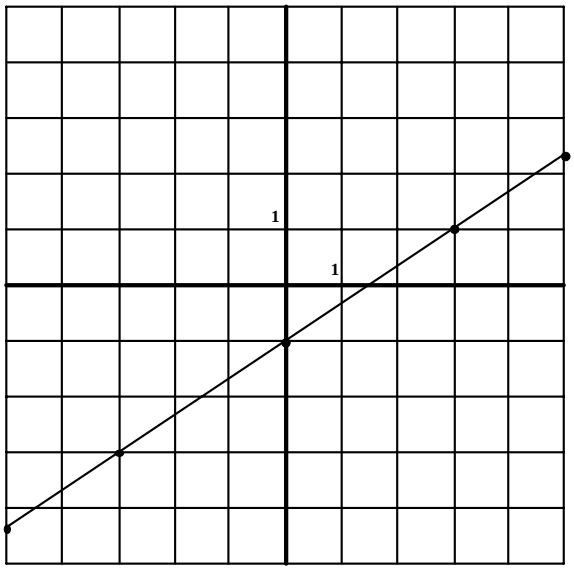
(A) If an annual rate of 7½% in simple interest is charged on a loan of $290 and no payments are made for nine months, to the nearest whole cent how much is owed?

(B) If only the interest is paid monthly on a loan of $7800 at 10.6% annual simple interest, to the nearest cent, how much total interest has been paid after 2.5 years?

Algebra

(1) Lines, their Equations, and Graphs

(A) Write the equation of the line graphed below.



(B) Graph the line whose equation is $y = -\frac{1}{3}x + 4$

(C) Given the table of values below, write the equation of the line that contains them.

x	y
0	380
5	445
10	510
15	575
20	640
25	705

(2) Polynomials

(A) Simplify $3(2x+1) - 3(x-1)(x+1)$.

(B) Factor $2x^2 - 18$.

(C) If $2x + 1 = 3$ and $2x^2 - 5x - 3 = 24$, what does $x - 3$ equal?

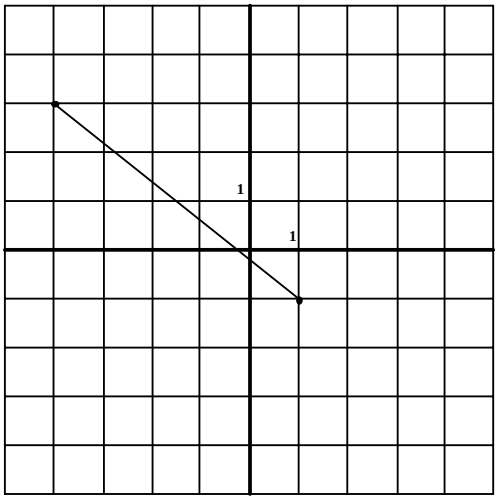
(D) Find k so that $x^2 - kx + 25$ is a perfect square.

(E) What should be added to $(4x^2 - 12x)$ to make it a perfect square?

(3) The Distance Formula

(A) Find the distance from the point at (-1,3) to the point at (5,-5).

(B) Find the length of the segment shown on the graph below.



(C) Find the perimeter of a triangle with vertices at (-5,-3), (7,2), and (4,6).

(4) Radical and Exponential Expressions

(A) Simplify $\sqrt{5xy^5} \cdot \sqrt{10x^3}$

(B) Simplify $\dfrac{\sqrt{98a^4b^2}}{\sqrt{2a^3b^2}}$

(C) Simplify $(2^3 - 6^0)^{-1}$

(D) Simplify $\dfrac{(2x^2y)^3}{2x^4y^2}$

(5) Functions

(A) If $f(2) = 0$ and $f(x) = 3x^2 + kx - 4$, find k.

(B) If $g(x) = 3x^2 + 2x + 6$ and $f(x) = 4x - 5$, find $\dfrac{g(2)}{f(5)}$.

(C) Write a quadratic function, $f(x)$, if $f(-2) = f(4) = 0$ and $f(1) = -9$.

(D) If $h(x) = 13 - 5x$, find $h(x+5)$.

(E) Find $P(a+b)$ if $P(x) = 5x + 2$.

(6) Complex Numbers

(A) Simplify $2i^3$

(B) Find i^{93}

(7) Sequences

(A) Find the next term in the geometric sequence: 3, 12, 48, ____

(B) Find the missing term in the arithmetic sequence: 7½, ____, 10½, …

(8) Factorials

(A) Find $\frac{3!\cdot 10!}{9!}$.

(B) Find $\frac{9!}{7!} + 3!\cdot 2! - 5!$.

(9) Logarithms

(A) Expand $\log(x^2 \cdot \sqrt{y} \cdot \sqrt[3]{3z})$.

(B) Rewrite as a single logarithm: $3\log A + 2\log B - \frac{1}{2}\log C$.

Placement Test Preparation Problems Solutions

Pre-Algebra

(1A) $3\frac{3}{4}$ C. (1B) The 10-ounce box costs \$0.01 more per ounce.

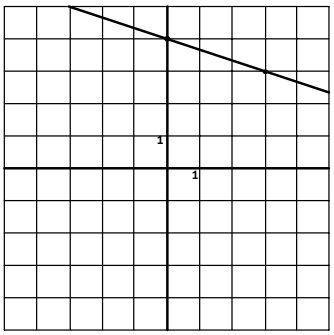
(2A) 4.1 (2B) 2.9 (2C) 5 (2D) –5°F

(2E) 61°F (2F) 2 (2G) 0.00063 (2H) 1.6×10^{17}

(3A) \$306.31 (3B) \$2067.00

Algebra

(1A) $y=\frac{2}{3}x-1$ (1B)



(1C) $y=13x+380$

(2A) $-3x^2+6x+6$ (2B) $2(x-3)(x+3)$ (2C) 8

(2D) $k=-10$ or $k=10$ (2E) 9

(3A) 10 (3B) $\sqrt{41}$ (3C) $18+9\sqrt{2}$

(4A) $5x^2y^2\sqrt{2y}$ (4B) $7\sqrt{a}$ (4C) $\frac{1}{7}$

(4D) $4x^2y$

(5A) $k=-4$ (5B) $\frac{22}{15}$ (5C) $f(x)=x^2-2x-8$

(5D) $-5x-12$ (5E) $5a+5b+2$

(6A) $-2i$ (6B) i

(7A) 192 (7B) 9

(8A) 60 (8B) –36

(9A) $2\log x+\frac{1}{2}\log y+\frac{1}{3}(\log 3+\log z)$ (9B) $\log\frac{A^3\cdot B^2}{\sqrt{C}}$