

## Placement Test Preparation Problems

### Pre-Algebra

#### (1) Ratios and Proportions

- (A) A cookie recipe calls for  $2\frac{1}{2}$  cups of flour and 1 cup of sugar. Suzanne has  $1\frac{1}{2}$  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  $\frac{48.72}{7.9 + 8.9}$ .
- (C)  $-2(3 - 4) - (5 - 8)$
- (D) The temperature at noon on Tuesday was  $16^{\circ}\text{F}$ . This was  $21^{\circ}\text{F}$  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:  $-2^{\circ}\text{F}$ ,  $+6^{\circ}\text{F}$ ,  $+7^{\circ}\text{F}$ ,  $-8^{\circ}\text{F}$ ,  $-2^{\circ}\text{F}$ , and  $-6^{\circ}\text{F}$ . What was the temperature at 2:00 p.m. if it was  $56^{\circ}\text{F}$  at 8:00 p.m.?
- (F) Find  $|-4| + |-5 + 2| - |-5|$ .
- (G) Write  $6.3 \times 10^{-4}$  in standard form.
- (H) Find  $(20,000)^4$  in scientific notation.

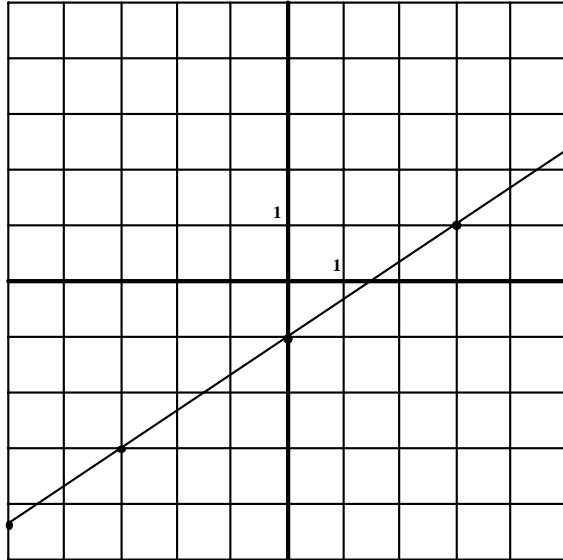
#### (3) Finance

- (A) If an annual rate of  $7\frac{1}{2}\%$  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  $6x^2 + 13x + 5 = 24$  and  $2x + 1 = 3$ , what is  $3x + 5$ ?

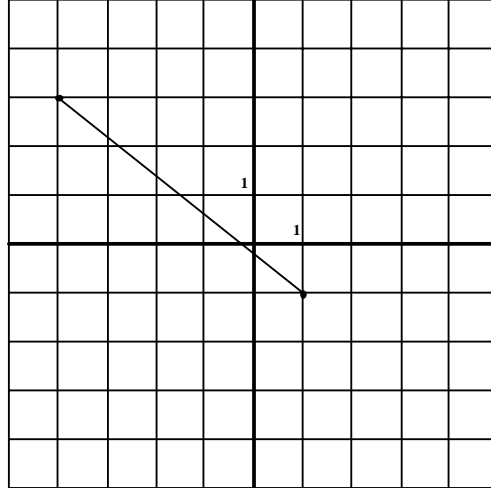
(D) Find  $k$  so that  $x^2 - kx + 25$  is a perfect square.

(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  $\frac{\sqrt{98a^4b^2}}{\sqrt{2a^3b^2}}$

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

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

(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  $\frac{g(2)}{f(5)}$ .

(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:  $7\frac{1}{2}$ , \_\_\_\_\_,  $10\frac{1}{2}$ , ...

(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

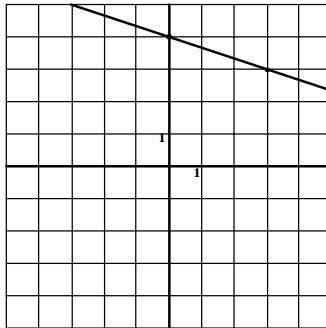
### Pre-Algebra

- |                           |  |              |                           |
|---------------------------|--|--------------|---------------------------|
| (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) $-5^{\circ}\text{F}$ |
| (2E) $61^{\circ}\text{F}$ | (2F) 2   | (2G) 0.00063 | (2H) $1.6 \times 10^{17}$ |
| (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) $\log \frac{A^3 \cdot B^2}{\sqrt{C}}$ |                            |