

$$\begin{array}{r}
 -\frac{118}{37} \\
 -\frac{4263}{296} \\
 \hline
 4337 \\
 \hline
 296
 \end{array}$$

232.55  
-22

## Algebra Review

Name: \_\_\_\_\_

Due Date \_\_\_\_\_

Do all your work in your notebook on lined paper, and just put the final answers in the places provided below. Graph paper is required for question 9.

[49 marks total]

1) [6 marks] Expand and simplify each of the following.

a)  $4\sqrt{65}(2\sqrt{13} - 5\sqrt{5})$

$$\underline{104\sqrt{5} - 100\sqrt{13}}$$

b)  $(7\sqrt{2} - 11\sqrt{7})^2$

$$\underline{945 - 154\sqrt{14}}$$

c)  $(7\sqrt{3} - 2)(7\sqrt{3} + 2)$

$$\underline{143}$$

2) [2 marks] Find  $k$  if  $17^{3k-2} = 83521$

$$k = \underline{2}$$

3) [4 marks] Simplify  $\frac{\left(\frac{2}{7}a^{-3}b^2c\right)^3 \left(-\frac{3}{14}a^2b^{-1}c^3\right)^{-2}}{\left(-\frac{15}{2}a^4b^{-3}c^5\right)^{-1}}$

$$\underline{-3 \frac{17}{21} \frac{b^5 c^2}{a^9}}$$

4) [2 marks] Solve for  $y$ :  $2(3y - 5) - (y + 2) - 7 = -5(2 - 3y) - 3$

$$y = \underline{-\frac{3}{5}}$$

5) [3 marks] Solve for  $m$ :

$$\frac{3}{8}(2m - 5) - 2(m + 3) - 5 + 2m - \frac{m-2}{6} = \frac{7(3m+1)}{4} - \frac{m-5}{24}$$

$$m = \underline{-3 \frac{5}{37}}$$

6) [2 marks] Give the solution set for  $n \in \mathbb{Z}$ :  $5(n - 3) - 7n < 9$

$$\text{SS} = \underline{\{ -11, -10, -9, \dots, 3 \}}$$

7) [1 mark] Give the solution set for  $0n \geq 0$ ,  $n \in \mathbb{R}$

$$\text{SS} = \underline{\{ R \}}$$

8) [2 marks] Find the values of  $x$  and  $y$  in the following system of two equations.

$$7x - 3y = -16$$

$$4x + 6y = \underline{2}$$

$$x = \underline{-1 \frac{2}{3}}$$

$$y = \underline{-1 \frac{1}{9}}$$

9) [6 marks] For the following three inequalities:

a) Make a t-chart for each inequality. Show these on your graph paper.

b) Graph the three lines on the same axis on graph paper, using a straight edge. The graph must be turned in with this exercise.

c) Find the points of intersection of these lines.

d) Calculate the area enclosed by the three lines using both the shoelace formula and Pick's rule. Make sure that your answers agree!!

e) Fill in the blanks below.

$$l_1 : 3x - y \geq 5 \text{ (Use } x \text{ values 5 and -1 in the t-chart)}$$

$$l_2 : 2x + 3y \leq 18 \text{ (Use } x \text{ values 0 and 9)}$$

$$l_3 : x - 4y \leq -2 \text{ (Use } x \text{ values -2 and 10)}$$

Point of intersection of  $l_1$  and  $l_2$

$$\underline{\underline{3, 4}}$$

Point of intersection of  $l_1$  and  $l_3$

$$\underline{\underline{2, 1}}$$

Point of intersection of  $l_2$  and  $l_3$

$$\underline{\underline{6, 2}}$$

Area using the shoelace formula (show this work):

$$A = \underline{\underline{5\frac{1}{2} \text{ units}^2}}$$

Work shown on graph paper

Area using Pick's rule (show this work):

$$A = \underline{\underline{5\frac{1}{2} \text{ units}^2}}$$

Work shown on graph paper

10) [1 mark] In the term  $x^2y$ , what is the coefficient?

$$\underline{\underline{1}}$$

11) [1 mark] State the degree of the term  $5a^2b^4c$

$$\underline{\underline{7}}$$

12) [1 mark] Give an example of a trinomial

$$\underline{\underline{3x^2 + y^4 - 2y}}$$

13) [1 mark] Give the degree of the polynomial  $5x^3yz^4 - xy^7z$

$$\underline{\underline{9}}$$

14) [1 mark] Why is the polynomial in question #13 not monic?

Answer on paper

15) [1 mark] A polynomial of degree 5 is called

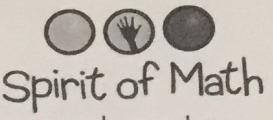
Quintic Polynomial

16) [3 marks] Describe the polynomial  $3m^3 - 2mn + m^2n^2$  in three different ways:

i) Trinomial

ii) Quartic

iii) Not monic



Quadratic Polynomial

17) [1 mark] A polynomial of degree 2 is called

18) [4 marks] Expand and simplify each of the following.

a)  $(3n-5)^2$

$$\underline{9n^2 - 30n + 25}$$

b)  $(4a-3b)(7a+b)$

$$\underline{28a^2 - 17ab - 3b^2}$$

c)  $(6s^2t-5r^3)(7r^3t-2s^2t^2)$

$$\underline{52r^3s^2t^2 - 12s^4t^3 - 35r^6t}$$

d)  $(3x^2-4x+2)(5x-1)$

$$\underline{15x^3 - 23x^2 + 14x - 2}$$

19) [3 marks] a) Give the equation, in slope,  $y$ -intercept form, of the line that is represented by the values in the given t-chart.

x	y
1	-1
-2	8
4	-10

$$\underline{y = -3x + 2}$$

$$\underline{y = \frac{x}{3} + \frac{2}{3}}$$

$$\underline{-3x - y = -2}$$

0) [3 marks] For the line in question #19, state (using the correct letters):

a) the slope

$$\underline{m = -3}$$

b) the  $x$ -intercept

$$\underline{b = \frac{2}{3}}$$

c) the  $y$ -intercept

$$\underline{b = 2}$$

[1 mark] What is the slope of a line perpendicular to the line in question #19?

$$\underline{-\frac{1}{3}}$$

$$9) \quad 3x_1 - u > 5 \quad 2u + 3u \leq 18 \quad x - 4u < -2$$

## Algebra Review

$$1a) (4\sqrt{65} \times 2\sqrt{13}) - (4\sqrt{65} \times 5\sqrt{5}) \\ = 104\sqrt{5} - 100\sqrt{13}$$

$$b) [(7\sqrt{2} \times 7\sqrt{2}) - (7\sqrt{2} \times 11\sqrt{7})] - [(11\sqrt{7} \times 7\sqrt{2}) - (11\sqrt{7} \times 11\sqrt{7})] \\ = (98 - 77\sqrt{14}) - (77\sqrt{14} - 847) \\ = 98 - 77\sqrt{14} - 77\sqrt{14} + 847 \\ = 945 - 154\sqrt{14}$$

$$c) (7\sqrt{3} \times 7\sqrt{3}) + (7\sqrt{3} \times 2) + (-2 \times 7\sqrt{3}) + (-2 \times 2) \\ = 147 + 14\sqrt{3} - 14\sqrt{3} - 4 \\ = 147 - 4 \\ = 143$$

OR

$$\text{Identity} = a^2 - b^2 \\ (7\sqrt{3})^2 - (2)^2 \\ = 147 - 4 \\ = 143$$

$$2) 83521 = 17^4$$

$$3k - 2 = 4$$

$$3k = 6$$

$$k = 2$$

$$3) \left[ \left( \frac{2}{7} \right)^3 \times \left( -\frac{3}{14} \right)^2 \div \left( -\frac{15}{2} \right)^{-1} \right] \times (a^{-9-4+4}) \times (b^{6+2-3}) \times (c^{3-6+5}) \\ = \left( \frac{8}{343} \times \frac{108}{9} \div -\frac{2}{15} \right) a^{-9} \cdot b^5 \cdot c^2 \\ = -\frac{80}{21} \frac{b^5 c^2}{a^9} \\ = -3 \frac{17 b^5 c^2}{21 a^9}$$

$$4) 2(3y-5)-(y+2)-7 = -5(2-3y)-3$$

$$6y-10-y-2-7 = -10+15y-3$$

$$-19+5y = -13+15y$$

$$-10y = 6$$

$$y = -\frac{3}{5}$$

$$5) \frac{3}{8}(2m-5) - 2(m+3) - 5 + 2m - \frac{m-2}{6} = \frac{7(3m+1)}{4} - \frac{m-5}{24}$$

$$9(2m-5) - 48(m+3) - 120 + 48m - 4m+8 = 42(3m+1) - m-5$$

$$18m-45 - 48m - 144 - 120 + 48m - 4m+8 = 126m+42 - m-5$$

$$14m-301 = 125m+37$$

$$-111m = 338$$

$$m = -3\frac{5}{37}$$

$$6) 5(n-3) - 7n < 9$$

$$5n - 15 - 7n < 9$$

$$-2n < 24$$

$$n < -12$$

$$SS = \{-13, -14, -15, \dots\}$$

$$7x-3y = -16$$

$$4x+6y = 2$$

$$14x-6y = -32$$

$$4x+6y = 2$$

$$18x = -30$$

$$x = -1\frac{2}{3}$$

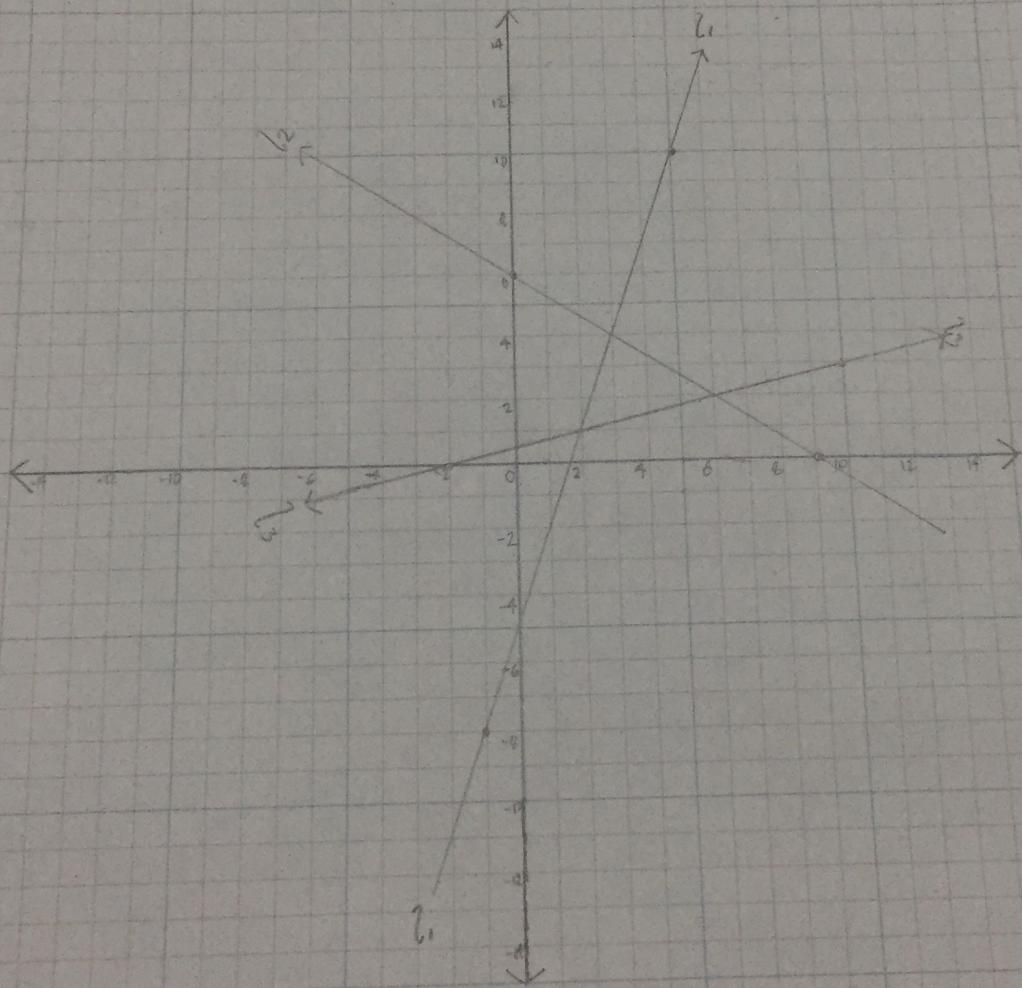
$$3y = -4\frac{1}{3}$$

$$y = 1\frac{4}{9}$$

9)

$$3x - y \geq 5 \quad 2x + 3y \leq 18 \quad x - 4y \leq -2$$

$x$	$y$	$x$	$y$	$x$	$y$
5	10	0	6	-2	0
-1	-8	9	0	10	3



$$\frac{1}{2} \times \begin{vmatrix} 3 & 4 \\ 2 & 1 \\ 6 & 2 \\ 3 & 4 \end{vmatrix} = \frac{1}{2} \times [(3+4+24) - (6+6+8)] \\ = \frac{1}{2} \times 11 \\ = 5\frac{1}{2} \text{ units}^2 \\ = 27.5 \text{ mm}^2$$

Pick's Rule:  $\frac{1}{2} \times (\text{Border dots}) + (\text{dots inside}) - 1$

$$\frac{1}{2} \times 3 + 5 - 1 = 5\frac{1}{2} \text{ units}^2 \\ = 27.5 \text{ mm}^2$$

$$11) 2+4+1=7$$

(4) Because the first term has a coefficient of 5 whereas for a monic, it would be 1

$$\begin{aligned} 18a) & (3n-5)(3n-5) \\ & = [(3n \times 3n) - (3n \times 5)] - [(5 \times 3n) - (5 \times 5)] \\ & = (9n^2 - 15n) - (15n - 25) \\ & = 9n^2 - 30 + 25 \end{aligned}$$

$$\begin{aligned} b) & [(4a \times 7a) + (4a \times b)] - [(3b \times 7a) + (3b \times b)] \\ & = (28a^2 + 4ab) - (21ab + 3b^2) \\ & = 28a^2 + 4ab - 21ab - 3b^2 \\ & = 28a^2 - 17ab - 3b^2 \end{aligned}$$

$$\begin{aligned} c) & (6s^2t - 5r^3)(7r^3t - 2s^2t^2) \\ & = [(6s^2t \times 7r^3t) - (6s^2t \times 2s^2t^2)] - [(5r^3 \times 7r^3t) - (5r^3 \times 2s^2t^2)] \\ & = (42r^3s^2t^2 - 12s^4t^3) - (35r^6t - 10r^3s^2t^2) \\ & = 42r^3s^2t^2 - 12s^4t^3 - 35r^6t + 10r^3s^2t^2 \\ & = 52r^3s^2t^2 - 12s^4t^3 - 35r^6t \end{aligned}$$

$$\begin{aligned} d) & (3x^2 - 4x + 2)(5x - 1) \\ & = [(3x^2 \times 5x) - (3x^2 \times 1)] - [(4x \times 5x) - (4x \times 1)] + [(2 \times 5x) - (2 \times 1)] \\ & = (15x^3 - 3x^2) - (20x^2 - 4x) + (10x - 2) \\ & = 15x^3 - 3x^2 - 20x^2 + 4x + 10x - 2 \\ & = 15x^3 - 23x^2 + 14x - 2 \end{aligned}$$

$$19) y = mx + b$$

$$m = -3$$

$$b = 2$$

$$y = -3x + 2$$

$$b) \frac{x}{a} + \frac{y}{b} = 1$$

$$1 = \frac{x}{\frac{1}{3}} + \frac{y}{-\frac{1}{3}}$$

$$c) Ax + By = C$$

$$-y = -3x + 2$$

$$y - 2 = -3x$$

$$-2 = -3x - y$$

$$-3x - y = -2$$

$$21) -3 \xrightarrow{\text{negative reciprocal}} \frac{1}{3}$$