DAWSON COLLEGE
MATHEMATICS DEPARTMENT

FINAL EXAMINATION
Winter 2023

Remedial Activities for Secondary IV Mathematics
201-016-RE

Instructor: G. Chu

Student Name:_____

Student I.D.:_____

Date: May 18, 2023   Time: 14:00 – 17:00

Instructions:
- Print your name, student ID number and section in the space provided above.
- All questions are to be answered directly on the examination paper.
- Only calculators SHARP EL-531 are permitted.
- Please show all your work clearly.
- Please justify all your answers.
- Your answers must be exact and simplified unless otherwise stated.

All questions are equally weighted.
<u>This exam must be returned intact.</u>

1. Simplify $\dfrac{9y^{-7}(3x^{-3}y)^2}{(3x)^{-4}}$ with positive exponents only.

2. Expand and simplify: $(x^2 + 3x + 7)(2x + 5) - (2x^3 + 35)$

3. Simplify $\dfrac{x^2-9}{3x^5+2x^4} \cdot \dfrac{6x^2+19x+10}{x^3+27}$

4. Simplify $\dfrac{1-\dfrac{2}{x}-\dfrac{8}{x^2}}{x^2-16}$

5. Rationalize the denominator and simplify the expression: $\dfrac{\sqrt{7}+2}{\sqrt{28}-1}$

6. If $Ax + B(x - C) = Dx - E$, solve for x.

7. The sum of 5 consecutive even integers is 650. Find them.

8. The product of 2 consecutive integers is 650. Find them.

9. Solve the linear system: $\begin{cases} -2x + 7y = 41 \\ 3x + 2y = 1 \end{cases}$

10. Solve for x: $\sqrt{12 + x^2} - 6 = x$.

11. Solve for x: $49^{x^2-11x} = \left(\dfrac{1}{343}\right)^{x+8}$

12. Solve for x: $log_2(x^2 - 14x) = 5$

13. Suppose $(7, 8)$ and $(3, -8)$ are the endpoints of a diameter in a circle. Find the center and the radius of the circle.

14. Find the domain of $f(x) = \sqrt{5x - 8(x + 3) + 18}$ and graph the final answer on the real line.

15. Let $g(x) = x^2 + 3x + 6$.

    a. Find $2g(3) - g(g(1))$.

    b. Find $g(2x) + g(2 + x)$ and simplify.

16. Find an equation of the line if it passes through the x-intercept of $21y + 2x = 6$ and is parallel to $2y + 21 = 6x$.

17. Find the intercepts and vertex of $f(x) = 3x^2 - 12x + 9$. Sketch and state its range.

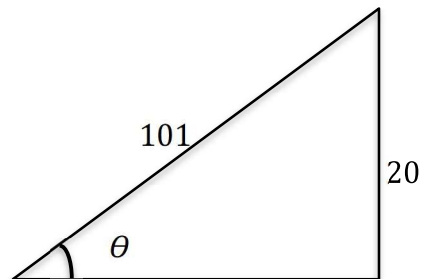18. A company's profit of selling hockey sticks is given by:

$$P(x) = -400 + 6x - 0.005x^2$$

where x is the number of hockey sticks.

    a. How many hockey sticks should be sold to maximize the profit?

    b. What is the maximum profit?

19. Find the exact value of $3 \cos \theta - 2 \sin \theta$.

20. A tree casts a 39 m long shadow when the angle of elevation of the sun is 39°. Find the height of the tree. Correct your answer to 4 decimal places.

Answers:

1. $\dfrac{6561}{x^2 y^5}$

2. $11x^2 + 29x$

3. $\dfrac{(x-3)(2x+5)}{x^4(x^2-3x+9)}$

4. $\dfrac{x+2}{x^2(x+4)}$

5. $\dfrac{16+5\sqrt{7}}{27}$

6. $\dfrac{BC-E}{A+B-D}$

7. $126, 128, 130, 132 \; and \; 134$

8. $\{25, 26\} \; and \; \{-26, -25\}$

9. $x = -3, y = 5$

10. $x = -2$

11. $x = 8, x = \dfrac{3}{2}$

12. $x = 16, x = -2$

13. $(5,0), 2\sqrt{17}$

14. $x \leq -2$

15. $-88, 5x^2 + 13x + 22$

16. $y = 3x - 9$

17. $y = 3x^2 - 12x + 9$

    a. $y - int: (0, 9)$

    b. $x - int: (1, 0), (3, 0)$

    c. $vertex: (2, -3)$

    d. $range: y \geq -3$

18. $600 \; hockey \; sticks, \$1400$

19. $\dfrac{257}{101}$

20. $31.5816 \; meters$