

DAWSON COLLEGE
MATHEMATICS DEPARTMENT

FINAL EXAMINATION
Fall 2022

Remedial Activities for Secondary IV Mathematics
201-016-RE

Instructor: M. Beck, G. Chu

Student Name: _____

Student I.D.: _____

Date: December 13, 2022

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.
This exam must be returned intact.

1. Simplify $\frac{4xy^{-7}}{8x^3(2x^2y)^{-5}}$ with positive exponents only.
2. Expand and simplify: $(x - 7)^2(3x^2 + 5)$
3. Simplify $\frac{x^2-16}{x^2-4x} \div \frac{x^2 + 9x + 20}{x^3+2x^2-15x}$
4. Simplify $\frac{x+5}{x^2-9} + \frac{x-1}{x^2+3x}$
5. Rationalize the denominator and simplify the expression: $\frac{2-\sqrt{45}}{1+\sqrt{20}}$
6. A farmer has a total of 189 chickens and cows. The animals have 452 legs in total. Find the number of chickens and cows the farmer has.
7. Solve for x : $x - 3(x + 5) + 7(x + 2) = 5x + 8$
8. Solve for x : $(x - 3)(x + 5) + 7(x + 2) = 5x + 8$
9. The sum of a number and 3 times its reciprocal is $\frac{52}{7}$. Find the number(s).
10. Solve for x : $7 - \sqrt{19 - 3x} + x = 0$
11. Solve for x : $27^{4x-5}(\sqrt{3})^{3x+7} = \frac{1}{81}$
12. Solve for x : $27^{4x-5} = 7$. Correct your answer to 4 decimal places.
13. Solve for x and give the final answer using inequalities, intervals and on the real number line:

$$-1 < 3(x - 6) - 5x \leq 9$$
14. If the endpoints of a diameter of a circle is $(2, 9)$ and $(-2, 3)$, find:
 - a. the slope of this diameter,
 - b. the center of the circle and
 - c. the area of the circle.

15. Let $f(x) = \frac{x^{21} - x + 2022}{x^2 - x - 6}$ and $g(x) = x^2 + 5x + 1$.

- a. Find the domain of $f(x)$.
- b. Find $g(x - 2) + g(x) - 2$ and simplify.

16. In Montreal, the taxi fare y in \$ is a linear function of the distance traveled x in km. Write the linear equation and fill up the following table.

| | | | | |
|---|-------|---|-------|-------|
| x | 6 | 7 | 11 | |
| y | 12.25 | | 19.25 | 27.65 |

17. Find the intercepts and vertex of $f(x) = -x^2 + 7x - 10$. Sketch and state its range.

18. The height h in meters of a baseball in a game, t second after it is batted is given by

$$h(t) = 2 + 9t - 5t^2$$

- a. When does the baseball reach its maximum height and what is its maximum height?
- b. When will the baseball hit the ground?

19. Find the exact value of $8 \cos 30^\circ - \tan 60^\circ + \csc 45^\circ$

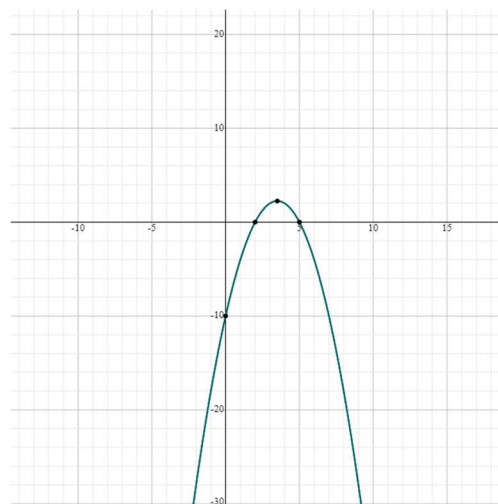
20. Find the distance between a boat and a 27-meter tall lighthouse where the angle of elevation from a boat to the top of the light house is 33° . Correct your answer to 4 decimal places.

Answers:

1. $\frac{16x^8}{y^2}$
2. $3x^4 - 42x^3 + 152x^2 - 70x + 245$
3. $x - 3$
4. $\frac{2x^2 + x + 3}{x(x-3)(x+3)}$
5. $\frac{7\sqrt{5} - 32}{19}$
6. 152 chickens and 37 cows
7. No solution
8. $-2 \pm \sqrt{13}$
9. $x = 7$ and $3/7$
10. -2
11. $\frac{5}{9}$
12. 1.3976
13. $-\frac{27}{2} \leq x < -\frac{17}{2}, [-\frac{27}{2}, -\frac{17}{2})$



14. $\frac{3}{2}, (0, 6), 13\pi$
15. $x \neq -2, x \neq 3, 2x^2 + 6x - 6$
16. $y = 1.4x + 3.85, y = 13.65, x = 17$
17. $y = -x^2 + 7x - 10$
 - a. $y - int: (0, -10)$
 - b. $x - int: (2, 0), (5, 0)$
 - a. $vertex: (3.5, 2.25)$
 - b. $range: y \leq 2.25$



18. 0.9s, 6.05m, 2s
19. $3\sqrt{3} + \sqrt{2}$
20. 41.5763 m