

Final Exam W2020 - Due: by noon April 24th

Student # _____

Hello Amth 092 Students. Do all the questions to the best of your ability. Show your work. The Answer is only worth 1 or 2 marks - your work is worth the other marks. If you need to sketch a graph and cannot print out the Exam, just make a sketch on ordinary white paper and label the graph. Good luck and make sure you get the Exam in by April 24th (NOON). Please send it in earlier if you can.

- 1) What is the slope and the y-intercept of the following linear function. $y = \frac{2}{3}x - 5$? (2 marks)

Solve the following short answer questions. Show your work beside the question. (2 marks each)

2) a) $|x + 2| = 5$ _____

b) $(x + 3)(x - 5) = 0$ _____

c) $\sqrt{x} + 1 = 9$ _____

d) $x^2 - 6 = 19$ _____

e) Evaluate $36^{\frac{1}{2}}$ _____

f) Evaluate $4^{\frac{3}{2}}$ _____

g) Change $\sqrt[3]{x^2}$ to exponential form. _____

h) Change $(10x)^{\frac{3}{2}}$ to radical form. _____

i) Multiply $(\sqrt{x+h} + 8)(\sqrt{x+h} - 8) =$ _____

j) Evaluate: If $f(x) = 3x^3 - x^2$, Find $f(-2)$ _____

Solve the following Limits. Show your work. (4 marks each)

3) a) $\lim_{x \rightarrow 5} \frac{x^3 - 5x^2}{x^2 + 4} =$

b) $\lim_{x \rightarrow 4} \frac{16 - x^2}{x - 4} =$

Composition of functions. Perform the indicated operation. Show your work. (5 marks)

4) If $f(x) = 2x^2 + 3$, Find $\frac{f(x+h) - f(x)}{h}$

Simplify. Show your work. (3 marks each)

5) $\sqrt{147u^4v^2}$

A) $7u^2v\sqrt{3}$

B) $6uv\sqrt{3}$

C) $4v^2\sqrt{u}$

D) $6uv\sqrt{2v}$

6) $\sqrt{180x^4y^3}$

A) $4x\sqrt{2xy}$

B) $4y^2\sqrt{2x}$

C) $6x^2y\sqrt{5y}$

D) $14xy\sqrt{xy}$

Simplify. Show your work. (3 marks)

7) $\sqrt[3]{448x^5y^6}$

A) $4xy^2\sqrt[3]{7x^2}$

B) $-4x\sqrt[3]{2x^2y}$

C) $3x^2y\sqrt[3]{4y}$

D) $4y^2\sqrt[3]{7xy}$

Rewrite each equation in exponential form. Show your work. (2 marks each)

8) $\log_{11} \frac{1}{121} = -2$

9) $\log_{11} 121 = 2$

Rewrite each equation in logarithmic form. (2 marks each)

10) $19^{-2} = \frac{1}{361}$

11) $169^{\frac{1}{2}} = 13$

Solve each equation. Exponential Equations. Show your work. (2 marks each)

12) $5^{-a} = 1$

13) $2^{2r-2} = 2^{2-r}$

Solve each equation. Exponential Equations. Show your work. (3 marks each)

14) $\left(\frac{1}{3}\right)^{-x-2} = 3^2$

15) $243^{3v-2} = 81$

Evaluate each expression. Show your work. (3 marks each)

16) $\log_{\frac{1}{7}} \frac{1}{343} = x$

17) $\log_{16} 4 = x$

Multiply the following Conjugates. Show your work. (2 marks each)

18) a) $(2x+5)(2x-5)$

b) $(\sqrt{x}+3)(\sqrt{x}-3)$

c) $(\sqrt{x+h}+10)(\sqrt{x+h}-10)$

Factor each completely. Use Grouping. Show your work. (3 marks)

19) $49x^3 + 28x^2 + 7x + 4$

Solve each equation by factoring. Show your work. (3 marks)

20) $5k^2 + 26k + 24 = 0$

Solve each equation with the quadratic formula. Show your work. (3 marks)

21) $5v^2 + 4v - 33 = 0$

Find the value that completes the square and then rewrite as a perfect square. Show your work. (2 marks each)

22) $x^2 + 34x + \underline{\hspace{1cm}}$

23) $m^2 + 3m + \underline{\hspace{1cm}}$

Solve each equation by completing the square. Use Completing the Square to solve. Show your work. (3 marks)

24) $n^2 + 4n - 77 = 7$

Solve each equation by taking square roots. Show your work. (3 marks)

25) $7 - 5n^2 = -493$

Do Two of the following Problems. Show your work. (10 marks)

- 26) a) You are building a wheelchair ramp for your Kohkom and you want to know if your ramp will meet the Canadian Code for slope. The slope of the ramp must be less than or equal to $\frac{1}{12}$. You have a distance of 26 feet (run) and a height(rise) of 2.5 feet. If you build the ramp will your ramp pass the Code?
- b) You are on a Holiday to visit your Kohkom in Regina, Saskatchewan. You want to rent a car to take your Kohkom out for a day of sightweeing. You have two choices for a Car Rental. Company A charges \$0.50 per kilometre driven plus a daily charge of \$100. Company B charges \$0.55 per kilometre driven plus a daily charge of \$90. For how many kilometres is Company A cheaper than Company B?
- c) You are manufacturing a bushing and the diameter of the bushing has a tolerance of ± 0.005 inches. You want the bushing to have a 5 inch diameter. Use an Absolute Value Inequality Equation to find the upper and lower tolerance levels for this bushings diameter. Make sure you write out the Equation.

Solve the following Problems involving Pythagorean Theorem and Distance, rate, and time. Show your work. (6 marks each)

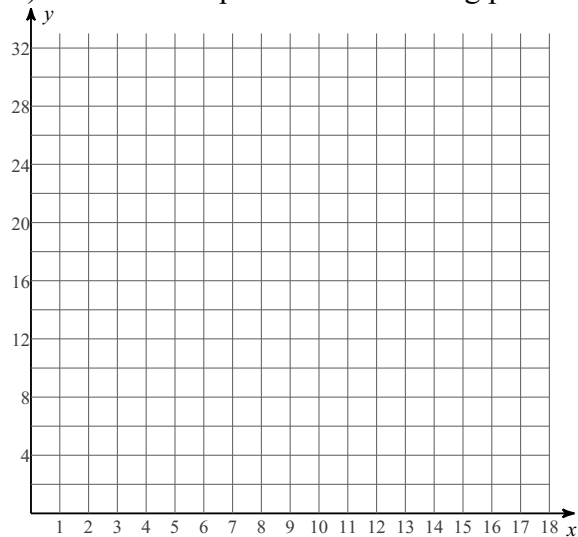
27) a) You are given a right triangle. The hypotenuse is x metres. One of the legs is 5 metres less than the hypotenuse and the other leg is 10 metres less than the hypotenuse. Find all three sides of this right triangle.

b) You are travelling from Regina to Old Wives Lake by Mossbank to get an idea about the terrain of that area. You are doing some research about the Old Wives Lake Massacre of a group of elderly Cree Kohkoms. The distance to the site is about 100 kilometres. You travel there at an average speed of 90 km/hour and you travel back at an average speed of 70 km/hour. If it takes you $\frac{1}{2}$ hour longer to return, how long does it take to go to Old Wives Lake and how long does it take to come back from Old Wives Lake? (Round off your answer to 2 decimal places)

Solve the following Problem involving a linear equation. Show your work. Answer each part of the question. If you cannot scan the document to send it back, make a sketch of the graph on plain white paper. (10 marks)

28) You are boarding a passenger airplane at the Regina Airport. You are going to be flying to Vancouver to visit your Kohkom. The elevation of the Regina Airport is 1893 feet. The passenger aircraft will climb at a steady rate of 1800 feet per minute.

- Write a linear equation that models the altitude in terms of time in minutes.
- What is the slope and the starting point in this linear equation?
- How long will it take the aircraft to reach an altitude of 32000 feet?
- Sketch the equation from starting point to 32000 feet.



This question involves factoring out the common factor and simplifying. Show your work. (4 marks)

29) Given $(x + 1)^{-2} + (x + 1)^{-3}$, factor out the common factor and simplify your answer as much as possible.

Simplify each and state the excluded values. Show your work. (3 marks each)

30) $\frac{8}{2 - m} \cdot \frac{m^2 - 4}{3m + 6}$

A) $\frac{9m^2}{m - 9}; \{9\}$

B) $m + 5$; None

C) $-\frac{8}{3}; \{2, -2\}$

D) $m - 10$; None

31) $\frac{n + 7}{3n + 21} \div \frac{1}{3n - 21}$

A) $n - 7; \{-7, 7\}$

B) $\frac{n + 7}{4}$; None

C) $\frac{n + 4}{4}$; None

D) $\frac{n + 7}{9}$; None