MTH 111, Exam #2, Part 1, Fall 2020 Name KEY

Instructions: For this portion of the exam, you may use a metric/English conversion chart, and a scientific calculator to find the solutions to the questions. You will then post the answers to those questions in Canvas under Exam #2 Part 1. You may not use other people or notes to complete the exam, and while submitting the exam you will be required to use the Lockdown Browser. After completing this exam, also submit you work and answers for Part 2 in the Part 2 submission folder.

Academic Integrity Statement

I affirm that, I, _____ (student name), do attest that I alone am completing the problems on this test without receiving unauthorized assistance. I understand that violations of academic integrity may result in sanctions, up to and including expulsion from the college.

_____(Student Signature)

_____(Student ID number)

Attach a copy of your photo ID to the online submission (there is a question drop box for it). The ID must be a photo ID. A Driver's license, School ID (NOVA or otherwise), or a work ID are acceptable as long as it contains your full name and photo.

Every answer is worth 4 points.

1. Simplify.

a. $\frac{-132rs^3}{-33r^2s^2}$ $= \frac{4s}{r}$

b. $\frac{27a^3-18a^2+36a}{-9a}$ $= \frac{27a^3}{-9a} - \frac{18a^2}{-9a} + \frac{36a}{-9a} = -3a^2 + 2a - 4$

c. $[(-2)(-3) + (-24) \div (-2)] \div [-10 + 7(-1)^2]$

$6 + 12 \qquad -10 + 7$

$18 \qquad / \quad -3$ $\qquad -6$

d. $(-4a^2b)(-5ab^3)(-2a^4)$ $\qquad -40a^7b^4$

e. $(-2h^3k^6m^2)^5$ $\qquad -32h^{15}k^{30}m^{10}$

2. Evaluate the when $x = -2, y = 3, z = -1$

a. $\frac{(y-x)^2-4y}{4x^2+2}$ $\qquad \frac{(3-(-2))^2 - 4(3)}{4(-2)^2+2} = \frac{(3+2)^2-12}{4(4)+2} = \frac{25-12}{16+2} = \frac{13}{18}$

b. $\frac{x^2+(z-y)^2}{4x^2-z^2}$ $\qquad \frac{(-2)^2 + (-1-3)^2}{4(-2)^2 - (-1)^2} = \frac{4+16}{16-1} = \frac{20}{15} = \frac{4}{3}$

3. Circle all the following expressions that are like terms.

a. $7x$
b. $-x^2$
c. $\frac{1}{2}x$
d. 5
e. $-0.6x$

4. Combine like terms.

$(7x + 8) - 5(x - 6)$

$7x+8-5x+30$

$2x+38$

5. Solve each equation for the variable.

a. $4x - 2 = 18$

$4x = 20$

$x = 5$

b. $\frac{2}{3}y - 4 = 8$

$\frac{2}{3}y = 12$

$y = \frac{12}{1} \cdot \frac{3}{2} = 18$

$y = 18$

c. $-3x + 17 = 6x - 37$

$54 = 9x$

$x = 6$

d. $27 - 8(2 - y) = -13$

$27 - 16 + 8y = -13$

$11 + 8y = -13$

$8y = -24$

$y = -3$

e. $16(x+3) = 7(x-5) - 9(x+4) - 7$

$16x + 48 = 7x - 35 - 9x - 36 - 7$

$16x + 48 = -2x - 78$

$18x = -126$

$\boxed{x = -7}$

f. $\frac{2x}{3} - 7 = -\frac{x}{2}$ $\times 6$

$4x - 42 = -3x$

$7x = 42$

$\boxed{x = 6}$

g. $\frac{4x}{6} - \frac{x+5}{2} = \frac{6x-6}{8}$ $\times 24$

$16x - 12(x+5) = 3(6x-6)$

$16x - 12x - 60 = 18x - 18$

$4x - 60 = 18x - 18$

$-14x = 42$

$\boxed{x = -3}$

6. Amy and Kurt earned a total of \$512 by working a total of 30 hours. If Amy earns \$20/hr and Kurt earns \$16/h, how many hours did each work?

Amy hrs = x

Kurt hrs = y = 30 − x

$x + y = 30 \rightarrow y = 30 - x$

$20x + 16y = 512$

$20x + 16(30 - x) = 512$

$20x + 480 - 16x = 512$

$4x = 32$

$\boxed{x = 8}$

$\boxed{y = 22}$

7. Jeff invested \$30,000 in a business whereas his partner Kris invested \$40,000. How much more needs to be invested in order to generate a total that will yield \$6250 annually with a 5% rate of return?

$0.05(30{,}000 + 40{,}000 + x) = 6250$

$3500 + 0.05x = 6250$

$0.05x = 2750$

$x = 55{,}000$

8. The formula for piston displacement is $P = cd^2SN$, where c is a constant, d is the cylinder bore, S is the stroke, and N is the number of cylinders. For $c = 0.7854, d = 3, S = 4, N = 4$, find the piston displacement.

$0.7854(3)^2(4)(4) = 113.0976$

round 2 places: 113.10

9. What is the slope of the line passing through the points (3,3) and (1,5)?

$$m = \frac{5-3}{1-3} = \frac{2}{-2} = -1$$

10. Determine if the following pairs of lines are parallel, perpendicular or neither.

a. $\begin{cases} y = \frac{3}{4}x + 2 \\ y = -\frac{4}{3}x - 5 \end{cases}$ perpendicular

b. $\begin{cases} x - 4y = 5 \\ x + 4y = 11 \end{cases}$ $-4y = -x + 5$, $4y = -x + 11$; $y = \frac{1}{4}x - \frac{5}{4}$, $y = -\frac{1}{4}x + \frac{11}{4}$ neither

c. $\begin{cases} -3x + 9y = 20 \\ x = 3y \end{cases}$ $9y = 3x + 20$, $3y = x$; $y = \frac{1}{3}x + \frac{20}{9}$, $y = \frac{1}{3}x$ parallel

MTH 111, Exam #2, Part 2, Fall 2020 Name KEY

Instructions: For this portion of the exam, you may use a metric/English conversion chart, and a scientific calculator to find the solutions to the questions. You will then post the answers to those questions in Canvas under Exam #2 Part 2. You may not use other people or notes to complete the exam.

Academic Integrity Statement

I affirm that, I, _____ (student name), do attest that I alone am completing the problems on this test without receiving unauthorized assistance. I understand that violations of academic integrity may result in sanctions, up to and including expulsion from the college.

_____(Student Signature)

_____(Student ID number)

Attach a copy of your photo ID to the online submission (there is a question drop box for it). The ID must be a photo ID. A Driver's license, School ID (NOVA or otherwise), or a work ID are acceptable as long as it contains your full name and photo.

Every answer is worth 3 points. The work shown is worth 5 points.

1. Simplify $\frac{3a^2b+4a^2b^2-6ab^2}{2ab^2}$

$$\frac{3a^2b}{2ab^2} + \frac{4a^2b^2}{2ab^2} - \frac{6ab^2}{2ab^2}$$

$$\frac{3a}{2b} + 2a - 3$$

2. Combine like terms.

$$2x^3 + 4x^2y - 4y^3 - x^2y + y - y^3$$

$$2x^3 - 3x^2y - 5y^3 + y$$

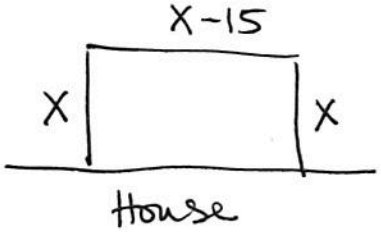
3. Translate the following statements into algebraic expressions or equations.
   a. The difference between twice a number and thirty is fifty.

$$2x - 30 = 50$$

   b. The product of a number and six decreased by seventeen is seven.

$$6x - 17 = 7$$

4. One side of a rectangular yard is bounded by the side of a house. The other three sides are to be fenced with 345 ft of fencing. The length of fence opposite the house is 15 ft less than either of the other two sides. Find the length and width of the yard.



$X + X + X - 15 = 345$

$3X - 15 = 345$

$3X = 360$

$X = 120$ width, length

$X - 15 = 105$ s.i. opp. to house

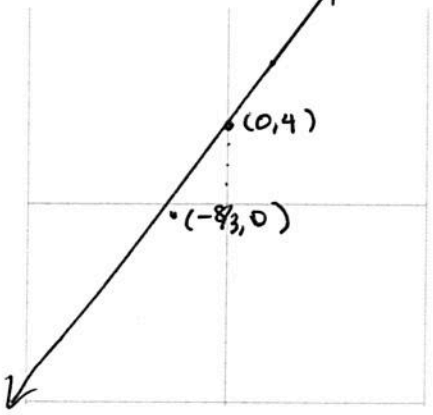
5. Solve the formula $A = ab + \frac{d}{2}(a + c)$ for d.

$$A - ab = \frac{d}{2}(a+c)$$

$$2(A - ab) = d(a+c)$$

$$\boxed{\frac{2(A-ab)}{a+c} = d}$$

6. Draw the graph of the line with $m = \frac{3}{2}, b = 4$ on the graph below. Label the intercepts.



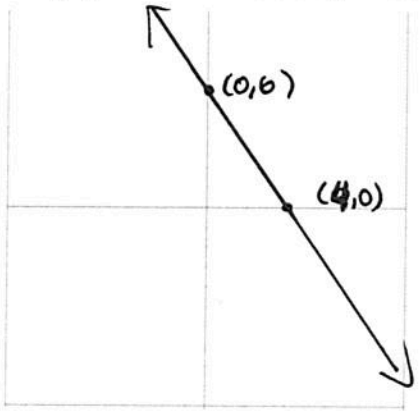
$$y = \frac{3}{2}x + 4$$

$$0 = \frac{3}{2}x + 4$$

$$-4 = \frac{3}{2}x$$

$$-\frac{8}{3} = x$$

7. Draw the graph of the line $3x + 2y = 12$ on the graph below. Label the intercepts.



$$3(0) + 2y = 12$$

$$y = 6$$

$$3(x) + 2(0) = 12$$

$$3x = 12$$

$$x = 4$$

8. Find the equation of the line through the point $(-3, -3)$ and with a slope of $\frac{1}{2}$.

$$y+3 = \tfrac{1}{2}(x+3)$$
$$y+3 = \tfrac{1}{2}x + \tfrac{3}{2}$$
$$-3 \qquad\quad -3$$
$$y = \tfrac{1}{2}x - \tfrac{3}{2}$$

9. Find the equation of the line passing through the points $(3,3)$ and $(1,5)$.

$m = -1$ (from Part I of exam)

$$y-3 = -1(x-3)$$
$$y-3 = -x+3$$
$$+3 \qquad +3$$
$$y = -x+6$$