MPM 1D9

Grade 9 Pre-AP Math
Unit 1 – Practice Test

Victim: Mr. Solutions Well done Mr. S. !!

KU	APP	TIPS	COM
30/30	17/17	12/12	22/22

Terminology (12 COM)

1. Match each term in the left column with the ***best*** definition or description in the right column.

E Binomial	**A.** To raise a power to an exponent, keep the base and multiply the exponents.
H Polynomial	**B.** Write a mathematical expression in a simpler form.
B Simplify	**C.** A symbol, usually a letter, which represents an unknown or unspecified value.
K Equation	**D.** The sum of the exponents on the variables in a term.
G Like Terms	**E.** A polynomial with exactly two terms.
I Distributive Law	**F.** Any mathematical calculation combining constants and/or variables using any valid mathematical operations.
A $(a^x)^y = a^{xy}$	**G.** Terms that contain exactly the same variable part, that is, exactly the same literal coefficient.
L Pythagorean Theorem	**H.** An algebraic expression in which each term consists of constants and/or variables combined using only multiplication (including powers).
D Degree of a Term	**I.** $a(x+y) = ax + ay$
J Term	**J.** Any mathematical calculation combining constants and/or variables using any operations except for addition and subtraction.
C Variable	**K.** A mathematical statement asserting that two expressions are equal.
F Expression	**L.** $c^2 = a^2 + b^2$

Modified True/False (3 KU)

Indicate whether each statement is ***true*** or ***false***. If false, ***change*** the ***underlined part*** to make the statement true.

2. T/F F ✓ The expression "$x - 6$" means "six reduced by a number." **Change:** $6 - x$ ✓

✓ = ½ mark

3. T/F F ✓ The expression "$2 + x + 5$" means "double a number increased by 5." **Change:** $2x + 5$ ✓

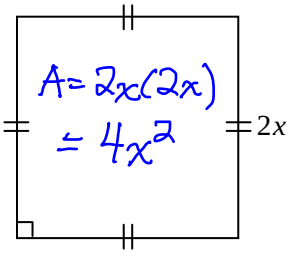
4. T/F F ✓ The expression "$4n - 7$" means "the quotient of 4 and a number, decreased by 7." **Change:** product ✓

Multiple Choice (3 KU)

Identify the choice that best completes the statement or answers the question.

5. Which expression represents the area of the square shown at the right?

(a) $4x^2$ ✓ **(b)** $8x^2$ **(c)** $8x$ **(d)** $2x^2$



6. In which pair are the expressions equivalent?

(a) $5m^2$ and $(5m)^2$ **(b)** $(yz)^4$ and y^4z^4 ✓ **(c)** $2(c^7)^3$ and $2c^{10}$ **(d)** $-3a^2$ and $(-3a)^2$

7. If $a = -2$ and $c = 5$, what is the value of the expression $\frac{a+c}{a^2-c^2}$?

$\frac{-2+5}{(-2)^2-5^2} = \frac{3}{4-25} = \frac{3}{-21} = -\frac{1}{7}$

(a) $\frac{1}{3}$ **(b)** $\frac{3}{29}$ **(c)** $-\frac{3}{29}$ **(d)** $-\frac{1}{7}$ ✓

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***Full Solutions* (10 COM)**

①②③④ BEDMAS

8. Evaluate. **(8 KU)**

(a) $-3\left(5^2-4^2\right)-6\left(6^2-5^2\right)$

$=-3(25-16)-6(36-25)$

$=-3(9)-6(11)$

$=-27-66$

$=-93$

(b) $2t^2-3st^3+(3st)^3$, if $t=\frac{1}{2}$ and $s=2$

$=2\left(\frac{1}{2}\right)^2-3(2)\left(\frac{1}{2}\right)^3+\left[3(2)\left(\frac{1}{2}\right)\right]^3$

$=\frac{2}{1}\left(\frac{1}{4}\right)-\frac{6}{1}\left(\frac{1}{8}\right)+3^3$

$=\frac{2}{4}-\frac{6}{8}+27$

$=\frac{2}{4}-\frac{3}{4}+\frac{108}{4}$

$=\frac{107}{4}$

9. Simplify. **(16 KU)**

(a) $\left(x^2-5x\right)-\left(3x^2-7x\right)$

$=x^2-5x+(-3x^2+7x)$

$=x^2-5x+(-3x^2)+7x$

$=x^2-5x-3x^2+7x$

$=x^2-3x^2-5x+7x$

$=-2x^2+2x$

(b) $\left(x^2-5x\right)\left(3x^2-7x\right)$

$=3x^4-7x^3-15x^3+35x^2$

$=3x^4-22x^3+35x^2$

(c) $\frac{\left(t^2\right)^3\left(2t^3\right)^4}{(4t)^3}$

$=\frac{t^6(2^4t^{12})}{4^3t^3}$

$=\frac{16t^6(t^{12})}{64t^3}$

$=\frac{16t^{18}}{64t^3}$

$=\left(\frac{16}{64}\right)\left(\frac{t^{18}}{t^3}\right)=\frac{1}{4}t^{15}$

(d) $2y\left(y^2-4y\right)-3y\left(5y^2-7y\right)$

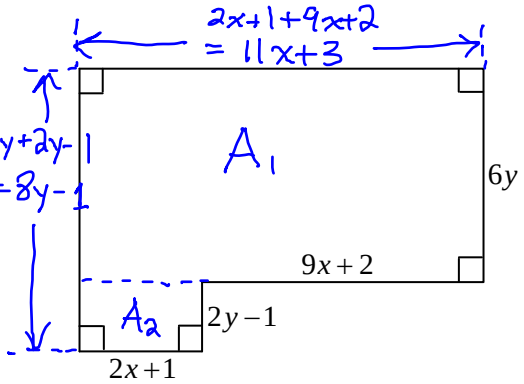
$=2y^3-8y^2-15y^3+21y^2$

$=2y^3-15y^3-8y^2+21y^2$

$=-13y^3+13y^2$

10. Write an algebraic expression, in ***simplest form***, for …

(a) …the ***perimeter*** of the figure at the right. **(4 APP)**



$P=11x+3+6y+9x+2+2y-1+2x+1+8y-1$

$=11x+9x+2x+6y+2y+8y+3+2-1+1-1$

$=22x+16y+4$ units

(b) …the ***area*** of the figure at the right. **(4 APP)**

$A=A_1+A_2$

$=6y(11x+3)+(2x+1)(2y-1)$

$=66xy+18y+4xy-2x+2y-1$

$=66xy+4xy+18y+2y-2x-1$

$=70xy+20y-2x-1$ units^2

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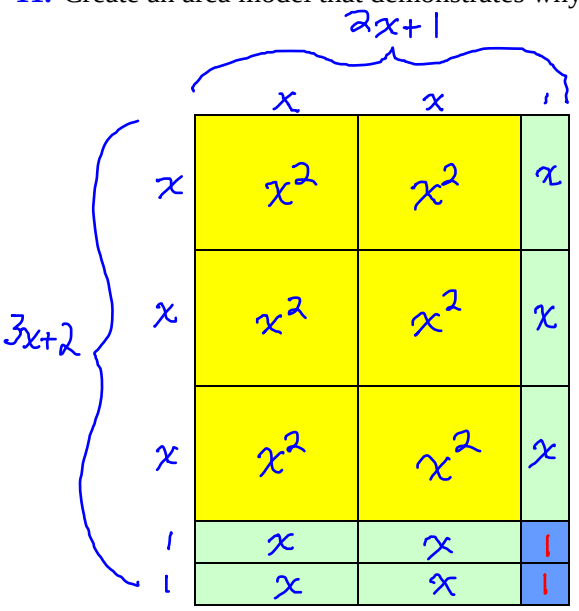
11. Create an area model that demonstrates why $(2x+1)(3x+2)=6x^2+7x+2$ **(5 APP)**



$A=(2x+1)(3x+2)$

BUT

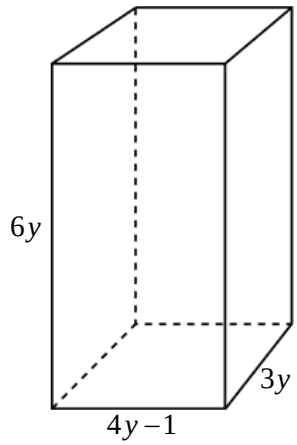
$A=x^2+x^2+x^2+x^2+x^2+x^2$
$+x+x+x+x+x+x+x+1+1$
$=6x^2+7x+2$

$\therefore (2x+1)(3x+2)=6x^2+7x+2$

Note: This argument uses the following logic:
If a=b and a=c then b=c

12. Write an algebraic expression, in ***simplest form***, for the ***volume*** of the prism shown at the right. (Note that for a prism, $V=l\times w\times h$.) **(4 APP)**

$V=lwh$
$=3y(6y)(4y-1)$ ✓
$=18y^2(4y-1)$ ✓
$=72y^3-18y^2$ units^3



13. Two friends, Elliot and Dang, are travelling to the airport in two different taxis. The taxi company used by Elliot charges a $5.00 flat fee plus $0.50 for every kilometre. In Dang's case, the taxi company charges a $3.00 flat fee plus $0.70 for every kilometre. **(6 TIPS)** (Can't assume they travel the same distance)

(a) Write two expressions, one that represents Elliot's cost of travelling by taxi and another that represents Dang's cost of travelling by taxi. e → distance travelled by Elliot d → distance travelled by Dang

Elliot: $5+0.5e$ ✓ Dang: $3+0.7d$ ✓

(b) Write an expression that represents Dang's and Elliot's ***total cost*** of travelling by taxi.

$5+0.5e+3+0.7d=8+0.5e+0.7d$ ✓

(c) If Elliot travelled 35 km and Dang travelled 75 km, how much money did each friend spend?

$e=35$, $d=75$
Elliot: Cost $=5+0.5(35)=\$22.50$ ✓
Dang: Cost $=3+0.7(75)=\$55.50$ ✓

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14. The table below summarizes the results of an experiment studying bacterial growth. At the beginning of the experiment, there are ten bacteria in a dish. Every 12 hours, the number of bacteria doubles. **(6 TIPS)**

(a) Extend the values in the table for the next two days.

Time Elapsed (h)	*Number of Bacteria*
0	10
12	$10 \times 2 = 20$
24	$(10 \times 2) \times 2 = 10 \times 2^2$ $= 40$
36	$(10 \times 2^2) \times 2 = 10 \times 2^3$ $= 80$
48	$(10 \times 2^3) \times 2 = 10 \times 2^4$ $= 160$
60	$(10 \times 2^4) \times 2 = 10 \times 2^5$ $= 320$
72	$(10 \times 2^5) \times 2 = 10 \times 2^6$ $= 640$
84	$(10 \times 2^6) \times 2 = 10 \times 2^7$ $= 1280$ ✓ ✓
96	$(10 \times 2^7) \times 2 = 10 \times 2^8$ $= 2560$

(b) Assuming that the growth rate remains constant, use the pattern in the table to calculate the number of bacteria you would expect to find after 7 days.

The bacterial population doubles twice every day. After 7 days, the population will have doubled 14 times.

Therefore, the population after seven days will be

$10(2^{14}) = 163840$ ✓

(c) Write an equation that relates the number of bacteria to the amount of time elapsed (in days).

b = # bacteria, t = time in days

$b = 10(2^{2t})$ ✓

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