

Foundations Unit 6 Study Guide

Answer Key

Teacher: _____

Student Name: _____

DIRECTIONS: Do all work on separate scratch paper. Your work must be neat, well organized, complete, and lead to the answer you give, circle your answers. Copy your answers to the appropriate place provide on this test.

OBJ. 1: Simplifying Exponents

1. $(a^3b^6c)^2(a^3b)^8(a^{-5}b^{-8}c^{3.6})^0$

2. $(m^5n^{-8}m^{-7})^{-3}$

3. $\frac{18x^{-6}y^8}{-32x^{-2}y^{25}}$

4. $7x^{10}(3x^{-9})^3$

OBJ. 2: Addition and Subtraction of Polynomials

5. $(8x^2 - 3x + 17) + (x^2 - 6x - 5)$

6. $(17x^2 + 5x) + 7(2x^2 + 3x)$

7. $6(5x^2 - 10x - 12) - 4(3x - 6 + 9x^2)$

8. $(14x^4 - 3x^3 - 8x - 4) - (34x^4 + 50x^2 - 6x + 10)$

| Objective | Score |
|-----------|--------|
| 1 | A B NY |
| 2 | A B NY |
| 3 | A B NY |
| 4 | A B NY |
| 5 | A B NY |

ANSWERS:

| | |
|----|---------------------------|
| 1. | $a^{30} b^{20} c^2$ |
| 2. | $m^6 n^{24}$ |
| 3. | $\frac{9}{-16x^4 y^{17}}$ |
| 4. | $189/x^{17}$ |

| | | |
|-----------|----------|----------|
| 4/4 = 100 | 3/4 = 85 | 0-2 = NY |
|-----------|----------|----------|

| | |
|----|-----------------------------------|
| 5. | $9x^2 - 9x + 12$ |
| 6. | $31x^2 + 26x$ |
| 7. | $-6x^2 - 72x - 48$ |
| 8. | $-20x^4 - 3x^3 - 50x^2 - 2x - 14$ |

| | | |
|-----------|----------|----------|
| 4/4 = 100 | 3/4 = 85 | 0-2 = NY |
|-----------|----------|----------|

| | |
|-----|-------------------|
| 9. | $10x + 10$ |
| 10. | $x = 16$ |
| 11. | $31x^2 - 58x - 7$ |
| 12. | $3x^2 + 6x$ |

| | | |
|-----------|----------|----------|
| 4/4 = 100 | 3/4 = 85 | 0-2 = NY |
|-----------|----------|----------|

| | |
|-----|--|
| 13. | |
| 14. | |
| 15. | |
| 16. | |

| | | |
|-----------|----------|----------|
| 4/4 = 100 | 3/4 = 85 | 0-2 = NY |
|-----------|----------|----------|

| | |
|-----|--|
| 17. | |
| 18. | |
| 19. | |
| 20. | |

| | | |
|-----------|----------|----------|
| 4/4 = 100 | 3/4 = 85 | 0-2 = NY |
|-----------|----------|----------|

$$\textcircled{1} (a^3 b^6 c)^2 (a^3 b)^8$$

$$(a^3 b^6 c)^2 (a^3 b)^8$$

$$a^{3 \cdot 2} b^{6 \cdot 2} c^{1 \cdot 2} \cdot a^{3 \cdot 8} b^{1 \cdot 8}$$

$$a^6 \cdot b^{12} \cdot c^2 \cdot a^{24} \cdot b^8$$

$$a^6 \cdot a^{24} \cdot b^{12} \cdot b^8 \cdot c^2$$

$$a^{6+24} \cdot b^{12+8} \cdot c^2$$

$$\boxed{a^{30} b^{20} c^2}$$

① 0 exponents / st

↳ cross it out if nothing is left write a 1

② $(\quad)^{\times}$ distribute outside exponents

* if no exponent on bases inside () write a 1

③ move - exponents → none here

④ Combine like terms
- if multiplying add exponents
- if dividing, sub exponents

$$\textcircled{2} (m^5 n^{-8} m^{-7})^{-3}$$

$$m^{-15} n^{24} m^{21}$$

$$24 - 21 = 3$$

$$n^3 m^{15}$$

$$\boxed{m^6 n^{24}}$$

21 - 15 = 6
21 is bigger and on top, so m goes on top.

① 0 exponents ✓

② $(\quad)^{\times}$ multiply to all exponents ✓

③ move - exponents ✓

④ Combine Like Terms * if dividing subtract
* if multiplying add
* write answer where the bigger exponent is

$$\textcircled{3} \frac{18x^{-6}y^8}{-32x^{-2}y^{25}} \rightarrow \frac{18x^2y^8}{-32x^6y^{25}} \rightarrow \frac{18}{-32} \cdot \frac{x^2}{x^6} \cdot \frac{y^8}{y^{25}}$$

$$\rightarrow \frac{9}{-16} \cdot \frac{1}{x^4} \cdot \frac{1}{y^{17}} \Rightarrow \frac{9}{-16x^4y^{17}}$$

$\frac{18}{-32}$ reduces to $-\frac{9}{16}$

$6 - 2 = 4$
 x^6 was bigger and on bottom

$25 - 8 = 17$
 y^{25} was on bottom so write on bottom

① no 0 exponents

② no $(\quad)^{\times}$

③ move - exponents

* do not move -32 b/c it is a neg. number, not exponent

④ Combine Like Terms

④ $7x^{10}(3x^{-9})^3$

$7x^{10}(3x^{-9})^3$

$7x^{10} \cdot 3^3 x^{-9 \cdot 3}$

$7x^{10} \cdot 3^3 x^{-27}$

$7x^{10} \cdot 27 \cdot x^{-27}$

$7x^{10} \cdot 27$

$\frac{7x^{10} \cdot 27}{x^{27}}$

$\frac{7 \cdot 27}{x^{27}} \rightarrow \frac{189}{x^{17}}$

- ① no ⁰ exponents
- ② Distribute outside exponents (x)
- write a 1 on the 3 b/c it doesn't have an exponent
- ③ Move - exponents
- ④ Combine Like Terms

⑤ $(8x^2 - 3x + 17) + (x^2 - 6x - 5)$

$\boxed{8x^2} - 3x + \boxed{17} + \boxed{1x^2} - 6x - 5$

$8x^2 + 1x^2 - 3x - 6x$

$\boxed{9x^2 - 9x + 12}$

- Distribute and Combine like Terms
- 1st () has nothing to distribute
 - 2nd () distribute + 1
- Combine like terms

⑥ $(17x^2 + 5x) + 7(2x^2 + 3x)$

$\boxed{17x^2} + 5x + \boxed{14x^2} + 21x$

$17x^2 + 14x^2 \quad 5x + 21x$

$\boxed{31x^2 + 26x}$

- Distribute
- 1st () has nothing to distribute
 - 2nd () distribute + 7 by multiplying
- Combine Like Terms

* Remember:

Leave exponents alone when adding/subtracting

$$\textcircled{7} 6(5x^2 - 10x - 12) - 4(3x - 6 + 9x^2)$$

$$\boxed{30x^2} - 60x - \textcircled{72} - 12x + \textcircled{24} - \boxed{36x^2}$$

$$30x^2 - 36x^2 - 60x - 12x - 72 + 24$$

$$\boxed{-6x^2 - 72x - 48}$$

Distribute

- 1st () distribute 6
- 2nd () distribute -4
- * be sure to distribute *
- * the negative also *
- Combine Like Terms

$$\textcircled{8} (14x^4 - 3x^3 - 8x - 4) - (34x^4 + 50x^2 - 6x + 10)$$

$$\boxed{14x^4} - 3x^3 - \textcircled{8x} - \textcircled{4} - \boxed{34x^4} - \textcircled{50x^2} + \textcircled{6x} - \textcircled{10}$$

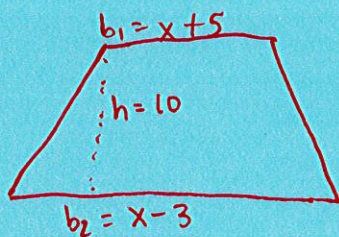
$$14x^4 - 34x^4 - 3x^3 - 50x^2 - 8x + 6x - 4 - 10$$

$$\boxed{-20x^4 - 3x^3 - 50x^2 - 2x - 14}$$

Distribute

- nothing to the 1st ()
- distribute -1 to 2nd ()
- Combine Like terms

$$\textcircled{9} A = \frac{1}{2} h (b_1 + b_2)$$



$$\begin{aligned} A &= \frac{1}{2} (10) (x + 5 + x - 3) \\ &= \frac{1}{2} (10) (2x + 2) \\ &= 5 (2x + 2) \\ &= \boxed{10x + 10} \end{aligned}$$

So we need to multiply $5 \cdot (2x + 2)$

$$\boxed{10x + 10}$$

OR \leftarrow think of the formula different than a plug in and read it as what it says.

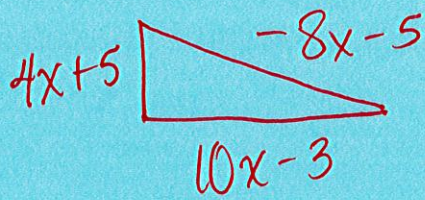
$\frac{1}{2} h$ means half of the height

if height is 10 half of it is $\textcircled{5}$

$(b_1 + b_2)$ means add the two bases together

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

⑩ Perimeter = 93



Well, perimeter is the addition of all the sides, so...

$$\begin{array}{r} -8x \quad (-5) \\ 4x \quad +5 \\ + 10x \quad (-3) \\ \hline 6x - 3 \end{array}$$

so $6x-3$ is perimeter

$$\text{Perimeter} = 93$$

$$6x - 3 = 93$$

now solve it.

$$6x - 3 = 93$$

$$+3 \quad +3$$

$$\hline 6x = 96$$

$$\frac{6x}{6} = \frac{96}{6}$$

$$\boxed{x = 16}$$

⑪ Find Area of the Shaded Region (A_oSR)

$$A_{oSR} = \text{Big Area} - \text{Small Area}$$

$$(36x^2 - 42x - 7) - (5x^2 + 16x)$$

$$36x^2 - 42x - 7 - 5x^2 - 16x$$

$$36x^2 - 5x^2 - 42x - 16x - 7$$

$$\boxed{31x^2 - 58x - 7}$$

$$\text{Big A} = 36x^2 - 42x - 7$$

$$\text{Small A} = 5x^2 + 16x$$

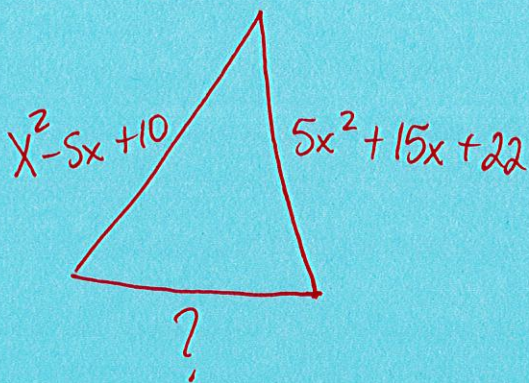
Distribute -1

now combine like terms

12) 2 ways to think about # 12

Way 1

$$\text{Perimeter} = 9x^2 + 16x + 32$$



1st: add 2 sides together

$$(x^2 - 5x + 10) + (5x^2 + 15x + 22)$$

$$x^2 - 5x + 10 + 5x^2 + 15x + 22$$

$$x^2 + 5x^2 - 5x + 15x + 10 + 22$$

$$6x^2 + 10x + 32$$

2nd

subtract (Perimeter) - (2 sides)

$$(9x^2 + 16x + 32) - (6x^2 + 10x + 32)$$

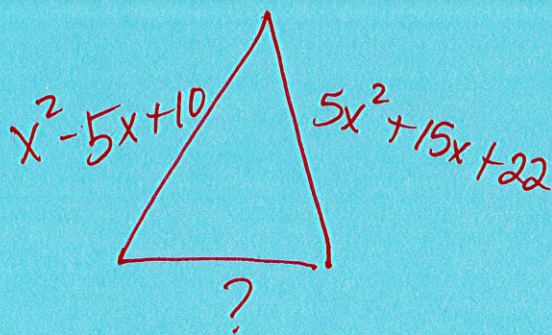
$$9x^2 + 16x + 32 - 6x^2 - 10x - 32$$

$$9x^2 - 6x^2 + 16x - 10x + 32 - 32$$

$$\boxed{3x^2 + 6x}$$

Way 2

$$\text{Perimeter} = 9x^2 + 16x + 32$$



1st

add 2 sides: See other way 1st Step

$$6x^2 + 10x + 32$$

2nd

ask how far each term is away from the perimeter's like term

$$6x^2 \text{ to } 9x^2 \rightarrow \text{that's } \uparrow 3x^2$$

$$10x \text{ to } 16x \rightarrow \text{that's } \uparrow 6x$$

$$32 \text{ to } 32 \rightarrow \text{that's } \downarrow 0$$

so $\boxed{3x^2 + 6x}$