

EXPONENTS PRACTICE

Midterm Review Worksheet A

Simplify:

1. $3 \cdot 4^3$

2. $4x^3 \cdot 2x^3$

3. $x^5 \cdot x^3$

4. $2x^3 \cdot 2x^2$

5. $\frac{6^5}{6^3}$

6. $\frac{x^4}{x^7}$

7. 8^0

8. $-(9x)^0$

9. $(y^4)^3$

10. $(x^2y)^4$

11. $\frac{6x^7}{2x^4}$

12. $\frac{8x^5}{4x^2}$

13. $(2cd^4)^2(cd)^5$

14. $(2fg^4)^4(fg)^6$

15. $\frac{x^5y^6}{xy^2}$

16. $\frac{x^2y^5}{xy^4}$

17. $\left(\frac{4x^5y}{16xy^4}\right)^3$

18. $\left(\frac{5x^3y}{20xy^5}\right)^4$

19. y^{-7}

20. 7^{-2}

21. $\frac{1}{x^{-5}}$

22. $\frac{1}{2^{-4}}$

23. $x^5 \cdot x^{-1}$

24. x^{-6}

25. $x^9 \cdot x^{-7}$

26. $(j^{-13})(j^4)(j^6)$

27. $\frac{x^{-1}}{x^{-8}}$

28. $\frac{52x^6}{13x^{-7}}$

29. $f^{-3}(f^2)(f^{-3})$

30. $\frac{x^{-4}}{x^{-9}}$

31. $\frac{24x^6}{12x^{-8}}$

32. $\frac{3x^2y^{-3}}{12x^6y^3}$

33. $(2x^3y^{-3})^{-2}$

34. $\frac{2x^4y^{-4}}{8x^7y^3}$

35. $(4x^4y^{-4})^3$

36. $5x^2y(2x^4y^{-3})$

37. $\left(\frac{-7a^2b^3c^0}{3a^3b^4c^3}\right)^{-4}$

38. $\left(\frac{-2a^3b^2c^0}{3a^2b^3c^7}\right)^{-2}$

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Midterm Review Worksheet B

Laws of Exponents Worksheet

Rewrite the following as single exponent using exponent rules:

Problems

Work Space

$$\frac{4^5 \times 4^6}{4^3}$$

Answer:

$$(3^{-2})^7 \times 3^3 \times 3^7$$

Answer:

$$\frac{(5^5)^{20}}{5^4 \times 5^{-7}}$$

Answer:

$$\frac{\left(\left(\frac{11}{20}\right)^4 \times \left(\frac{11}{20}\right)^{-8}\right)^5}{\left(\frac{11}{20}\right)^{-6}}$$

Answer:

$$\left(\frac{4^{-3} \times 4^{-6}}{4^7 \times 4^2}\right)^4$$

Answer:

INTERVAL NOTATION WORKSHEET

NAME: _____

Midterm Review Worksheet C

Put in interval notation and draw a graph of each inequality.

1. $x \geq 4$

0

1. _____



2. $x < 6$

0

2. _____



3. $x \leq -2$

0

3. _____



4. $x > 8$

0

4. _____



5. $x < -10$

0

5. _____

**Write each interval as an inequality .**

6. $(-\infty, -8]$

6. _____

7. $[5, \infty)$

7. _____

8. $(-2, \infty)$

8. _____

9. $[-10, \infty)$

9. _____

10. $(-\infty, 6)$

10. _____

In each part, express the set in interval notation and as an inequality.



Inequality: _____

Interval: _____



Inequality: _____

Interval: _____



Inequality: _____

Interval: _____



Inequality: _____

Interval: _____



Inequality: _____

Interval: _____



Inequality: _____

Interval: _____

Adding and Subtracting Polynomials

Simplify each expression.

1) $(5p^2 - 3) + (2p^2 - 3p^3)$

2) $(a^3 - 2a^2) - (3a^2 - 4a^3)$

3) $(4 + 2n^3) + (5n^3 + 2)$

4) $(4n - 3n^3) - (3n^3 + 4n)$

5) $(3a^2 + 1) - (4 + 2a^2)$

6) $(4r^3 + 3r^4) - (r^4 - 5r^3)$

7) $(5a + 4) - (5a + 3)$

8) $(3x^4 - 3x) - (3x - 3x^4)$

9) $(-4k^4 + 14 + 3k^2) + (-3k^4 - 14k^2 - 8)$

10) $(3 - 6n^5 - 8n^4) - (-6n^4 - 3n - 8n^5)$

11) $(12a^5 - 6a - 10a^3) - (10a - 2a^5 - 14a^4)$

12) $(8n - 3n^4 + 10n^2) - (3n^2 + 11n^4 - 7)$

13) $(-x^4 + 13x^5 + 6x^3) + (6x^3 + 5x^5 + 7x^4)$

14) $(9r^3 + 5r^2 + 11r) + (-2r^3 + 9r - 8r^2)$

15) $(13n^2 + 11n - 2n^4) + (-13n^2 - 3n - 6n^4)$

16) $(-7x^5 + 14 - 2x) + (10x^4 + 7x + 5x^5)$

17) $(7 - 13x^3 - 11x) - (2x^3 + 8 - 4x^5)$

18) $(13a^2 - 6a^5 - 2a) - (-10a^2 - 11a^5 + 9a)$

19) $(3v^5 + 8v^3 - 10v^2) - (-12v^5 + 4v^3 + 14v^2)$

20) $(8b^3 - 6 + 3b^4) - (b^4 - 7b^3 - 3)$

21) $(k^4 - 3 - 3k^3) + (-5k^4 + 6k^3 - 8k^5)$

22) $(-10k^2 + 7k + 6k^4) + (-14 - 4k^4 - 14k)$

23) $(-7n^2 + 8n - 4) - (-11n + 2 - 14n^2)$

24) $(14p^4 + 11p^2 - 9p^5) - (-14 + 5p^5 - 11p^2)$

25) $(8k + k^2 - 6) - (-10k + 7 - 2k^2)$

26) $(-9v^2 - 8u) + (-2uv - 2u^2 + v^2) + (-v^2 + 4uv)$

27) $(4x^2 + 7x^3y^2) - (-6x^2 - 7x^3y^2 - 4x) - (10x + 9x^2)$

28) $(-5u^3v^4 + 9u) + (-5u^3v^4 - 8u + 8u^2v^2) + (-8u^4v^2 + 8u^3v^4)$

29) $(-9xy^3 - 9x^4y^3) + (3xy^3 + 7y^4 - 8x^4y^4) + (3x^4y^3 + 2xy^3)$

30) $(y^3 - 7x^4y^4) + (-10x^4y^3 + 6y^3 + 4x^4y^4) - (x^4y^3 + 6x^4y^4)$

Multiplying Polynomials

Find each product.

1) $6v(2v + 3)$

2) $7(-5v - 8)$

3) $2x(-2x - 3)$

4) $-4(v + 1)$

5) $(2n + 2)(6n + 1)$

6) $(4n + 1)(2n + 6)$

7) $(x - 3)(6x - 2)$

8) $(8p - 2)(6p + 2)$

9) $(6p + 8)(5p - 8)$

10) $(3m - 1)(8m + 7)$

11) $(2a - 1)(8a - 5)$

12) $(5n + 6)(5n - 5)$

$$13) (4p - 1)^2$$

$$14) (7x - 6)(5x + 6)$$

$$15) (6n + 3)(6n - 4)$$

$$16) (8n + 1)(6n - 3)$$

$$17) (6k + 5)(5k + 5)$$

$$18) (3x - 4)(4x + 3)$$

$$19) (4a + 2)(6a^2 - a + 2)$$

$$20) (7k - 3)(k^2 - 2k + 7)$$

$$21) (7r^2 - 6r - 6)(2r - 4)$$

$$22) (n^2 + 6n - 4)(2n - 4)$$

$$23) (6n^2 - 6n - 5)(7n^2 + 6n - 5)$$

Solving Multi-Step Equations

Solve each equation.

1) $4n - 2n = 4$

2) $-12 = 2 + 5v + 2v$

3) $3 = x + 3 - 5x$

4) $x + 3 - 3 = -6$

5) $-12 = 3 - 2k - 3k$

6) $-1 = -3r + 2r$

7) $6 = -3(x + 2)$

8) $-3(4r - 8) = -36$

9) $24 = 6(-x - 3)$

10) $75 = 3(-6n - 5)$

$$11) -3(1 + 6r) = 14 - r$$

$$12) 6(6v + 6) - 5 = 1 + 6v$$

$$13) -4k + 2(5k - 6) = -3k - 39$$

$$14) -16 + 5n = -7(-6 + 8n) + 3$$

$$15) 10p + 9 - 11 - p = -2(2p + 4) - 3(2p - 2)$$

$$16) -10n + 3(8 + 8n) = -6(n - 4)$$

$$17) 10(x + 3) - (-9x - 4) = x - 5 + 3$$

$$18) 2(2k + 11) = 12(2k + 12)$$

$$19) -12(x - 12) = -9(1 + 7x)$$

$$20) -11 + 10(p + 10) = 4 - 5(2p + 11)$$

Critical thinking question:

21) Explain two ways you could solve $20 = 5(-3 + x)$

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Midterm Review Worksheet G

Scientific Notation

Write each number in standard format.

1) 5.4491×10^{-1} = _____

2) 1.23×10^{-6} = _____

3) 7.5596×10^1 = _____

4) 3.2787×10^5 = _____

5) 7.17×10^8 = _____

6) 4.53×10^{-2} = _____

7) 5.693×10^{-4} = _____

8) 1.24×10^{-3} = _____

9) 6.2781×10^4 = _____

10) 6.4446×10^7 = _____

Write each number in scientific notation.

1) 0.000063950 = _____

2) 32210 = _____

3) 4484800000 = _____

4) 0.0000000034220 = _____

5) 0.000000330540 = _____

6) 0.00000007350 = _____

7) 754.7 = _____

8) 1254 = _____

9) 0.000527 = _____

10) 2081000 = _____



Multiplying and Dividing Using Scientific Notation

Simplify. Write each answer in scientific notation.

1) $(8.18 \times 10^{-6})(1.15 \times 10^{-5})$

2) $(5.8 \times 10^{-6})(2 \times 10^4)$

3) $(0.8 \times 10^4)(1.28 \times 10^6)$

4) $(3.8 \times 10^{-6})(2.37 \times 10^{-3})$

5) $(1.9 \times 10^{-3})(2 \times 10^4)$

6) $(9.2 \times 10^5)(4 \times 10^{-3})$

7) $\frac{7.8 \times 10^4}{8 \times 10^1}$

8) $\frac{5.3 \times 10^3}{7.65 \times 10^5}$

9) $\frac{4.6 \times 10^2}{5.01 \times 10^{-3}}$

10) $\frac{7.6 \times 10^0}{5.4 \times 10^{-6}}$

11) $\frac{5.5 \times 10^{-1}}{5.3 \times 10^2}$

12) $\frac{2.04 \times 10^{-1}}{2 \times 10^{-2}}$

13) $(7.87 \times 10^{-1})^{-6}$

14) $(9.1 \times 10^{-5})^{-4}$

15) $(4 \times 10^1)^{-5}$

16) $(2.19 \times 10^4)^{-6}$

17) $(9.7 \times 10^{-3})^4$

18) $(5.9 \times 10^0)^{-2}$

19) $(6.9 \times 10^{-6})(770 \times 10^2)$

20) $(7.57 \times 10^{-4})(8.8 \times 10^{-1})$

21) $(0.95 \times 10^1)(0.4 \times 10^{-2})$

22) $(12 \times 10^5)(2 \times 10^2)$

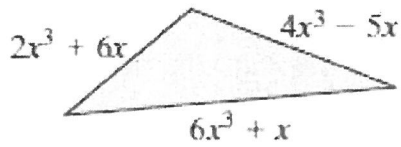
23) $(5.32 \times 10^1)(2.21 \times 10^1)$

24) $(8 \times 10^{-4})^6$

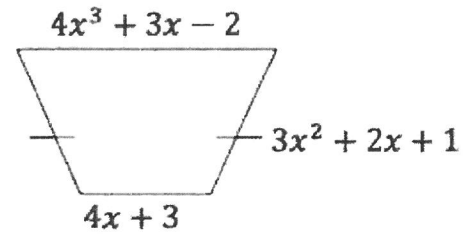
POLYNOMIALS – WORD PROBLEMS

WRITE AN EXPRESSION FOR THE PERIMETER.

1.)

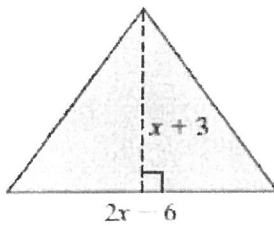


2.)



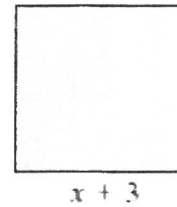
WRITE AN EXPRESSION FOR THE AREA.

3.)

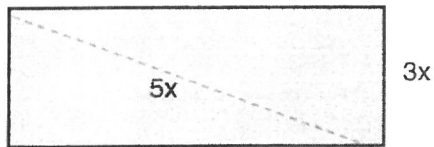


4.)

Square

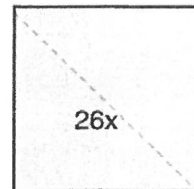


5.)



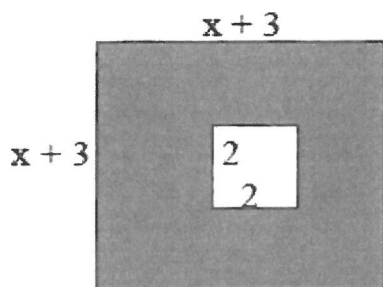
6.)

Square



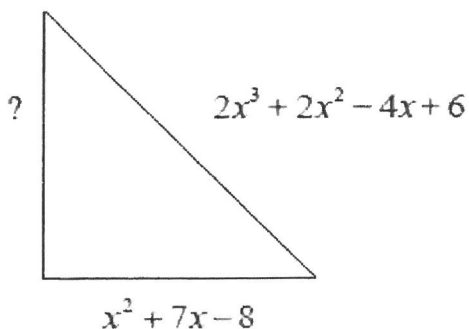
7.) A RECTANGULAR GARDEN HAS A LENGTH OF $x + 8$ UNITS AND A WIDTH OF $x - 4$ UNITS. DRAW A DIAGRAM, AND LABEL THE DIMENSIONS. FIND THE AREA.

8.) FIND THE AREA OF THE SHADED REGION.



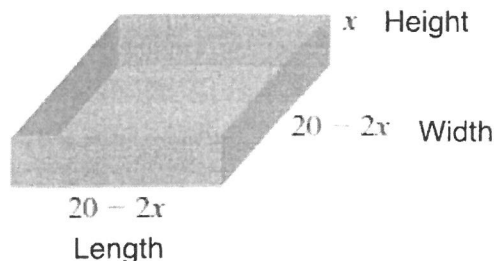
9.) GIVEN THE PERIMETER, FIND THE MISSING SIDE.

$$P = 2x^3 + 4x^2 + 6x + 3$$

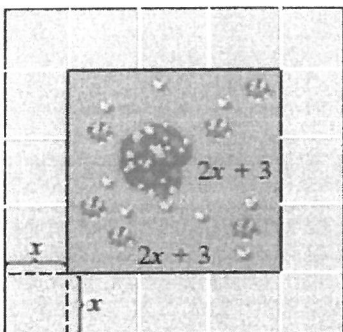


10.) A BOX IS CREATED FROM A SHEET OF CARDBOARD 20 IN. ON A SIDE BY CUTTING A SQUARE FROM EACH CORNER AND FOLDING UP THE SIDES. LET X REPRESENT THE LENGTH OF THE SIDES OF THE SQUARES REMOVED FROM EACH CORNER. FIND AN EXPRESSION FOR THE VOLUME OF THE BOX IN TERMS OF X.

Volume = Length x Width x Height



11.) A SQUARE GARDEN IS SURROUNDED BY A WALKWAY OF WIDTH X.



A) FIND THE AREA OF THE GARDEN.

B) FIND THE AREA OF THE WALKWAY AND THE GARDEN.

12.) IF THE PERIMETER OF A RECTANGLE IS EXPRESSED BY $6x^2 + 8x + 8$ AND THE WIDTH IS $2x^2 + 1$, FIND AN EXPRESSION FOR THE LENGTH.

Name _____

Date _____

Midterm Review Worksheet J

Using the Pythagorean Theorem in Word Problems

Solve by drawing a picture, identifying a, b, and c, and applying the Pythagorean Theorem. Don't forget to give your answer with units!

1. Two sides of a right triangle are 8 and 12 in.
 - a. Find the missing side if these are the lengths of the legs.

 - b. Find the missing side if these are the lengths of a leg and hypotenuse.

2. The foot of a ladder is placed 6 feet from a wall. If the top of the ladder rests 8 feet up on the wall, how long is the ladder?

3. John leaves school to go home. He walks 6 blocks North and then 8 blocks west. How far is John from the school?

4. Scott wants to swim across a river that is 400 meters wide. He begins swimming perpendicular to the shore he started from but ends up 100 meters down river from where he started because of the current. How far did he actually swim from his starting point?

5. A ramp is placed from a ditch to a main road 2 ft. above the ditch. If the length of the ramp is 12 ft., how far away is the bottom of the ramp from the road?

6. A soccer field is a rectangle 90 meters wide and 120 meters long. The coach asks players to run from one corner to the corner diagonally across. What is this distance?

7. The area of a square is 81 square centimetres. First, find the length of a side. Then, find the length of the diagonal.

8. An isosceles triangle has congruent sides of 20 cm. The base is 10 cm. Find the height of the triangle.

9. To get from point A to point B you must avoid walking through a pond. To avoid the pond, you must walk 34 meters south and 41 meters east. To the nearest meter, how many meters would be saved if it were possible to walk through the pond?

10. Jill's front door is 42 inches wide and 84 inches tall. She purchased a circular table that is 96 inches in diameter. Will the table fit through the front door? Explain.

11. In the Old West, settlers often fashioned tents out of a piece of cloth thrown over tent poles and then secured to the ground with stakes forming an isosceles triangle. How long would the cloth have to be so that the opening of the tent was 4 meters high and 3 meters wide?

Name: _____ Group: _____

Midterm Review Worksheet K

Factoring by Greatest Common Factor

Factor the greatest common factor out of the polynomial.

1. $8x^2 + 10x$

2. $12y - 16$

3. $-15d^5 + 45d^3$

4. $13a + 20b$

5. $c^3 + c^2 - c$

6. $6n^2 - 30n + 42$

7. $-7m^2 - 10m + 17$

8. $18p^3 - 63p^2 - 9p$

9. $18x^2 - 50y^2$

10. $100z^9 + 50z^6 - 75z^5$

11. $36rs^2 - 108r^2s^3$

12. $36k - 30$

13. $a^7b - a^{10}$

14. $2c^5d^4 - 3c^4 + 4c^3$

15. $3g^8 + 3g^7$

16. $18x^5 - 48x^4 + 56x^3 - 86x$

17. $23y^{10} - 46y^7 + 68y^2 + 10y$

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Midterm Review Worksheet L

Factoring By Grouping

Factor each completely. If non-factorable, write "Non-factorable".

1) $q^3 - 8q^2 + 7q - 56$

6) $w^3 + 8w^2 - 2w - 16$

2) $6m^3 + 36m^2 - 12m - 72$

7) $y^3 - 2y^2 + 5y - 10$

3) $4s^3 + 6s^2 + 6s + 9$

8) $36w^3 - 54w^2 + 24w - 36$

4) $12r^3 - 27r^2 + 8r - 18$

9) $3h^3 - 18h^2 + 15h - 90$

5) $m^3 - 9m^2 + 5m - 45$

10) $27x^3 - 63x^2 + 45x - 105$

