

Unit 1 Test Review

Unit Conversions (Dimensional Analysis)

1.) Convert 63 miles to feet

2.) Convert 1456 inches to meters. (Use 2.54 cm per inch)

3.) Convert 80 miles per hour to feet per second.

Simplifying radicals (square roots)

4.) Simplify $\sqrt{x^{11}y^5z^9}$

5.) Simplify. $\sqrt{98x^5y^8}$

6. Simplify $\sqrt{3x} \cdot \sqrt{27x^5}$

7. Simplify $\sqrt{2x} \cdot \sqrt{10x^8}$

8. Rationalize the denominator. $\frac{7}{\sqrt{a}}$

9. Rationalize the denominator. $\frac{\sqrt{11}}{\sqrt{5y}}$

10. Add.

$$6\sqrt{2x} + \sqrt{18x} + \sqrt{50x}$$

11.) Subtract

$$\sqrt{24x} - 2\sqrt{54x}$$

Unit 1 Test Review

Accuracy and Precision

12. Which measurement is more precise?

- a.) 23 cm.; 15 meters; 52 km.
- b.) 2.1 in. ; 3.456 in. ; 54 in.

13. Describe the scenario as exact, estimation or approximation.

- a.) The diagonal of a square with side lengths of 5 is $5\sqrt{2}$
- b.) The diagonal of a square with side lengths of 5 is 7.1.
- c.) The thermometer measures 96°F .
- d.) If 4 dogs eat about a cup of dog food a day, Pam thinks that the bag of dog food will last a week.
- e.) The circumference of a circle with diameter of 10 is 31.4.
- f.) the circumference of a circle with diameter 10 is 10π
- g.) The population of Columbus is 230,000.

Significant Figures

14. Tell the number of significant figures.

0.003440

45,020,100

6100.0

50,000

Unit 1 Test Review

15. Using your knowledge of precision, perform the operations and round to the correct digit.

$$4.4 + 8.14$$

$$60 - 32.1$$

$$(7.6)(29.2)$$

$$80 \cdot 45$$

Polynomials

16. Use the following expression:

$$-4x^2 + 6x - 12$$

a. Name the type of polynomial. _____

b. State the leading coefficient. _____

c. State the constant _____

17. Adding and Subtracting:

$$(9x^2 + 5x - 7) + (4x^2 + 7x + 1)$$

$$(-8x^2 + 7x + 6) + (2x^2 + 15)$$

$$(9x^2 + 5x - 7) - (4x^2 + 7x + 1)$$

$$(-8x^2 + 7x + 6) - (2x^2 + 15)$$

18. Multiplying:

$$(x + 5)(x - 4)$$

$$(3x - 1)(x + 6)$$

$$(4x + 1)(x + 7)$$

$$(x + 8)^2$$

$$(x + 6)(x - 6)$$

Unit 1 Test Review

Rational and Irrational Numbers:

19. For the following, decide if the statement is true **Always, Sometimes, or Never**.

The product of two irrational numbers is rational.

The product of two irrational numbers is irrational.

The sum of a two rational numbers is irrational.

The sum of two rational numbers is rational.

20. Fill in the blank with **Rational or Irrational**.

The sum of a rational number and an irrational number is _____

The product of a **non-zero** rational number and irrational number is _____

Closure Property:

21. Explain why polynomials are closed under addition, subtraction and multiplication but not division.

22. Explain why whole numbers are not closed under subtraction, but integers are.

23. Rational numbers are closed under division for all real numbers except _____?

Unit 1 Test Review

Unit Conversions (Dimensional Analysis)

1.) Convert 63 miles to feet

$$\frac{63 \text{ mi}}{1} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}} = 332,640 \text{ ft}$$

2.) Convert 1456 inches to meters. (Use 2.54 cm per inch)

$$\frac{1456 \text{ inches}}{1} \cdot \frac{2.54 \text{ cm}}{1 \text{ inch}} \cdot \frac{1 \text{ meter}}{100 \text{ cm}} = 36.9824 \approx 36.98 \text{ meters}$$

3.) Convert 80 miles per hour to feet per second.

$$\frac{80 \text{ miles}}{1 \text{ hr.}} \cdot \frac{5280 \text{ ft.}}{1 \text{ mile}} \cdot \frac{1 \text{ hr.}}{3600 \text{ sec.}} = 117.3 \text{ ft/sec.}$$

Simplifying radicals (square roots)

4.) Simplify $\sqrt{x^{11}y^5z^9}$

$$\sqrt{x^{10}x^1 y^4 y^1 z^8 z^1}$$

$$\boxed{x^5 y^2 z^4 \sqrt{xyz}}$$

6. Simplify $\sqrt{3x} \cdot \sqrt{27x^5}$

$$\sqrt{81x^6}$$

$$\boxed{9x^3}$$

81 is a perfect square.

8. Rationalize the denominator. $\frac{7}{\sqrt{a}}$

$$\frac{7}{\sqrt{a}} \cdot \frac{\sqrt{a}}{\sqrt{a}} = \frac{7\sqrt{a}}{\sqrt{a^2}} = \boxed{\frac{7\sqrt{a}}{a}}$$

10. Add.

$$6\sqrt{2x} + \sqrt{18x} + \sqrt{50x}$$

$$6\sqrt{2x} + 3\sqrt{2x} + 5\sqrt{2x}$$

$$\boxed{14\sqrt{2x}}$$

$$\sqrt{18x} = 3\sqrt{2x}$$

$$\sqrt{50x} = 5\sqrt{2x}$$

11.) Subtract

$$\sqrt{24x} - 2\sqrt{54x}$$

$$2\sqrt{6x} - 6\sqrt{6x}$$

$$\boxed{-4\sqrt{6x}}$$

$$\sqrt{24x} = 2\sqrt{6x}$$

$$2\sqrt{54x} = 2 \cdot 3\sqrt{6x} = 6\sqrt{6x}$$

9-6

5.) Simplify. $\sqrt{98x^5y^8}$

$$\sqrt{7^2 \cdot 2 \cdot x^4 \cdot x \cdot y^8}$$

$$\boxed{7x^2y^4\sqrt{2x}}$$

$$\begin{matrix} 98 \\ \swarrow \searrow \\ 2 \quad 49 \\ \quad \swarrow \searrow \\ \quad 7 \quad 7 \end{matrix}$$

7. Simplify $\sqrt{2x} \cdot \sqrt{10x^8}$

$$\sqrt{20x^9}$$

$$\sqrt{2^2 \cdot 5 \cdot x^8 \cdot x}$$

$$\boxed{2x^4\sqrt{5x}}$$

$$\begin{matrix} 20 \\ \swarrow \searrow \\ 2 \quad 10 \\ \quad \swarrow \searrow \\ \quad 2 \quad 5 \end{matrix}$$

#6-7 multiply first!

9. Rationalize the denominator. $\frac{\sqrt{11}}{\sqrt{5y}}$

$$\frac{\sqrt{11}}{\sqrt{5y}} \cdot \frac{\sqrt{5y}}{\sqrt{5y}} = \boxed{\frac{\sqrt{55y}}{5y}}$$

* For #10-11 Simplify first!

Unit 1 Test Review

Accuracy and Precision

12. Which measurement is more precise?

a.) 23 cm.; 15 meters; 52 km. *smaller unit*

b.) 2.1 in.; 3.456 in.; 54 in. *same units, more decimals.*

13. Describe the scenario as exact, estimation or approximation.

a.) The diagonal of a square with side lengths of 5 is $5\sqrt{2}$ exact
because they left $\sqrt{2}$ as irrational - no decimal.

b.) The diagonal of a square with side lengths of 5 is 7.1. Approximate
they made $\sqrt{2}$ a decimal.

c.) The thermometer measures 96° F. Approximate
measurements are always approximate

d.) If 4 dogs eat about a cup of dog food a day, Pam thinks that the bag of dog food will last a week. estimation

e.) The circumference of a circle with diameter of 10 is 31.4. Approximate
used 3.14 as π

f.) the circumference of a circle with diameter 10 is 10π exact

g.) The population of Columbus is 230,000. *estimation*

Significant Figures

14. Tell the number of significant figures.

0.003440 *Pacific rule* 4
→

45,020,100 *Atlantic rule* 6

6100.0 (P) 5

50,000 (A) 1

Unit 1 Test Review

15. Using your knowledge of precision, perform the operations and round to the correct digit.

$$4.4 + 8.14 = 12.54$$

1 decimal 12.5

$$60 - 32.1 = 27.9$$

no decimal: 28

$$(7.6)(29.2) = 221.92$$

2 sig figs = 220

$$80 \cdot 45 = 3600$$

1 sig fig 4000

Polynomials

16. Use the following expression:

$$-4x^2 + 6x - 12$$

a. Name the type of polynomial. trinomial

b. State the leading coefficient. -4

c. State the constant -12

17. Adding and Subtracting:

$$(9x^2 + 5x - 7) + (4x^2 + 7x + 1)$$

$$\underline{9x^2 + 5x - 7 + 4x^2 + 7x + 1}$$

$$\underline{13x^2 + 12x - 6}$$

$$(9x^2 + 5x - 7) - (4x^2 + 7x + 1)$$

$$\underline{9x^2 + 5x - 7 - 4x^2 - 7x - 1}$$

$$\underline{5x^2 - 2x - 8}$$

18. Multiplying:

$$(x + 5)(x - 4)$$

$$\begin{array}{r} x^2 - 4x + 5x - 20 \\ \hline x^2 + x - 20 \end{array}$$

$$(4x + 1)(x + 7)$$

$$\underline{4x^2 + 28x + 1x + 7}$$

$$\underline{4x^2 + 29x + 7}$$

$$(x + 6)(x - 6)$$

$$\underline{x^2 - 6x + 6x - 36}$$

cancel

$$\underline{x^2 - 36}$$

$$(-8x^2 + 7x + 6) + (2x^2 + 15)$$

$$\underline{-8x^2 + 7x + 6 + 2x^2 + 15}$$

$$\underline{-6x^2 + 7x + 21}$$

$$(-8x^2 + 7x + 6) - (2x^2 + 15)$$

$$\underline{-8x^2 + 7x + 6 - 2x^2 - 15}$$

$$\underline{-10x^2 + 7x - 9}$$

$$(3x - 1)(x + 6)$$

$$\underline{3x^2 + 18x - 1x - 6}$$

$$\underline{3x^2 + 17x - 6}$$

$$(x + 8)^2 = (x + 8)(x + 8)$$

$$\underline{x^2 + 8x + 8x + 64}$$

$$\underline{x^2 + 16x + 64}$$

Unit 1 Test Review

Rational and Irrational Numbers:

19. For the following, decide if the statement is true Always, Sometimes, or Never.

The product of two irrational numbers is rational. Sometimes $\text{ex: } \sqrt{2} \cdot \sqrt{18} = \sqrt{36} = 6$ ^{rational}

The product of two irrational numbers is irrational. Sometimes
 $\text{ex: } \sqrt{2} \cdot \sqrt{6} = \sqrt{12} = 2\sqrt{3}$

The sum of a two rational numbers is irrational. Never!

The sum of two rational numbers is rational. Always

20. Fill in the blank with Rational or Irrational.

The sum of a rational number and an irrational number is irrational

The product of a non-zero rational number and irrational number is irrational

Closure Property:

21. Explain why polynomials are closed under addition, subtraction and multiplication but not division. If we add, subtract or multiply 2 polynomials we will still have a polynomial. However, If we divide the variables will remain in the denominator - which cannot happen in a polynomial.

22. Explain why whole numbers are not closed under subtraction, but integers are. If we subtract 2 whole numbers like $2 - 5 = -3$ we will get a negative (not a whole number). However, integers contain negative numbers, so subtracting is not a problem.

23. Rational numbers are closed under division for all real numbers except 0?