

1. (a) State if **rational** or **irrational**. If irrational, give your calculator **approximation**.
If rational write as a **reduced fraction**.

(i) $\sqrt{0.64}$

(ii) $\sqrt{0.46}$

- (b) Name the property illustrated

(i) $3 + (w + x) = (3 + w) + x$ _____

(ii) $3(w + x) = 3w + 3x$ _____

2. (a) **Evaluate** $4x^2 - 3y$ if $x = -3$ and $y = -4$. Show the substitution correctly.

(b) Find the **sum** of the polynomials: $3y^2 - 4y + 7 + y^2 + 5y - 11$.

(c) **Simplify** the expression $2(9x - 7) - 3(4x + 3)$

(d) **Simplify** the expression $5x - 6(5 - 7x)$

3. Simplify, and write with positive exponents only.

(a) $(2x^{-2}y^3)^{-2}$

(b) $\frac{(x^{-3}y^{-1})^{-3}}{(x^4y^{-3})^{-2}}$

4. Solve the equations (a) $2x - 8 = 9(x + 3)$

(b) $16x - 7 = 11x + 18$

(c) $\frac{3}{2}x + \frac{5}{6} = \frac{2}{3}x + 1$

5. (a) **Solve** for y in the equation $7x + 5y = 4$.

(b) **Solve** the **inequality** $3x - 4 \geq 5x + 6$

(c) **Graph** the **inequality** $-1 < x \leq 3$

- (d) Write an **algebraic expression** for
"three times the difference of a number and five".

6. Consider the straight line through the points $(1, 3)$ and $(4, 1)$.
- (a) Find the **slope** of the line.
 - (b) Find the **slope-intercept equation** of the line.
 - (c) Find the (x, y) -coordinates of the **x-intercept**
 - (d) Draw a graph of the line, showing both intercepts, and one additional point..
7. (a) Find the **difference** of the polynomials $5x^2 - 7x + 2$ and $2x^2 - 4x + 7$.
- (b) Find the product $(2x + 7)(5x - 2)$
 - (c) Expand $(5x + 7)^2$
8. (a). Write the **quotient in scientific notation** $(2 \times 10^{97}) \div (5 \times 10^{22})$
- (b) **Long division** $x - 5 \overline{) 3x^3 - 13x^2 - 8x + 2}$

IN THE FOLLOWING WORD PROBLEMS, SET UP AN APPROPRIATE EQUATION, SOLVE, CHECK, AND ANSWER WITH A SENTENCE.

9. The length of a rectangle is 3 meters more than **twice** the width. The perimeter of the rectangle is 54 meters. Find the dimensions of the rectangle, using algebra.
10. One cyclist rides away at 9 miles per hour. One-half hour later another cyclist follows the first at 12 miles per hour. How long will it take the second cyclist to catch up with the first? How many miles has each cycled?
11. Maria splits her \$15,000 lottery prize into two parts, one part invested at 4%, the other part at 7%. How much is invested at each rate, if the total interest after one year is 5% of \$15,000 ?
12. Find how many liters of a 2% solution and a 7% solution must be mixed to make 60 liters of a 4% solution.

(100 points, total.)