

1. Express the following sets using interval notation and as number line graphs:

$$A = \{x \mid x \geq 2\}$$

$$B = \{x \mid -5 \leq x < 2\}$$

$$A \cap B$$

$$A \cup B$$

- 2 & 3. Simplify completely using properties of exponents. Do not convert to radicals. Express your answer using positive exponents.

$$2. \quad \frac{\frac{1}{x+2} - \frac{1}{2}}{x}$$

$$3. \quad \left(\frac{2^{-1} x^{1/4}}{y^{1/3} x^{1/6}} \right)^3$$

$$4. \quad \text{Solve for } x: \quad \frac{-2ax}{x+3} + 6 = \frac{-4x+1}{x+3}$$

$$5. \quad \text{Factor \& simplify completely: } (y+2)^{\frac{1}{5}} - (y+2)^{-\frac{4}{5}}$$

6. For what value of K does the equation $3x^2 - 4x + K = 0$ have exactly one real solution?

7. Find the length and midpoint of the segment with endpoints $(-2, 5)$ and $(1, -3)$.

8. Let $P = (-2, 5)$ & $Q = (1, -3)$ be the endpoints of a diameter of a circle.

a. Find the center of the circle.

b. Find the length of the radius of the circle.

c. Write an equation for the circle.

9. The revenue per share for eBay Inc. was \$.20 in 1998 and \$.91 in 1999. Assuming that this trend will continue **linearly**, write an equation that models the relationship between revenue per share and time since 1998.

$$10. \quad \text{Solve for } y: \quad \left(1 + \frac{1}{y}\right)^2 + 3\left(1 + \frac{1}{y}\right) = 40$$

$$11. \quad \text{Find all real and complex solutions for: } x^4 - 3x^3 - 9x^2 + 27x = 0$$

$$12. \quad \text{Show that this: } x^2 + 2x + y^2 - 14y + 48 = 0 \text{ is an equation of a circle. Find the center and radius of the circle.}$$

13. Find the equation of a line that passes through the point $(-1, 4)$ and is

a. parallel to the line given by: $3x - 5y = 10$.

b. perpendicular to the line $3x - 5y = 10$.

Graph both lines for each part.

$$14. \quad \text{Solve the inequality } \left| \frac{1}{2}x - \frac{1}{4} \right| \geq \frac{1}{4}. \text{ Graph your solution on the real number line.}$$

$$15. \quad \text{Solve the inequality. Express your solution using interval notation. } \frac{2+x}{3-x} \leq 1$$

$$16. \quad \text{Divide } \frac{3+i}{2-4i}. \text{ Express the answer in the form } a + bi.$$

$$17. \quad \text{Solve for } x: \quad \sqrt{x+3} + 3 = x$$