

## REVIEW - UNIT 2

### FORMULAS TO MEMORIZE:

Quadratic formula:  $x_{1,2} = \frac{-b \pm \sqrt{D}}{2a}, \quad D = b^2 - 4ac$

Equation of a circle with radius  $r$  and center  $(h, k)$ :  $(x-h)^2 + (y-k)^2 = r^2$

Distance  $d$  on the real line between points  $a$  and  $b$ :  $d = |a-b|$

Distance on the plane between points  $(x_1, y_1)$  and  $(x_2, y_2)$ :  $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Midpoint Formula:  $M = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$

1. Which of the following equations is: identity, conditional equation, or contradiction?

a)  $(\sqrt{x} - \sqrt{x-1})(\sqrt{x} + \sqrt{x-1}) = 1$       b)  $\frac{2}{1-x} = 0$       c)  $\frac{2}{1-x} = 2$

2. Solve the equations:

a)  $\frac{3}{x(x-3)} + \frac{4}{x} = \frac{1}{x-3}$       b)  $\frac{1}{3x-1} + \frac{x}{1-3x} = 3$

3. Write without absolute value signs using the piecewise definition and simplify:

a)  $\frac{(x-1)^2}{|x-1|}$       b)  $x - |3x+6|$

4. Evaluate: a)  $\sqrt{-64}$       b)  $\sqrt{-125} \cdot \sqrt{-80}$       c)  $i^{44}$

5. Perform the indicated operations. Give answer in standard form.

a)  $(4-3i) - (4+3i)$       b)  $(2+i)(-6-2i)$       c)  $\frac{1+i}{i^3}$       d)  $\frac{(2-i)^2}{3+2i}$

6. Find all solutions of the equations:

a)  $x^4 - 1 = 0$       b)  $(y+1)^2 = 16$       c)  $2x^2 - x - 5 = 0$       d)  $x^2 - 3x + 3 = 0$

7. Solve the quadratic equation by completing the square:  $4x^2 - 4x - 35 = 0$ .

8. Solve the equation:  $\frac{3}{2x^2 - x} - \frac{x}{2x-1} + \frac{1}{x} = 2$

9. Find all (four) solutions of the equation:  $4x^{-4} - 3x^{-2} - 1 = 0$ .

10. In the morning, Mary drove to the office at average speed of 45 mph. Her average speed on return trip home was 30 mph. The return trip in the afternoon took 10 minutes longer because of heavy traffic. How far away from home is her office?

11. The width of a rectangle is 2 feet less than its length. Find the length of the rectangle if its diagonal is 10 ft.

12. A ball was thrown directly upward from the roof of a building. After  $t$  seconds, its height above the ground  $h$  (in feet) is given by  $h(t) = -16t^2 + 40t + 24$ .

- 1) What is the height of the building?
- 2) Will the ball reach the top of a tree which is 56 feet tall?
- 3) After how many seconds will the ball return to the roof?

