

1. Factor the following expressions completely. You may find it helpful to use the following formulas:

- $u^3 + v^3 = (u + v)(u^2 - uv + v^2)$

- $u^3 - v^3 = (u - v)(u^2 + uv + v^2)$

(a) $x^2 - 8x + 16$

(b) $16x^4 - y^8z^8$

(c) $27x^3 - y^6$

2. Solve for x in the following:

(a) $x^2 + x - 12 = 0$

(b) $|1 - 5x| \leq 2$

3. Write each of the following expressions in lowest terms. Your answers should not include negative exponents or radicals.

(a) $\frac{20a^{14}b^{-7}(2b)^3}{4a^{-4}b}$

(b) $\frac{z}{z^{\frac{1}{5}}}$

4. State the domain for each of the following algebraic expressions:

(a) $\frac{1}{x^2 - 2x}$

(b) $\sqrt{2x + 1}$

5. Draw the following sets on the number line:

(a) $[-2, 1)$

(b) $|x| - 4 \geq -1$

6. Find the distance between the points $(-1, 4)$ and $(3, 2)$ and the midpoint of the line segment joining them.

7. Determine if the equation $y = x^2 + 2$ exhibits any of the types of symmetry discussed in class and then sketch the graph of the equation.

8. Find the slope-intercept form of each of the following lines:

(a) With slope -2 and y -intercept $(0, 3)$.

(b) Through the points $(1, \frac{1}{2})$ and $(2, \frac{1}{3})$.

(c) Perpendicular to the line $y = 2x - 3$ and through the point $(0, -1)$.