

Math 1021 Review for Test 1

NOTE THIS IS NOT ALL ENCOMPASSING. THERE MIGHT BE TYPES OF PROBLEMS ON THE TEST THAT ARE NOT ON THIS REVIEW. You must know how to do any of the types of homework problems that were assigned.

1. Express $18^2 \cdot 24^3$ as a product of a power of 2 and a power of 3.

2. Simplify the following. Express answers in terms of positive exponents.

(a) $(2a^{-3}b^2)^{-2}$ (b) $\left(\frac{x^2}{y^4}\right)^{-3}$ (c) $\frac{4x^{-3}y^{-5}}{6x^{-4}y^3}$ (d) $\left(\frac{m^{-3}m^3}{n^{-2}}\right)^{-2}$ (e) $\left(\frac{x^4y^{-1}}{x^{-2}y^3}\right)^2$

(f) $(27x^3)^{2/3}$ (g) $(16x^8y^{-4})^{1/4}$ (h) $\left(\frac{x^{-1/3}y^{1/2}}{x^{-1/4}y^{1/3}}\right)^6$

3. Perform the indicated operations and simplify when needed.

(a) $(2x^3 - 3x^2 + x + 5) + (2x^2 + x - 1)$ (b) $(2x^3 - 3x^2 + x + 5) - (2x^2 + x - 1)$

(c) $(2x^3 - 3x^2 + x + 5)(2x^2 + x - 1)$ (d) $2x^2 + x - 1 \sqrt{2x^3 - 3x^2 + x + 5}$

(e) $(2x + 3y)^2$ (f) $(2x - 3y)^2$ (g) $(2x + 3y)(2x - 3y)$ (h) $(3x + 2)(4x - 3)$

(i) $(x + 1)^3$

4. Factor completely the following polynomials.

(a) $x^2 - 10x + 25$ (b) $4x^2 + 12x + 9$ (c) $9x^2 - 4$

(d) $6x^2 + 10x - 3x - 5$ (e) $x^2 + 4x - 12$ (f) $2y^3 - 22y^2 + 48y$

(g) $2x^2 + x - 3$ (h) $12x^2 + 7x - 10$ (i) $2x^4 - 16x$

(j) $x(x - 5) + 3(x - 5)$ (k) $(x - 5)(x + 6) + (x - 5)(2x + 5)$

5. Find $P(-2)$, $P(0)$ and $P(\sqrt{2})$ for the polynomial function $P(x) = 3x^3 - 2x^2 + 1$.

6. Perform the indicated operations and simplify your answers.

$$(a) \frac{x}{x-3} + \frac{3}{3-x} \quad (b) \frac{1}{4x^2} - \frac{2x+1}{3x^3} + \frac{3}{12x} \quad (c) \frac{y-3}{y^2-4} - \frac{y+2}{y^2-4y+4} - \frac{2}{2-y}$$

$$(d) \frac{4}{2x-1} \cdot \frac{10x-5}{16} \quad (e) \frac{x+1}{x-x^2} \cdot \frac{x^2-2x+1}{x^2-1} \quad (f) \frac{4x^2-4x+1}{2x^2+5x-3} \div \frac{2x^2-3x-2}{2x^2+7x+3}$$

$$(g) \frac{\frac{x^2}{y^2} - 1}{\frac{x}{y} + 1} \quad (h) \frac{1}{x+h} - \frac{1}{x} \quad (i) \frac{a+b^{-1}}{b+a^{-1}}$$

7. Simplify the following radicals:

$$(a) \sqrt{12x^3y^5z^2} \quad (b) \sqrt[3]{\frac{8a^7}{27b^3}}$$

8. Express the following in terms of rational exponents.

$$(a) \left(\sqrt{(x+1)^3}\right)^5 \quad (b) \sqrt{\frac{x-1}{x-2}} \left(\sqrt{(x-1)(x-2)}\right)^3$$

9. Perform the indicated operations and simplify. State your answers in radical notation.

$$(a) 3\sqrt{a^4} + 4\sqrt[3]{8a^6} \quad (b) \frac{1}{\sqrt{a}} - \frac{2\sqrt{a}}{a} \quad (c) \frac{1}{\sqrt{x}-1} - \frac{1}{\sqrt{x}+1}$$

10. Rationalize the denominator in each of the following.

$$(a) \frac{5}{\sqrt{5x}} \quad (b) \frac{x}{\sqrt[3]{x}} \quad (c) \frac{1}{\sqrt{x}-1} \quad (d) \frac{1}{\sqrt{x+3}-\sqrt{x}}$$