

Math1010
Final Exam Review Exercises
(taken straight off of old final exams)

(1) Solve the linear equation. $4(x-2)=12+2(x-5)$

(2) Find the solution of these simultaneous equations.

$$3x - 2y = 7$$

$$2x + 4y = 6$$

(3) Two hundred tickets were sold for a Children's Theater performance. Adult tickets were \$10 each, and children tickets were \$6 each. The receipts totaled \$1520. How many tickets of each type were sold?

(4) Solve the equation. $x^2 + x - 3 = 0$

(5) Solve the equation. $x(x-1) = x-2$

(6) The length of a rectangle is 3 inches more than its width. The area of the rectangle is 70 square inches. Find the length and the width of the rectangle.

(7) Write the following polynomial in standard form.

$$(x^2 + 1)(2x + 5) - 2(x^2 + 1)$$

(8) Simplify. $4^{-2} \cdot (2^2)^3 \cdot \left(\frac{1}{3}\right)^{-2}$

(9) Simplify $2^{2/3} \cdot (4^2)^{1/3}$

(10) Multiply and simplify. $\frac{x^2 - 5x + 6}{x + 1} \cdot \frac{x^2 + x}{x - 2}$

(11) Rationalize the denominator. $\frac{2}{3 - \sqrt{6}}$

(12) Solve the inequality and graph the solutions on a real number line.

$$4x + 3 \geq 2(x - 1) + 10$$

(13) Factor the polynomial. $2x^3 + 10x^2 + 12x$

(14) Compute and simplify. $\frac{25}{14} \cdot \frac{28}{15}$

(15) Compute and simplify. $\frac{15}{4} \div \frac{45}{16}$

(16) Compute and simplify. $\frac{2 + \frac{2}{3}}{\frac{1}{2} + \frac{3}{4}}$

(17) Write the equation of the line that goes through the points (1,2) and (3, -2).

(18) Solve for x. $\frac{x}{2} = \frac{2 - \frac{3}{x}}{1 - \frac{1}{x}}$

(19) Perform the indicated operations and simplify.

$$(2x+3)(x^2+3x-1) - (x^2+3)(2x-1)$$

(20) Let $f(x) = \frac{x^2}{x^2 - x - 2}$ (a) What is the domain of this function?

(b) Evaluate $f(-5)$. (c) Evaluate $f(2x-1)$

(21) Simplify. $\frac{\left(\frac{y-x}{x-y}\right)}{\left(\frac{x+y}{xy}\right)}$

(22) Factor completely. $4x^3 + 4x^2 - 3x$

(23) Factor completely. $2x^4 - 32$

(24) Solve for x. $3x - 2 = 4 - 2x$

(25) Find the equation of the line perpendicular to the line $2y=4x-8$ and going through the point (-2, 3).

(26) Solve the equation. $3x^2 + 5x - 2 = 0$

(27) Divide these polynomials. $(2x^3 - 3x + 1) \div (x^2 + x + 1)$

(28) Simplify. $\frac{x-1}{x+1} + \frac{x+1}{x-1} - \frac{x^2+x-2}{x^2-1}$

(29) Evaluate and write in standard form, i.e. $a + bi$.

$$(2+3i)^2$$

(30) Evaluate and write in standard form, i.e. $a + bi$.

$$\frac{3+i}{4-i}$$

(31) Solve $2x^2 - 6x + 5 = 0$

(32) Solve. $\sqrt{x+7} + 5 = x$

(33) Rationalize the denominator. $\frac{2-\sqrt{3}}{7-4\sqrt{3}}$

(34) Rewrite using only positive exponents and simplify. $(2x y^{-1})^2 (9x^3 y^2)^{-1/2}$

(35) Rewrite using only positive exponents and simplify. $\frac{(x^{-3} y^2 w^{-1})^3}{(x^{-5} y^{-2} w^0)^{-2}}$.

(36) Solve. $\frac{2}{x-1} + \frac{4}{2x+3} = \frac{3}{(x-1)(2x+3)}$

(37) Solve. $\sqrt{2x-4} + 4 = 10$

(38) Solve the following inequality and graph the solution set on the real number line. $|2-5x| \geq 8$

(39) Solve the following inequality and graph the solution set on the real number line. $|3x+1|-2 \leq 11$

(40) Simplify. $2\sqrt[3]{25x^5y^7}\sqrt[3]{10x^2y} + 3xy\sqrt[3]{16x^4y^5}$

(41) Solve the system of equations.
$$\begin{aligned} 2x - y - z &= 1 \\ x + y + 2z &= 4 \\ 3x + 2y + z &= 3 \end{aligned}$$

(42) The width of a room is 5 feet less than twice the length. If the area of the room is 250 square feet, what are the dimensions of the room?

(43) Simplify the expression (i.e. Write with only positive exponents such that x and y occur only once).

$$\frac{(x^4 y^{-3})^2}{(x^{-5} y^3)^{-3}}$$

(44) Rewrite this expression as a complex number in standard form (i.e. Your answer should be in the form $a+bi$ where a and b are real numbers).

$$\frac{2-5i}{1-3i}$$

(45) Simplify $\frac{\frac{3}{5} - \frac{1}{3}}{\frac{2}{9} + \frac{1}{2}}$.

(46) Find all the solutions of the equation $2x^2 + 5x - 12 = 0$.

(47) For $f(x) = \frac{2x+1}{x^2-2x}$, (a) Find the domain of $f(x)$. (b) Find $f(-3)$. (c) Find $f(x+1)$.

(48) Solve the linear system. (Make sure you show all your work!)

$$\begin{aligned}x + y + z &= 2 \\x + 2y - 2z &= 1 \\-2x - y + 3z &= 3\end{aligned}$$

(49) Find all the solutions of the equation $2x^2 - x - 7 = 0$.

(50) A grocer wants to mix cashews worth \$8 per pound with peanuts worth \$3 per pound. She wants to obtain a mixture to sell for \$4 per pound. How many pounds of peanuts must be used with 5 pounds of cashews?

(51) Find all solutions of $\frac{2x}{x-1} - \frac{1}{x+4} = 2$.

(52) Find the equation of the line that passes through the point (1, 2) and has slope -3. Graph the line.

(53) Simplify the following polynomial expression. What is its degree and leading coefficient? $(2x^2 - 3x)(x + 1) + 2x - 5$

(54) Solve the system of equations. (Make sure you show all your work.)

$$\begin{aligned}5x + 3y &= 9 \\2x - 4y &= 14\end{aligned}$$

(55) Find the distance between the point (3, 2) and (-1, 4).

(56) Find the solution to the equation $\sqrt{1-2x} - 2 = 3$.

(57) Perform the division. $(x^4 + x^3 + x^2 - 2x - 5) \div (x^2 + x + 3)$.

(58) Joe takes 3 hours to do a job and Fred takes 7 hours to do the same job. Working together, how long will it take them to complete the job?

(59) Solve the equation $2(3x - 6) - 3(5 - x) = 9$.

(60) Simplify the expression $\frac{1}{x+5} + \frac{2}{x-3} - \frac{3}{x-1}$.

Answer Key:

(1) $x = 5$

(2) $(\frac{5}{2}, \frac{1}{4})$

(3) 80 adult tickets, 120 children's tickets

(4) $x = \frac{-1 \pm \sqrt{13}}{2}$

(5) $1 \pm i$

(6) width 7 inches, length 10 inches

(7) $2x^3 + 3x^2 + 2x + 3$

(8) 36

(9) 4

(10) $x(x-3)$

(11) $\frac{2(3 + \sqrt{6})}{3}$

(12) $x \geq \frac{5}{2}$

(13) $2x(x+3)(x+2)$

(14) $\frac{10}{3}$

(15) $\frac{4}{3}$

(16) $\frac{32}{15}$

(17) $y = -2x + 4$

(18) $x = 2, 3$

(19) $10x^2 + x$

(20) (a) $x \in \mathbf{R}, x \neq 2, -1$, (b) $\frac{25}{28}$, (c) $\frac{4x^2 - 4x + 1}{4x^2 - 6x}$ or $\frac{(2x-1)^2}{2x(2x-3)}$

(21) $y - x$

(22) $x(2x-1)(2x+3)$

(23) $2(x-2)(x+2)(x^2+4)$

(24) $x = \frac{6}{5}$

(25) $y = \frac{-1}{2}x + 2$

(26) $x = \frac{1}{3}, -2$

(27) $2x - 2 + \frac{-3x + 3}{x^2 + x + 1}$

(28) $\frac{x}{x+1}$

(29) $-5 + 12i$

- (30) $\frac{11}{17} + \frac{7}{17}i$
- (31) $\frac{3 \pm i}{2}$
- (32) $x = 9$
- (33) $2 + \sqrt{3}$
- (34) $\frac{4\sqrt{x}}{3y^3}$
- (35) $\frac{y^2}{w^3 x^{19}}$
- (36) $x = \frac{1}{8}$
- (37) $x = 20$
- (38) $x \geq 2$ OR $x \leq \frac{-6}{5}$
- (39) $\frac{-14}{3} \leq x \leq 4$
- (40) $16x^2 y^2 \sqrt[3]{2xy^2}$
- (41) (1, -1, 2)
- (42) 20 ft. by 12.5 ft
- (43) $\frac{y^3}{x^7}$
- (44) $\frac{17}{10} + \frac{1}{10}i$
- (45) $\frac{24}{65}$
- (46) $x = \frac{3}{2}, -4$
- (47) (a) $x \in \mathbf{R}, x \neq 0, 2$, (b) $\frac{-1}{3}$, (c) $\frac{2x+3}{x^2-1}$
- (48) (-1, 2, 1)
- (49) $x = \frac{1 \pm \sqrt{57}}{4}$
- (50) 20 pounds
- (51) $x = -9$
- (52) $y = -3x + 5$
- (53) $2x^3 - x^2 - x - 5$
- (54) (3, -2)
- (55) $2\sqrt{5}$
- (56) $x = -12$
- (57) $x^2 - 2 + \frac{1}{x^2 + x + 3}$
- (58) $x = 2\frac{1}{10}$ hours
- (59) $x = 4$

$$(60) \quad \frac{-2x+38}{(x+5)(x-3)(x-1)}$$