

Math 2 Practice Problems for the Final

1. Solve the equation.

a) $2r(r + 3)(5r - 4) = 0$

b) $-2x^3 = 108x - 30x^2$

c) $\frac{1}{x-4} - \frac{3x}{x^2-16} = \frac{2}{x+4}$

d) $\frac{x}{4} + \frac{5}{x} = 3$

e) $\sqrt{x+1} + 4 = 9$

f) $\sqrt{x-3} + \sqrt{x+2} = 5$

2. Perform the indicated operations and simplify completely.

a) $\frac{a^2b}{a^2-b^2} \cdot \frac{a+b}{4a^3b}$

b) $\frac{5x-15}{3-x} \cdot \frac{x+2}{10x+20} \div \frac{x^2-x-6}{x^2-9}$

c) $\frac{2}{a^2-2a+1} + \frac{3}{a^2-1}$

d) $\frac{3}{2x} \left(\frac{2}{x+1} - \frac{2}{x-3} \right)$

3. Divide. $(3x^3 + 12x - 4) \div (x - 2)$

4. Use synthetic division. $(x^5 - 1) \div (x - 1)$

5. Simplify.

a) $\sqrt{\frac{12}{25}}$

b) $\sqrt[3]{\frac{8x^4}{27y^3}}$

c) $\sqrt{18}\sqrt{50}$

d) $\sqrt{20x^4y^2}$

e) $-\sqrt{75} + \sqrt{12} - 3\sqrt{3}$

f) $(\sqrt{x} - y)(\sqrt{x} + y)$

g) $\frac{\frac{1}{x} - \frac{1}{y}}{\frac{1}{x^2} - \frac{1}{y^2}}$

6. Rationalize the denominator.

a) $\sqrt{\frac{3}{2}}$

b) $\sqrt[3]{\frac{8}{3x^5}}$

c) $\frac{\sqrt{x}}{\sqrt{x} + \sqrt{y}}$

7. Solve by completing the square

a) $2x^2 + 7x = 4$

b) $x^2 + 6x + 2 = 0$

c) $x^2 - 4x + 8 = 0$

d) $x^2 + 5x = -7$

8. Solve using the quadratic formula.

a) $(x + 5)(x - 1) = 2$

b) $5x^2 - 3 = 14x$

9. Solve the system of equations

a) $2x - 4y = 22$

b) $5x - 10y = 6$

c) $3x - 6y = 12$

d) $2y = x - 4$

e) $\frac{1}{2}x - \frac{3}{4}y = -\frac{1}{2}$

f) $\frac{1}{8}x + \frac{3}{4}y = \frac{19}{8}$

d) $y = 2x - 4$

e) $y^2 = 4x$

f) $x^2 + y^2 = 10$

g) $9x^2 + y^2 = 18$

h) $x^2 + 2y = 9$

i) $5x - 2y = 5$

j) $x^2 - 3y^2 = 1$

k) $4x^2 + 5y^2 = 21$

10. Graph the solution to the inequality in two variables (page 691):

a) $y \leq -x^2 + 3$

b) $x^2 - y^2 < 1$

c) $\frac{x^2}{4} + \frac{y^2}{9} \geq 1$

11. Graph the solution to the system of inequalities (page 691):

a) $2x \leq 4$

b) $x + y \geq 1$

c) $y \geq x^2$

d) $x + y \geq 3$

e) $x^2 + y^2 \leq 16$

f) $x^2 + y^2 \geq 4$

g) $x^2 + y^2 < 4$

h) $x^2 - y^2 \leq 1$

12. Find the range of the quadratic function.

a) $f(x) = 2x^2 - 4x + 5$

b) $g(x) = -x^2 + 6x + 1$

13. Graph the conic section:

a) $x = -(y + 2)^2 + 3$

b) $(x - 1)^2 + (y - 2)^2 = 4$

c) $4x^2 + 4y^2 + 16x + 8y = 1$

d) $x^2 - \frac{y^2}{4} = 1$

e) $\frac{y^2}{4} - \frac{x^2}{16} = 1$

f) $6(x - 2)^2 + 9(y + 5)^2 = 36$