Review Questions for Exam 1

Disclaimer: This is not a *practice exam.* It is meant to reflect the sort of material you will be expected to know on the exam, not to indicate the actual questions or length of the exam.

1. (a) Sketch the graph of $x^2 + (y+1)^2 = 5$.
(b) Find the distance between the points $(1,3)$ and (2,5).
(c) Give the equation of the circle center $(1,3)$ which passes through (2,5).

2. Simplify $\dfrac{(3x^{-3}y^4/zy^{-4})^3}{(3x^2/y^2)^2z^3}$ using only positive rational exponents (assume that $x, y, z \neq 0$).

3. Simplify $\dfrac{\sqrt{9x^3y^2}}{\sqrt[5]{xy^2}}$ using only positive rational exponents (assume x, y positive).

4. (a) Extract squares and simplify $\sqrt{75y^{10}} - \sqrt{2y^3 \cdot 6y^7}$ using only positive rational exponents. Assume that y is positive.

(b) What happens in (a) if y can also be negative?

5. Write the polynomial in standard form: $(x^3 + 3x - 2)(x^2 - 3) + 2(x-1)(x+1)$.

6. Factor
(a) $16x^5 - 9x^3$. (b) $2x^2 + 11x - 21$.
(c) $x^4 - 13x^2 + 36$. (d) $3x^2(2x-5) + 5x(2x-5) - 2(2x-5)$.

7. Simplify $\dfrac{x^4 + 8x^3 + 16x^2}{x^3 + 2x^2 - 8x}$.

8. Perform the indicated operations and simplify

(a) $\dfrac{2x+1}{x^2+x-6} + \dfrac{1}{x^2-5x+6}$. (b) $\dfrac{\dfrac{1}{x+2} - \dfrac{1}{x+3}}{\dfrac{1}{x^2+4x+4} - \dfrac{1}{x^2+5x+6}}$.

9. Rationalize the denominator of $\dfrac{\sqrt{2}+3}{3-\sqrt{2}}$ and simplify.

10. Solve the linear equation: $\sqrt{5}(x-7) + 5 = \sqrt{2}(3x + \sqrt{2})$.

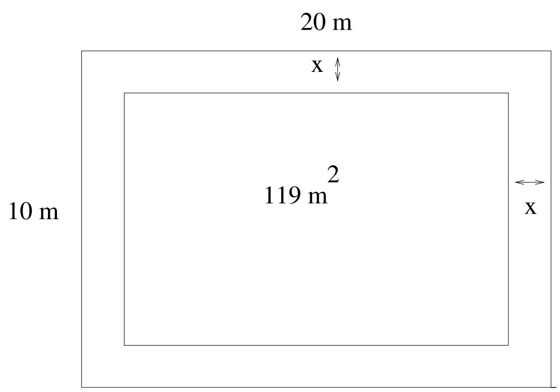
11. Solve the equations
(a) $\dfrac{x+1}{x-2} = \dfrac{x+3}{x-1}$.
(b) $\dfrac{2}{x^2-3x} = \dfrac{3}{x^2-x-6} + \dfrac{1}{x^2+2x}$.

12. Solve the equations
(a) $5 + x = x^2 - 2x$.
(b) $\dfrac{x}{1+x} = \dfrac{6}{x+5}$.

13. How many gallons of a 5% and 10% solution of acid should be mixed together to produce 10 gallons of 7% acid solution?

14. Use your calculator to graph $y = x^5 - 10x^3 + 5x$. Test for symmetry and find the coordinates of the x-intercepts to 4 decimal places.

15. A flower bed x metres wide is made by removing a strip from the edges of rectangular lawn 20 metres by 10 metres. If the remaining lawn has area 119 square metres, how wide was the path?



Solutions

1. (a) Circle center $(0, -1)$ radius $\sqrt{5}$. (b) $\sqrt{5}$. (c) $(x-1)^2 + (y-3)^2 = 5$.

2. $\dfrac{3y^{28}}{x^{13}z^6}$. **3.** $3x^{13/10}y^{3/5}$. **4.** (a) $3^{3/2}y^5$, (b) $3^{3/2}|y|^5$.

5. $x^5 - 9x + 4$.

6. (a) $x^3(4x-3)(4x+3)$, (b) $(2x-3)(x+7)$,
(c) $(x-3)(x+3)(x-2)(x+2)$, (d) $(2x-5)(3x-1)(x+2)$.

7. $\dfrac{x(x+4)}{x-2}$, $x \neq 0, -4$.

8. (a) $\dfrac{2x}{(x-3)(x+3)}$, $x \neq 2$, (b) $(x+2)$, $x \neq -2, -3$.

9. $\dfrac{11 + 6\sqrt{2}}{7}$. **10.** $x = \dfrac{7\sqrt{5} - 3}{\sqrt{5} - 3\sqrt{2}}$.

11. (a) $x = 5$, (b) $x = 7/2$.

12. (a) $x = \frac{1}{2}(3 + \sqrt{29})$, $x = \frac{1}{2}(3 - \sqrt{29})$. (b) $x = 3$, $x = -2$.

13. 6 gallons 5%, 4 gallons 10%.

14. Symmetric about origin. $(0, 0)$, $(\pm 0.7265, 0)$, $(\pm 3.0777, 0)$.

15. $x = 1.5$m.