

Exam 1 Practice Problems

1. Simplify

(a) $\left(\frac{a^2b^{-1}}{c^3}\right)^{-2}$

(b) $\left(\frac{a^2+b^{-1}}{c^2}\right)^{-2}$

(c) $\sqrt{\frac{\sqrt[3]{x}\sqrt[4]{y}}{\sqrt[5]{z}}}$

(d) $\frac{x^3-9}{x-3}$

(e) $\frac{4ab^2-10b^3}{20a^2b-8a^3}$

(f) $\frac{\frac{1}{x^3}+\frac{1}{y^3}}{\frac{1}{x}-\frac{1}{y}}$

2. Factor the following

(a) $(36 - (x - 3)^2)$

(b) $12x^2 + x - 6$

(c) $x^2 - 24x + 140$

3. Solve

$$x - (x - (2 - (4 + x))) = 3x$$

4. The points $(-2, 2)$ and $(-8, -2)$ are the endpoints of the diameter of the circle. Find the center and diameter and give the equation for this circle. Find the x - and y -intercepts and sketch this circle.

5. The point (x, y) is three times as far from $(1, 2)$ as it is from $(-1, 4)$. Write down an equation relating x and y .

6. What are the x and y intercepts of the graph of $y = x^2 - 4$?

7. Give the point-slope, slope-intercept, and standard form of the line passing through the points $(1, 1)$ and $(2, 2)$. Sketch the line.

8. Give the point-slope, slope-intercept, and standard form of the line passing through the point $(4, 5)$ and perpendicular to the line $2x - 3y + 4 = 0$. Sketch the line.

9. Find the slope of the line connecting $(x+h, (x+h)^2)$ and (x, x^2) . Simplify your answer.

10. Solve the following system

$$\begin{aligned}\frac{1}{4}x - \frac{1}{3}t &= 4 \\ \frac{2}{7}x - \frac{1}{7}t &= \frac{1}{10}\end{aligned}$$

11. I want to make a snack mix made from pretzels and chips that sells for \$2.50 per pound. If chips cost \$1.50 per pound and pretzels cost \$2.75 per pound, how many pounds of each do I need to make a 15 pound bag that sells for \$2.50? (Assume I'm not trying to cheat the customer here)
12. List the kinds of symmetry for $x^2 = (y + 1)^2 - 1$. What are the x - and y -intercepts for this graph?
13. What is the center and radius of the circle?

$$3x^2 + 3y^2 + 12x - 18y = 27$$

14. Solve

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

$$y(5y - 2) = 2$$

15. Find the values for k such that $2kx^2 + 3kx + 1$ has only one real root.
16. Solve $|x + 1| = 3x - 2$
17. Solve $(x + 2)^3 - 8 = 0$
18. Solve $x^4 + 3x^2 - 4 = 0$
19. Solve $\sqrt{x - 1} + 2 = x + 1$
20. Solve $\sqrt{x - 1} + \sqrt{x + 1} = 10$
21. Solve

$$2x - 3y = 4$$

$$x^2 - 4y - 2 = 2$$

22. Where do $y = 3x + 4$ and $y = -x^2$ intersect?
23. Where do $y = 3x + 4$ and $y = x^2$ intersect?
24. A right triangle has area 100 and hypotenuse of 15. What are the lengths of the two legs?