

Be sure to quickly look through the exam to get an idea of its length and the type of problems involved. First do the problems for which you have confidence, then work the other less obvious ones. Be neat and show only the work you want me to consider. Be as detailed as necessary. Please circle your final answers. Where appropriate you must support your answers with the relevant calculations.

1. Use the order of operations rules to evaluate each expression below for $x = 3, y = -2, z = 2$. You must show a few intermediate steps.

(a) $5x + z^3 \div y \cdot x$

(b) $\frac{x^2 + 1}{z(x - y^2)}$

2. Perform the indicated operations and simplify each expression. Combine like terms where possible, reduce any fractions to lowest terms and write expressions using positive exponents only.

(a) $4x - 3(2x - 5) + 5x$

(b) $(3x^2)^{-2}(5x^3)$

(c) $(2x - 5)^2$

(d) $\frac{x^2 + 3x - 10}{x + 2} \div \frac{x^2 - 25}{3x^2 + 6x}$

(e) $\frac{x}{x^2 - x - 2} - \frac{3}{x^2 + 11x + 10}$

(f) $\frac{1 - \frac{4}{x^2}}{2 + \frac{3}{x} - \frac{2}{x^2}}$

3. Simplify the radical expression $\sqrt{12} + 3\sqrt{3} - 5\sqrt{75}$.

4. Completely factor each polynomial below.

(a) $12x^5 - 27x$

(b) $x^2 + 5x - 24$

(c) $15x^2 + 11x - 12$

(d) $2ax - 5ab + 6bx - 15b^2$

5. Solve each equation or inequality below using the methods of algebra. If it's an inequality, graph the solution set on a number line. Give exact answers in simplified form (reduced fractions, simplified radicals.)

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

(b) $\frac{2x}{3} - \frac{1}{2} = \frac{x+2}{3}$

(c) $\frac{3}{x+5} = \frac{x}{2}$

(d) $(3y - 2)^2 = -20$

(e) $6x^2 + x - 2 = 0$

(f) $\sqrt{x+7} = x+1$

(g) $-5x - 8 > 7$

(h) $x - 1 < 2$ and $2x + 1 \geq -11$

6. Solve the equation $x^2 + 6x - 1 = 0$ by:

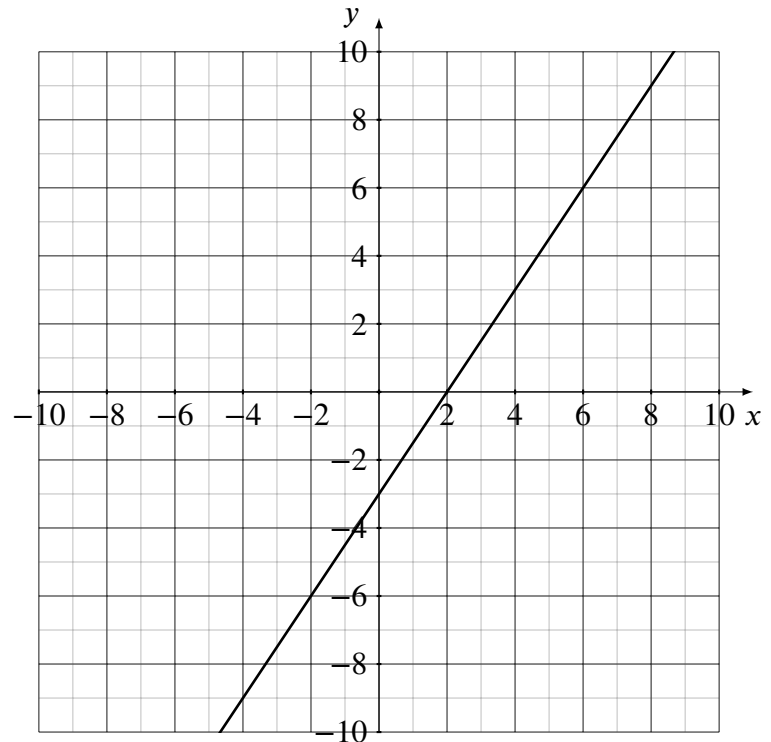
(a) completing the square.

(b) using the quadratic formula.

7. Solve the formula $A = \frac{1}{2}(B + b)h$, for B in terms of A , b and h .

8. The line graphed to the right has equation $3x - 2y = 6$.

- Find the slope of this line.
- Graph the line $x - 4y = -6$ as accurately as possible in the same coordinate system. Clearly indicate the solution to the system of the two graphed equations by circling it.
- Find the exact solution, as reduced fractions, by solving the system of these two equations using either the method of substitution or elimination.



9. Find the slope-intercept ($y = mx + b$) form of the line that contains the points $(-2, 1)$ and $(3, 5)$.

10. For each application below you must:

- Clearly declare variables using complete sentences.
- Set up an equation or system of equations (as appropriate) relating these variables.
- Solve the equation (or system of equations) using an algebraic method.
- State the solution to the problem using complete sentences.

(a) Derek has \$2.50 in nickels and quarters. If he has 8 more nickels than quarters, how many of each coin does he have?

(b) The length of a rectangle is 5 more than 3 times the width. The area is 42 square feet. Find the dimensions (the length and the width) of the rectangle.