

Quiz 1 will cover the following topics:

Decimals and Fractions (handout), Linear Equations (handout), Factoring 1 (handout): includes factoring out the greatest common factor, factoring via the difference of squares theorem, factoring by completing the square, factoring by grouping. Wordproblems (handout): basic percent problems, applications of linear and quadratic equations.

Quiz 1 Review Problems

- Convert each of the following decimal to a fraction.
a) 2.04 b) $0.\overline{24}$ c) $4.\overline{175}$ d) $0.\overline{357}$
- Completely factor each of the following.
a) $3a^3 - 27ab^2$ b) $2p^4 - 162$ c) $20x + 5x^3$
- Completely factor each of the following **by completing the square**.
a) $60x - 6x^2 + 2250$ b) $15a^3 - 8a^4 + a^5$ c) $6x^2 - 24x + 78$
- Solve each of the following equations. Make sure to check your solutions.
a) $\frac{2}{3}(x - 1) = \frac{3}{5}(x - 4) + 1$ c) $\frac{x + 2}{4} - \frac{x - 3}{5} = 20 - x$
b) $(m + 5)(m - 2)(2m + 11) = 0$ d) $(2x + 1)(2x - 5) = (x - 2)(4x - 1)$
- Basic percent problems.
a) One hundred twenty percent of what number is 1008?
b) Twelve percent of the town's population consists of students. If there are 600 students living in the town, how many people live there?
c) Susan got a 10% raise. A week later, she got another 10% raise. If we express the two raises as one, what percentage do we obtain?
d) Paul earned \$128 this week in his part time job. If this was a sixty percent increase from last week, how much money did he make last week?
- Applications of linear equations.
a) Ann is four years younger than Tina. How old is Ann if the sum of their ages is 62?
b) One number is 3 less than twice the other. The sum of the two numbers is 42. Find these numbers.
c) One side of a rectangle is 4 in shorter than three times the other side. Find the sides of the rectangle if its perimeter is 48 in.
d) We have some ten-dollar bills and some twenty-dollar bills. The number of ten-dollar bills is two greater than twice the number of twenty-dollar bills. How many ten-dollar bills do we have if the total value of all bills is \$620?

7. Applications of quadratic equations.

- The area of a rectangle is 1260 m^2 . Find the dimensions of the rectangle if we know that one side is 48 m longer than three times the other side.
- Find all numbers such that if we square the number, we get back the same number.
- Find all numbers such that if we raise the number to the third power, the result is four times the original number.
- We throw an object upward from the top of a 1200 ft tall building. The height of the object, (measured in feet) t seconds after we threw it is

$$h(t) = 160t - 16t^2 + 1200$$

- Where is the object 3 seconds after we threw it?
- How long does it take for the object to be at the height of 1344 ft?
- How long does it take for the object to hit the ground?

Quiz 1 Review Problems - Answers

1. For detailed solutions and more practice, see handout Decimals and Fractions.

$$\text{a) } \frac{51}{25} = 2\frac{1}{25} \quad \text{b) } \frac{8}{33} \quad \text{c) } 4\frac{175}{999} = \frac{4171}{999} \quad \text{d) } \frac{354}{990}$$

2. For detailed solutions and more practice, see handout Factoring 1.)

$$\text{a) } 3a(a + 3b)(a - 3b) \quad \text{b) } 2(p^2 + 9)(p + 3)(p - 3) \quad \text{c) } 5x(x^2 + 4)$$

3. For detailed solutions and more practice, see handouts Completing the Square Part 1, 2, and 3 and Factoring 1.

$$\text{a) } -6(x - 25)(x + 15) \quad \text{b) } a^3(a - 3)(a - 5) \\ \text{c) } 6(x^2 - 4x + 13), \text{ since } x^2 - 4x + 13 = (x - 2)^2 + 9 \text{ does not factor}$$

4. For detailed solutions and more practice, see handout Solving Linear Equations.

$$\text{a) } -11 \quad \text{b) } 2, -5, -\frac{11}{2} \quad \text{c) } 18 \quad \text{d) } 7$$

5. For detailed solutions and more practice, see handout Basic Percent Problems.

$$\text{a) } 840 \quad \text{b) } 5000 \quad \text{c) } 21\% \quad \text{d) } \$80$$

6. For detailed solutions and more practice, see handout Word Problems 1.

$$\text{a) } 29 \quad \text{b) } 15 \text{ and } 27 \quad \text{c) } 7 \text{ in by } 17 \text{ in} \quad \text{d) } 32$$

7. For detailed solutions and more practice, see handouts Wordproblems 2 and Factoring 1.

$$\text{a) } 14 \text{ m by } 90 \text{ m} \quad \text{b) } 0, 1 \quad \text{c) } 0, 2, -2 \\ \text{d) i) } 1536 \text{ ft} \quad \text{ii) } \text{after } 1 \text{ second and after } 9 \text{ seconds} \quad \text{iii) } 15 \text{ seconds}$$