Review Problems

Please note that Quiz 2 will cover material from the reviews for Quiz 1 and Quiz 2.

1. Convert each of the following decimal to a fraction of integers. You do NOT have to simplify the fraction.
   a) 2.04 b) $0.\overline{24}$ c) $4.\overline{175}$ d) $0.1\overline{76}$
2. Simplify each of the following expressions.
   a) $(2x-3)^2-(x-3)(2x+1)$
   b) $(3x^5+4y)(3x^5-4y)$
   c) $\dfrac{5x-30}{x^2-36}\cdot\dfrac{3x+18}{5}$
   d) $\dfrac{3x}{x-2}-\dfrac{x+4}{x-2}$
   e) $\dfrac{6^{2x+1}}{9^{x+1}\cdot 2^{2x-1}}$
   f) $\dfrac{(2x)^3\left(3x^{-2}\right)^2\left(-2x^2\right)}{\left(-2x^2\right)^3}$
   g) $\dfrac{5}{\left(\frac{1}{2}\right)^2\left(\frac{1}{3}\right)^2}$
   h) $\dfrac{5}{\left(\frac{1}{2}\right)^2+\left(\frac{1}{3}\right)^2}$
3. Completely factor each of the following.
   a) $3a^3-27ab^2$ b) $2p^4-162$ c) $20x+5x^3$ d) $6x-2x^2$
4. Factor each of the following by completing the square.
   a) $2x^3-8x^2-192x$
   b) $x^2-6x+34$
   c) $12x-x^2-36$
   d) $-50x-5x^2-45$
   e) $60x-6x^2+2250$
   f) $15a^3-8a^4+a^5$
   g) $6x^2-24x+78$
5. Solve each of the following equations. Make sure to check your solution(s).
   a) $2x^3=20x^2+1750x$
   b) $\dfrac{3x+17}{2}=x-1+\dfrac{x+19}{2}$
   c) $\dfrac{2}{3}(x-7)=\dfrac{4}{5}(x+1)$
   d) $7x^2+(x+3)(2x-1)=(3x+1)^2$
   e) $8a+2a^2=42$
   f) $8x^3=50x^2$
   g) $8p^3=50p$
   h) $2-(3-x)(2x+5)=(x-1)(2x-1)$
   i) $3(x-1)^2-x(2x+4)=(x-1)(2x-3)$
   j) $6x=2x^2$
6. Solve each of the following systems of equations.
   a) $\begin{cases} 3x-5y=31 \\ 2x-y=9 \end{cases}$
   b) $\begin{cases} x-4y=-20 \\ y=\frac{1}{4}x+5 \end{cases}$
   c) $\begin{cases} 4x-3y=12 \\ x+2y=-2 \end{cases}$
7. We have 75 coins, all dimes and quarters, in the total value of \$12.60. How many of each of the coins do we have?
8. Find all numbers such that
   a) If we square the number, we get back the same number.
   b) If we raise the number to the third power, the result is four times the original number.

9. 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

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

a) Where is the object 3 seconds after we threw it?
b) How long does it take for the object to hit the ground?

10. The area of a rectangle is $1260\,\text{m}^2$. Find the dimensions of the rectangle if we know that one side is 48 m longer than three times the other side.

11. Graph each of the following.

a) $2x - 3y = 5$ b) $3x = -5y$ c) $3x = -5$ d) $y = x^2$

Answers

1.) See handout Fractions and Decimals.

a) $\frac{204}{100} = 2\frac{4}{100}$ b) $\frac{24}{99}$ c) $4\frac{175}{999} = \frac{4171}{999}$ d) $\frac{175}{990}$

2.) a) $2x^2 - 7x + 12$ b) $9x^{10} - 16y^2$ c) 3 d) 2 e) $\frac{4}{3}$ f) $\frac{18}{x^5}$ g) 180 h) $\frac{180}{13}$

3.) See handout Factoring 1.

a) $3a(a+3b)(a-3b)$ b) $2\left(p^2+9\right)(p+3)(p-3)$ c) $5x\left(x^2+4\right)$ d) $-2x(x-3)$

4.) See handouts on completing the square, Parts 1 and 2.

a) $2x(x+8)(x-12)$ b) does not factor c) $-(x-6)^2$ d) $-5(x+1)(x+9)$

e) $-6(x-25)(x+15)$ f) $a^3(a-3)(a-5)$ g) $6\left(x^2-4x+13\right)$

5.) See handouts Linear Equations, Factoring 1, and R.3.

a) $35, 0, -25$ b) identity, all real numbers are solution c) -41 d) -4

e) $-7, 3$ f) $\frac{25}{4}, 0$ g) $-\frac{5}{2}, 0, \frac{5}{2}$ h) 7 i) $0, -5$ j) $0, 3$

For 6 and 7, see handouts on systems of equations.

6.) a) $x = 2, y = -5$

b) dependent system; there are infinitely many solutions $x \in \mathbb{R}, y = \frac{1}{4}x + 5$ or $y \in \mathbb{R}, x = 4y - 20$

c) $x = \frac{18}{11}, y = -\frac{20}{11}$ 7.) 41 dimes and 34 quarters

For 8-11, see handout Factoring 1.

8.) a) $0, 1$ b) $0, 2, -2$ 9.) a) 1536 ft b) 15 seconds 10.) 14 m by 90 m

11.) a) $2x - 3y = 5$ b) $3x = -5y$ c) $3x = -5$ d) $y = x^2$