Please note that Quiz 4 will also cover topics cevered on Quizzes 1-3 and Exam1. Please review those topics as well, even if they do not appear on this document.

1. Simplify each of the following expressions.
   a) $\left(\frac{2}{3^{-1}}\right)^{-2}$ b) $\left(2-3^{-1}\right)^{-2}$ c) $\left(\frac{-a^{-2}b}{b^{-2}}\right)^{-3}(-a)^{-2}$ d) $\left(\frac{-2x^{-2}y^{3}}{(-3)^{3}x^{-5}y^{7}}\right)^{0}$

2. Simplify each of the following expressions.
   a) $2\sqrt{80}-5\sqrt{45}+\sqrt{500}$ b) $\left(3\sqrt{5}-1\right)^{2}$ c) $\left(3\sqrt{5}-1\right)^{3}$ d) $\frac{11}{3\sqrt{5}-1}$
   e) Find the exact value of $-a^2-5a+8$ if $a=3\sqrt{5}-1$

3. Factor completely by completing the square or state if the expression does not factor.
   a) $12x-2x^2-16$ c) $12x-2x^2-4$ e) $6x^2-x-15$
   b) $12x-2x^2-20$ d) $12x-2x^2-32$

4. Solve each of the following inequalities.
   a) $x^2+4<6x$ b) $6-x^2-x\le 0$ c) $x^2-6x\le -11$ d) $4x-1\ge 4x^2$

5. a) Write the equation for the circle centered at $(7,0)$ and radius 6 units.
   b) Find the center and radius of the circle $10y+x^2+y^2=6\,(x+11)$

6. Graph each of the following equations.
   a) $y=-\frac{3}{4}x+4$ b) $y=x^2-8x+7$ c) $6y+x^2+y^2=8x$ d) $x=y^2$

7. Find an equation for each of the following lines given.
   a) has slope $-\frac{2}{3}$ and passes through the point $(-6,5)$.
   b) passes through the points $(-2,-7)$ and $(3,3)$

8. A person is standing 35 feet away from a street light that is 28 ft tall. How long is his shadow if he is 5.6 feet tall?

9. Solve each of the following percent problems.
   a) Sally got a 5% raise. Now she is making \$2520. How much was she making before the raise?
   b) A couch went on a 15% discount. The discount price is \$765. What was the original price?

10. Suppose that a and b are real numbers where one number is fifteen less than twice another. Find the smallest value of a) a^2+b^2 b) ab

11. Find the distance between $(3,5)$ and $(8,-3)$.

12. We invested \$5000 in two accounts. One account earns a 7% interest rate, the other earns 13%. How much money was invested in each account if after one year, the combined interest from the two accounts was \$542?

13. Consider the right triangle ABC. The height drawn to its hypotenuse AB divides it to line segments AD and DB. How long are the sides of the triangle if $\overline{AD}=3$ and $\overline{DB}=1$?

14. Compute the area of a regular triangle if all of its sides are 5 meters long.

Answers

1. See Exponents a) $\frac{1}{36}$ b) $\frac{9}{25}$ c) $-\frac{a^4}{b^9}$ d) 1

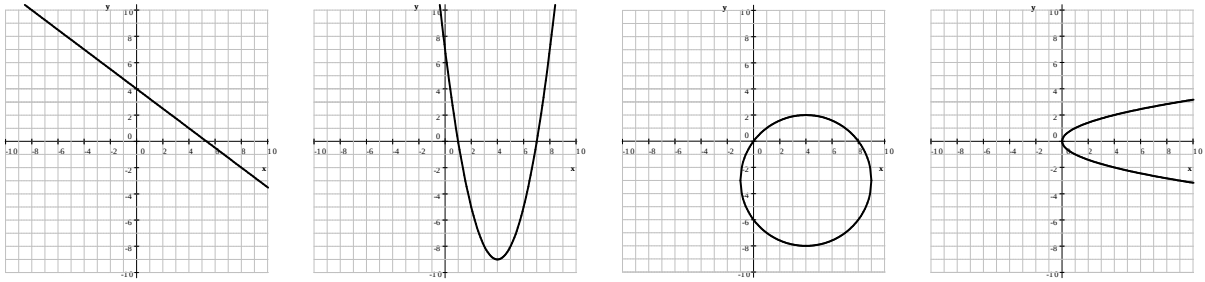
2. See handout Radical Expressions.
   a) $3\sqrt{5}$ b) $46-6\sqrt{5}$ c) $144\sqrt{5}-136$ d) $\frac{3\sqrt{5}+1}{4}$ e) $-33-9\sqrt{5}$

3. See handouts Completing the Square parts 1, 2, 3, and 4. a) $-2(x-2)(x-4)$ b) does not factor
   c) $-2\left(x-3+\sqrt{7}\right)\left(x-3-\sqrt{7}\right)$ d) does not factor e) $6\left(x-\frac{5}{3}\right)\left(x+\frac{3}{2}\right)$ or $(3x-5)(2x+3)$

4. See handout Quadratic Inequalities.
   a) $3-\sqrt{5}<x<3+\sqrt{5}$ b) $x\le -3$ or $x\ge 2$ c) no solution d) $x=\frac{1}{2}$

5. See handout Circles 1. a) $(x-7)^2+y^2=36$ b) center: $C(3,-5)$ radius $r=10$

6. a) b) c) d)



   b) See handout Graphing Parabolas.
   Vertex: $(4,-9)$, $y-$intercept: $(0,7)$, $x-$intercepts: $(1,0)$ and $(7,0)$
   Additional points: $(2,-5)$, $(3,-8)$, $(5,-8)$, $(6,-5)$ c) $(x-4)^2+(y+3)^2=25$

7. See handout Writing Equations of Lines.
   a) $-\frac{2}{3}(x+6)=y-5$ or $y=-\frac{2}{3}x+1$ b) $y=2x-3$

8. See handout Similar Triangles 8.75 feet

9. See handout Basic Percent Problems a) \$2400 b) \$900

10. See handout Optimization 1. a) 45 b) $-\frac{225}{8}$

11. See handout the Pythagorean Theorem. $\sqrt{89}$ units

12. See handouts linear word problems and systems of equations by substitution or elimination. \$1800 at 7% and \$3200 at 13%

13. See handout Similar Triangles 2 units, $2\sqrt{3}$ units, and 4 units long.

14. See handout Pythagorean Theorem. $\frac{25}{4}\sqrt{3}\,\text{m}^2$