

Please note that Quiz 3 will also cover all material covered on Review for Quizzes 1 and 2.

1. Simplify each of the following expressions.

a) $m^2 \cdot m^3$ b) $(m^2)^3$ c) $\frac{(a^3b^2)^3}{ab^4}$ d) $\frac{3^{2x-1}}{9^{x-1}}$ e) $\frac{(-p^2)^3 q^5}{(-p)^2 q^4}$ f) $\left(-\frac{2x^3y}{y^4}\right)^2 \left(\frac{2x^3y^2}{-8x^5y^2}\right)^3$

2. Solve each of the following systems of linear equations.

a) $\begin{cases} 3x - 2y = 12 \\ 2x - y = 4 \end{cases}$ b) $\begin{cases} x + 5y = 3 \\ y = -\frac{1}{5}x + \frac{3}{5} \end{cases}$ c) $\begin{cases} 2x - y = 6 \\ x = \frac{1}{2}y + 1 \end{cases}$

3. Solve each of the following word problems.

a) A farmer has some chickens and cows. One day he was asked: "*How many chickens and how many cows do you have?*" His answer was: "*All together, there are 73 heads and 188 legs*". How many chickens and how many cows does the farmer have?

b) A total of \$20 000 is to be invested in bonds and stocks. If the amount invested in bonds is to be \$4500 more than the amount invested in stocks, how much money is invested in each category?

c) Sally worked 50 hours last week and made \$660 for the week. For every hour worked over 40 her job pays time and a half. What is Sally's regular hourly pay rate?

4. Re-write the decimal $0.1\overline{74}$ as a fraction of two integers.

5. Simplify each of the following expressions.

a) $(5a - 1)^2$ d) $(2 - \sqrt{3})(5\sqrt{3} + 1)$ f) $(\sqrt{7} - 2)^3$
 b) $(3x^5 + 4y)(3x^5 - 4y)$
 c) $\sqrt{125} - 3\sqrt{80} + \sqrt{45}$ e) $(\sqrt{7} - 2)^2$ g) $(\sqrt{5} - \sqrt{2})^2$

6. Rationalize the denominator in each of the following expressions.

a) $\frac{3}{\sqrt{5}}$ b) $\frac{1}{\sqrt{10} - 3}$ c) $\frac{2}{\sqrt{7} + 1}$ d) $\frac{6}{2 - \sqrt{12}}$ e) $\frac{2}{\sqrt{5} - \sqrt{3}}$

7. Find the exact value of $-x^2 + 4x + 6$ if $x = 2 - \sqrt{3}$.

8. Factor $22x + 3x^2 - 16$ by completing the square.

9. Completely factor each of the following.

a) $9x^2 - 16y^{10}$ b) $5x^2 + 10x$ c) $900x + 15x^2 - 3x^3$ d) $32x^4 - 2$

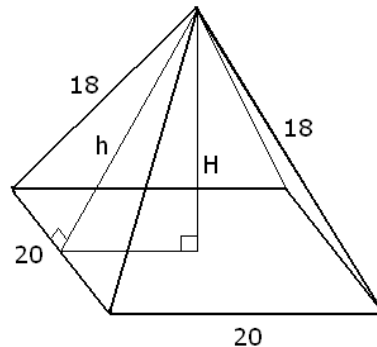
10. Solve each of the following equations. Make sure to check your solution(s).

a) $2x^3 = 20x^2 + 1750x$ e) $8a + 2a^2 = 42$
 b) $\frac{3x + 17}{2} = x - 1 + \frac{x + 19}{2}$ f) $8x^3 = 50x^2$
 c) $\frac{2}{3}(x - 7) = \frac{4}{5}(x + 1)$ g) $8p^3 = 50p$
 d) $7x^2 + (x + 3)(2x - 1) = (3x + 1)^2$ h) $2 - (3 - x)(2x + 5) = (x - 1)(2x - 1)$
 i) $2x^2 = 2x$

11. a) Graph the line $2x - 3y = -12$.

b) Graph the parabola $y = -8x + x^2 + 15$. Clearly label the coordinates of five points on the parabola, including vertex and intercepts.

12. a) One side of a rectangle is 4 ft shorter than three times the other side. Find the sides if the perimeter is 64 ft.
 b) One side of a rectangle is 4 ft shorter than three times the other side. Find the sides if the area is 84 ft^2 .
13. Today a cab ride costs a flat fee of \$3.25 and then \$1.8 per mile. We take a ride that costs \$23.05. How far was our destination?
14. a) The shortest side of a right triangle is 12 cm. The difference between the other two sides is 2 cm. Find the sides of the triangle. Use exact values.
 b) The hypotenuse of a right triangle is 82 cm. The difference between the other two sides is 62 cm. Find the sides of the triangle. Use exact values.
15. Find the distance between $(3, 8)$ and $(8, -4)$. Use exact values.
16. Find the length of the main diagonal in a rectangular prism with sides 7 m, 8 m, and 10 m long. Use exact values.
17. Consider the isosceles triangle with sides 7 m (meter), 7 m, and 10 m long.
 a) Compute the exact value of the height belonging to the 10 m long sides.
 b) Compute the exact value of the area of the triangle.
18. Find the length of the line segments denoted by h and H , based on the picture shown below. Use exact values.



Answers

1. See handout Exponents.) a) m^5 b) m^6 c) a^8b^2 d) 3 e) $-p^4q$ f) $-\frac{1}{16y^6}$
2. See handout on system of equations.
 a) $(-4, -12)$ b) this system is dependent, there are infinitely many solutions
 c) this system is inconsistent, there is no solution
3. See handout on system of equations.
 a) 52 chickens and 21 cows b) 7750 in stocks and 12 250 in bonds c) \$12
4. See handout Decimals and Fractions. $\frac{173}{990}$
5. See handout Radical Expressions.
 a) $25a^2 - 10a + 1$ b) $9x^{10} - 16y^2$ c) $-4\sqrt{5}$ d) $9\sqrt{3} - 13$ e) $11 - 4\sqrt{7}$ f) $-50 + 19\sqrt{7}$
 g) $7 - 2\sqrt{10}$

6. See handout Radical Expressions.

a) $\frac{3\sqrt{5}}{5}$ b) $\sqrt{10} + 3$ c) $\frac{\sqrt{7}-1}{3}$ d) $-\frac{3\sqrt{3}+3}{2}$ e) $\sqrt{5} + \sqrt{3}$

7. See handout Radical Expressions. 7

8. See handout Completing the Square - Part 3. $3(x+8)\left(x-\frac{2}{3}\right) = (x+8)(3x-2)$

9. See handout Factoring 1.

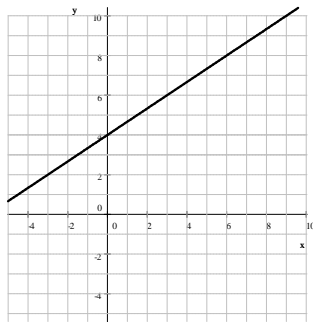
a) $(3x-4y^5)(3x+4y^5)$ b) $5x(x+2)$ c) $-3x(x+15)(x-20)$ d) $2(4x^2+1)(2x+1)(2x-1)$

10. See handouts Linear Equations and Factoring 1.

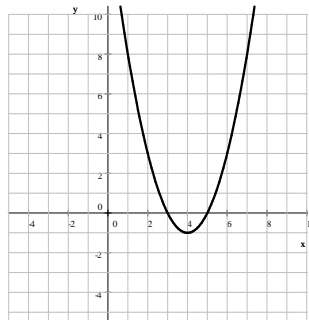
a) 35, 0, and -25 b) identity, all real numbers are solution c) -41 d) -4 e) -7, 3

f) $\frac{25}{4}, 0$ g) $-\frac{5}{2}, 0, \frac{5}{2}$ h) 7 i) 0, 1

11. See handouts Graphing Lines and Graphing a Parabola 1.



a) $y = \frac{2}{3}x + 4$



b) $y = x^2 - 8x + 15$

b) vertex: $(4, -1)$ y -intercept: $(0, 15)$ x -intercepts: $(3, 0)$ and $(5, 0)$ additional points: $(1, 8)$, $(2, 3)$

12. a) See handout Wordproblems 1. 9 ft and 23 ft

b) See handouts Factoring 1 and Wordproblems 2. 6 ft and 14 ft

13. see handout word problems 1 11 miles

For problems 12-16, see handout Pythagorean Theorem.

14. a) 35 cm and 37 cm b) 18 cm and 80 cm

15. 13 units

16. $\sqrt{213}$ m

17. a) $\sqrt{24}$ m = $2\sqrt{6}$ m b) $10\sqrt{6}$ m²

18. $h = \sqrt{224}$ unit = $4\sqrt{14}$ unit $H = \sqrt{124}$ unit = $2\sqrt{31}$ unit