

Review Problems

Please note that Exam 1 will also cover all topics covered on Quizzes 1, 2, and 3. Please review those topics as well, even if they do not appear on this document.

1. Simplify each of the following.

a) $\frac{2x-7}{7-2x}$ c) $(-2a^2b^3a^2)^3 \left(\frac{-ab}{a^3(2b)^2} \right)$ e) $(3\sqrt{2}-1)^2$

b) $\left(\frac{2a^2b^3}{-2^2(-a^3b)^2} \right)^2$ d) $\sqrt{300} - 2\sqrt{75} + \sqrt{12}$ f) $(3\sqrt{2}-1)^3$

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

a) $\frac{4}{\sqrt{7}}$ b) $\frac{1}{\sqrt{7}-3}$ c) $\frac{1}{\sqrt{10}+3}$ d) $\frac{2}{3\sqrt{5}-8}$ e) $\frac{5+\sqrt{3}}{5-\sqrt{3}}$

3. Find the exact value of $-x^2 - 6x + 1$ if $x = 3 - \sqrt{10}$.

4. Factor by completing the square.

a) $18x^2 - 24x - 2$ b) $2x^2 - 13x + 15$ c) $12x - 3x^2 - 39$

5. Solve each of the following equations. Make sure to check your solution.

a) $x^2 + 9 = 8x$ f) $\frac{2a+1}{5} - \frac{7-a}{2} = -a-9$ k) $7p + 15p^2 = 4$

b) $7x^3 + x^6 = 8$ g) $x^2 - 6x = 1$ l) $14 - (2x-5)^2 = 2x - x(4x-7)$

c) $\frac{3x-1}{5} - \frac{7-x}{3} = x-2$ h) $5p^7 = 20p^5$ m) $\sqrt{x} + \sqrt{x-5} = 5$

d) $5(x-2) - (3-4x) = 8(x-2) - (5-x)$ i) $m^2 + 55 = 16m$ n) $\sqrt{x+6} = 1 + \sqrt{x-1}$

e) $5p^7 = 20p^6$ j) $(-1-2x) - (3x+5)(2x-1) = 3(1-2x)(x-1) + 7$ o) $\sqrt{3x+1} = \sqrt{x+4} + 3$

6. Graph each of the following equations.

a) $y = -\frac{2}{3}x + 4$ b) $y = -5 + x^2 + 4x$

7. Find an equation for the line that

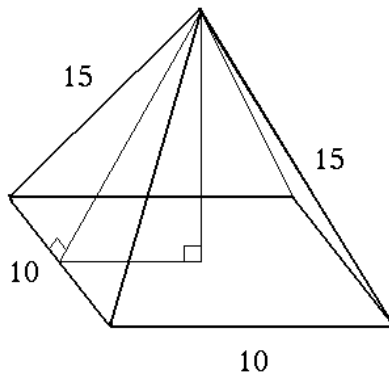
- passes through the points $(2, -5)$ and $(5, 1)$.
- is parallel to $2x - 3y = 5$ and passes through $(-6, -2)$
- is perpendicular to $2x - 3y = 5$ and passes through $(-6, -2)$
- is parallel to $7x - y = 10$ and passes through the point $(-3, -4)$.
- is perpendicular to $7x - y = 10$ and passes through the point $(14, 1)$
- passes through the points $(5, -2)$ and $(7, 4)$.

8. Sally got a 5% raise at work. Now she makes \$3150. How much was she making before the raise?

9. Currently, there are 60000 residents living in town T.

- This is a 20% decrease from last year's population. How many residents lived in the town a year ago?
- The town plans to increase its population to its previous size. What percent of an increase would this represent?

10. A year ago we placed some money in a bank account that earns 12% per year. How much money did we place in the account if it now contains \$3920?
11. Find the exact value of the height of the straight pyramid shown on the picture below.



12. Find the distance between the points $A(3, -2)$ and $B(-5, 10)$
13. Word Problems
- a) The diagonal of a rectangle is 178 cm long. The difference between the sides is 82 cm. How long are the sides?
- b) One side of a rectangle is 5 ft shorter than twice the other side. Find the sides if the area is 150 ft^2 .
- c) We have invested \$8000 in two bank accounts. One account earns an annual interest rate of 6%, the other account earns an annual interest rate of 9%. How much money was invested at each rate if after one year, the combined interest from these accounts was \$624?
- d) The sides of a right triangle have lengths (in centimeters) that are consecutive even integers. What are the lengths of the sides?
- e) A bank teller has 23 more five-dollar bills than ten-dollar bills. The total value of the money is \$610. How much of each denomination of bill does he have?

Review Problems - Answers

1. a) -1 b) $\frac{b^2}{4a^8}$ c) $2a^{10}b^8$ d) $2\sqrt{3}$ e) $19 - 6\sqrt{2}$ f) $63\sqrt{2} - 55$

2. a) $\frac{4\sqrt{7}}{7}$ b) $-\frac{\sqrt{7}+3}{2}$ c) $\sqrt{10}-3$ d) $-\frac{6\sqrt{5}+16}{19}$ e) $\frac{5\sqrt{3}+14}{11}$

3. $12\sqrt{10} - 36$

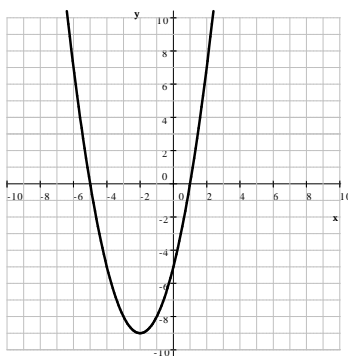
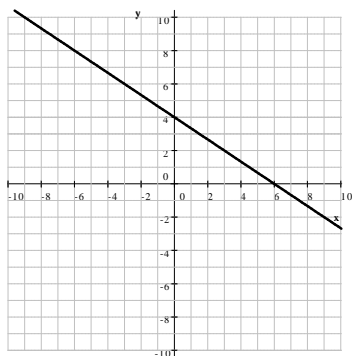
4. a) $18\left(x - \frac{2+\sqrt{5}}{3}\right)\left(x - \frac{2-\sqrt{5}}{3}\right)$ b) $2\left(x - \frac{3}{2}\right)(x-5) = (2x-3)(x-5)$ c) $-3(x^2 - 4x + 13)$

5. a) $4 - \sqrt{7}, 4 + \sqrt{7}$ b) $1, -2$ c) -8 d) no solution e) $0, 4$ f) -3 g) $3 \pm \sqrt{10}$

h) $-2, 0, 2$ i) $5, 11$ j) 0 k) $-\frac{4}{5}, \frac{1}{3}$ l) 1 m) 9 n) 10 o) 21

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

b) $y = -5 + x^2 + 4x$



7. a) $y = 2x - 9$ b) $y + 2 = \frac{2}{3}(x + 6)$ or $y = \frac{2}{3}x + 2$ c) $y + 2 = -\frac{3}{2}(x + 6)$ or $y = -\frac{3}{2}x - 11$

d) $y = 7x + 17$ e) $y = -\frac{1}{7}x + 3$ f) $y = 3x - 17$

8. \$3000

9. a) 75000 b) 25%

10. \$3500

11. $\sqrt{175} = 5\sqrt{7}$

12. $\sqrt{208}$ units = $4\sqrt{13}$ units

13. a) 78 cm and 160 cm b) 10 ft, 15 ft c) \$3200 at 6% and \$4800 at 8%

d) 6 cm, 8 cm, and 10 cm e) 33 ten-dollar bills and 56 five-dollar bills