

Algebra I Midterm Review

Name: Key

Unit 1 Expressions

1. Simplify the expression:

$$6(x + 1) - 8x(x - 2) + 10$$

$$-8x^2 + 6x + 32$$

2. Simplify the expression:

$$-2(2x + 7) - 3$$

$$-4x - 17$$

3. Simplify the expression.

$$3(x - 1) + 5(3x - 4)$$

$$18x - 23$$

4. Simplify the expression:

$$-2(2x - 3) + 3x$$

$$-x + 6$$

5. Solve for m.

$$mx + 4y = 3t$$

$$m = \frac{3t - 4y}{x}$$

6. Solve for r.

$$S = 2\pi rh$$

$$r = \frac{S}{2\pi h}$$

7. Solve for y.

$$Ax + by = C$$

$$y = \frac{C - Ax}{b}$$

8. Solve for h.

$$V = \pi r^2 h$$

$$h = \frac{V}{\pi r^2}$$

9. Write as an algebraic expression:

Five times the sum of the cube of y and the square of x

$$5(y^3 + x^2)$$

10. Write as an algebraic expression:

Twice the difference of x and y decreased by 3

$$2(x - y) - 3$$

11. Write as an algebraic expression:

Add 5 to the product of x and y, then divide by 8

$$\frac{(xy) + 5}{8}$$

12. Write as an algebraic expression:

Add 6 to n then multiply your answer by 4

$$4(6 + n)$$

13. Name the terms, coefficients, constants, and factors

| | | | | |
|--------------|-------------------------|---------------|--------------|------|
| Expression | $-3x^5 + 2x^3 - 5x - 1$ | | | |
| Terms | $-3x^5$ | $2x^3$ | $-5x$ | -1 |
| Factors | $-3 \cdot x^5$ | $2 \cdot x^3$ | $-5 \cdot x$ | |
| Coefficients | -3 | 2 | -5 | |
| Constants | | | | -1 |

14. Name the terms, coefficients, constants, and factors

| | | | | |
|--------------|-----------------|-------------|------|--|
| Expression | $9x^2 + 7x - 4$ | | | |
| Terms | $9x^2$ | $7x$ | -4 | |
| Factors | $9 \cdot x^2$ | $7 \cdot x$ | | |
| Coefficients | 9 | 7 | | |
| Constants | | | -4 | |

15. Simplify and show work:
 $(6x^2 - x - 4) + (2x^2 + 5x - 5)$

$$8x^2 + 4x - 9$$

16. Simplify and show work:
 $(2x^2 - 3x + 7) - (5x^2 + 3x + 6)$

$$-3x^2 - 6x + 1$$

17. Simplify and show work:
 $(x + 4)(x + 11)$

$$x^2 + 15x + 44$$

18. Simplify and show work:
 $(x + 5)^2$

$$x^2 + 10x + 25$$

19. Simplify the expression
 $11\sqrt{7} - 4\sqrt{7}$

$$7\sqrt{7}$$

20. Simplify the expression
 $\sqrt{72} + \sqrt{2}$

$$7\sqrt{2}$$

21. Simplify the expression
 $\sqrt{45}$

$$3\sqrt{5}$$

22. Simplify the expression
 $\sqrt{8} \cdot \sqrt{2}$

$$4$$

23. A rectangle has a length of $(x + 4)$ and a width of $(x - 1)$. Find the area of the rectangle.

$$x^2 + 3x - 4$$

24. A rectangle has a length of $(2x + 5)$ and a width of $(3x + 2)$. Find the perimeter of the rectangle.

$$10x + 4$$

25. Multiply the following binomials.
 $(x + 3)(x - 7)$

$$x^2 - 4x - 21$$

26. Multiply the following binomials.
 $(x - 3)^2$

$$x^2 - 6x + 9$$

27. Simplify:
 $\sqrt{5} + 4\sqrt{5} + 3\sqrt{7}$

$$5\sqrt{5} + 3\sqrt{7}$$

28. Simplify:
 $\sqrt{3} + 18\sqrt{11} - 7\sqrt{11}$

$$\sqrt{3} + \sqrt{11}$$

29. Simplify:
 $\frac{\sqrt{32}}{\sqrt{2}}$

$$4$$

30. Simplify:
 $2(\sqrt{5} - \sqrt{2}) + 3(\sqrt{2} - \sqrt{5})$

$$-\sqrt{5} + \sqrt{2}$$

31. Rational or Irrational? Why?
 π

32. Rational or Irrational? Why?
 $\sqrt{9}$

33. Complete the conjecture that describes the given expression.
 $\sqrt{5} + 2$

The sum of a (rational, irrational) number and a (rational, irrational) number is (rational, irrational).

34. Complete the conjecture that describes the given expression.
 $\sqrt{3}(\sqrt{11})$

The product of a (rational, irrational) number and a (rational, irrational) number is (rational, irrational).

Unit 2 Linear Equations and Inequalities

1. Solve by Substitution:

$$y = x - 2$$

$$3x + y = 8$$

$$\left(\frac{5}{2}, \frac{1}{2}\right)$$

2. Solve by Substitution:

$$4x - y = -6$$

$$y = 2x + 2$$

$$(-2, -2)$$

3. Solve by Elimination:

$$5x - 3y = 7$$

$$x + 3y = 5$$

$$(2, 1)$$

4. Solve by Elimination:

$$4x + 3y = 19$$

$$3x - 3y = 9$$

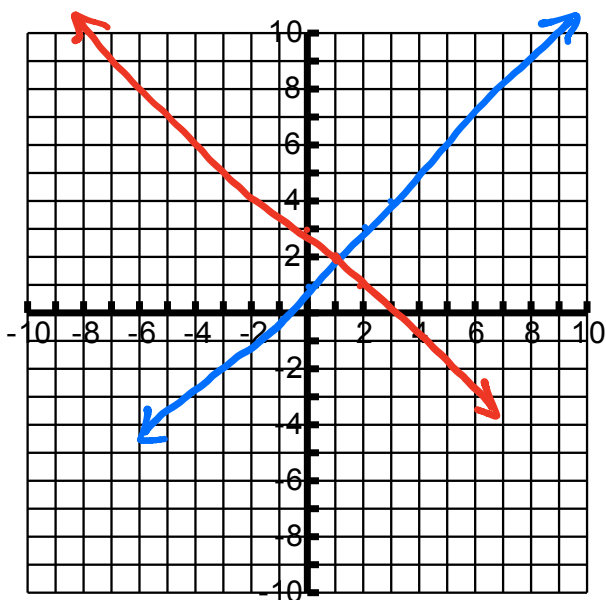
$$(4, 1)$$

5. Solve by Graphing:

$$y = -x + 3$$

$$y = x + 1$$

$$(1, 2)$$

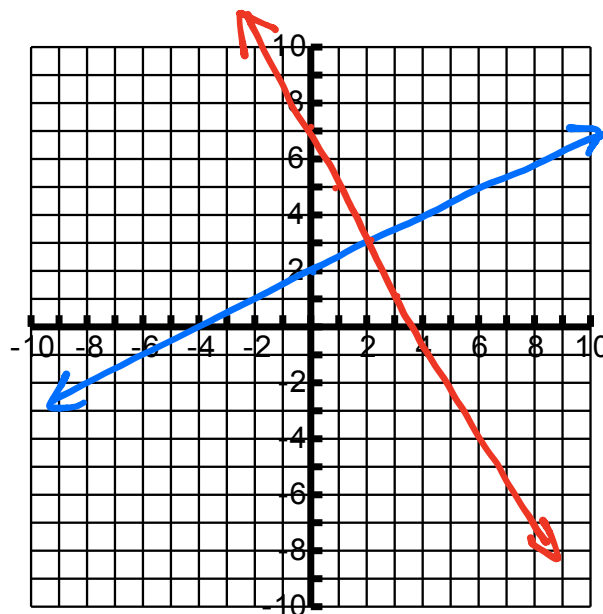


6. Solve by Graphing:

$$y = -2x + 7$$

$$-3x + 6y = 12$$

$$(2, 3)$$



7. Write an equation:

Alyssa needs \$5.00 to buy some ice cream. The only money she has is a jar of dimes and quarters.

$$.10X + .25Y = 5.00$$

8. Write an equation:

Bill wants to buy some CDs at the music store. Used ones sell for \$4.99, and new ones sell for \$13.99. He has \$75 to spend that he got for his birthday.

$$5x + 14y \leq 75$$

9. Write an Inequality:

Sarah is selling bracelets and earrings to make money for summer vacation. The bracelets cost \$2 each and earrings cost \$4 each. She needs to make at least \$500.

$$2X + 4Y \geq 500$$

10. Write an Equation:

A store sold 32 pairs of jeans for a total of \$1050. Brand A sold for \$30 per pair and Brand B sold for \$35 per pair.

$$30x + 35y = 1050$$

11. Is the ordered pair (5,9) a solution to the following linear system?

$$x + y = 14$$

$$-x + 2y = 11$$

No

12. What are the solutions of the following linear systems?

$$y = -x + 7$$

$$-2x + 2y = 6$$

(2,5)

13. Solve the literal equation for h.

$$V = \pi r^2 h$$

$$h = \frac{V}{\pi r^2}$$

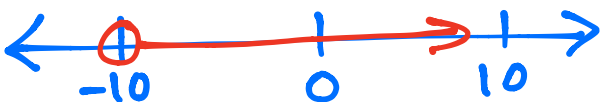
14. Solve the literal equation for y.

$$6w - y = 2z$$

$$y = 6w - 2z$$

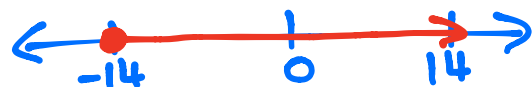
15. Solve and graph: $6x + 12 > 3x - 18$

$$x > -10$$

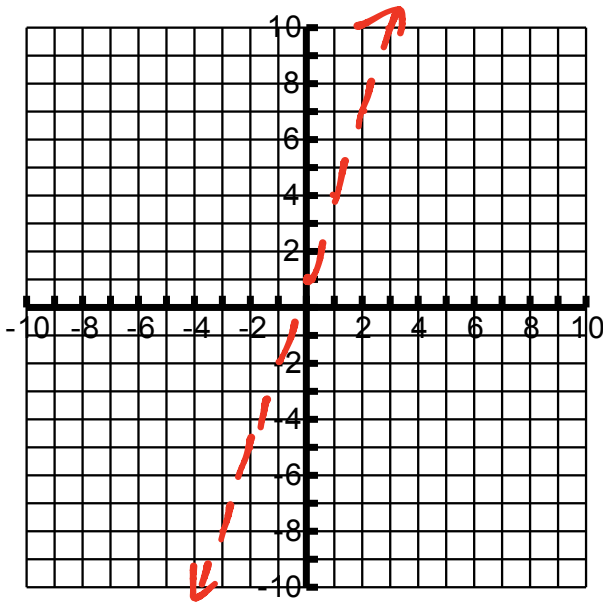


16. Solve and Graph: $-2x + 5 \geq -3x - 9$

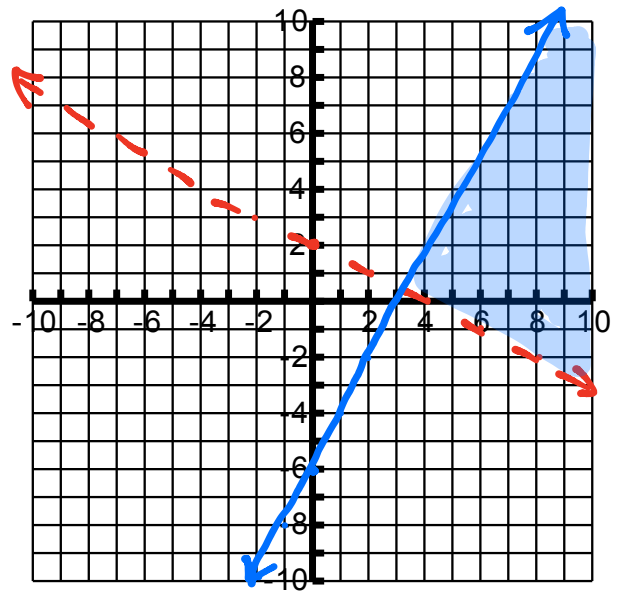
$$x \geq -14$$



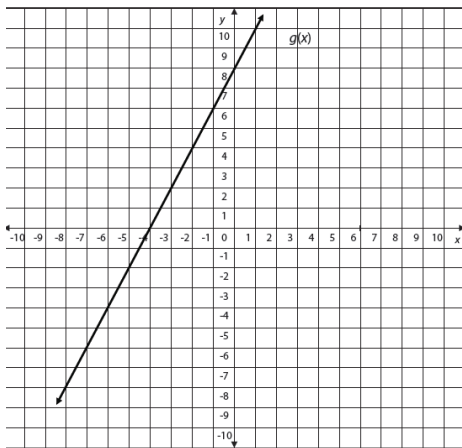
17. Graph: $y < 3x + 1$



18. $x + 2y > 4$
 $2x - y \geq 6$

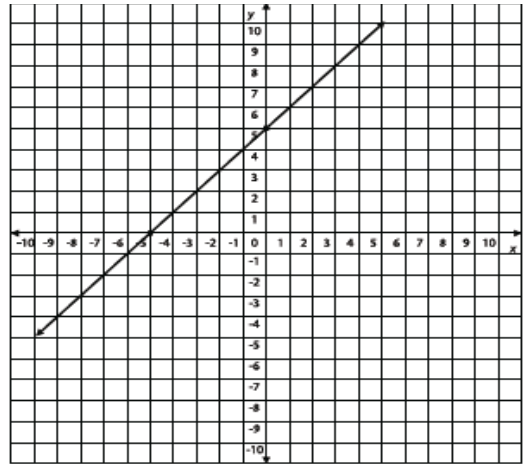


19. Find the rate of change:



2

20. Find the rate of change:



1

21. Find the rate of change:

| x | $f(x)$ |
|-----|--------|
| -2 | 1 |
| 0 | 7 |
| 2 | 13 |
| 4 | 19 |

3

22. If the domain of $f(x) = x + 2$ is $\{0, 3, 6\}$, what is the range of $f(x)$?

$\{2, 5, 8\}$

Unit 3 Quadratics

1. Factor:

$$x^2 + 6x + 5$$
$$(x+1)(x+5)$$

2. Factor:

$$2x^2 + x - 3$$
$$(x-1)(2x+3)$$

3. Solve by factoring:

$$x^2 - 9x + 20 = 0$$

$$x=5 \quad x=4$$

4. Solve by factoring:

$$x^2 - 16 = 0$$

$$x=4 \quad x=-4$$

5. Solve by factoring:

$$6x^2 + 7x = -2$$

$$x = -\frac{1}{2} \quad x = -\frac{2}{3}$$

6. Solve by factoring:

$$2x^2 - 10x - 28 = 0$$

$$x=7 \quad x=-2$$

7. Solve by using square roots:

$$3x^2 = 28$$

$$x = \pm \sqrt{\frac{28}{3}}$$

8. Solve by using square roots:

$$(x + 8)^2 = 16$$

$$x=0 \quad x=-8$$

9. Solve by completing the square:

$$2x^2 - 8x - 10 = 0$$

$$x = -1 \quad x = 5$$

10. Solve by completing the square:

$$3x^2 + 12x - 9 = 0$$

$$x = -2 \pm \sqrt{7}$$

11. Solve by completing the square:

$$x^2 - 5x - 2 = 0$$

$$x = \frac{5}{2} \pm \frac{\sqrt{33}}{2}$$

12. Solve by completing the square:

$$x^2 - 6x + 5 = 0$$

$$x = 5 \quad x = 1$$

13. Solve by using the quadratic formula:

$$3x^2 - 2 = -x$$

$$x = \frac{2}{3} \quad x = -1$$

14. Solve by using the quadratic formula:

$$x^2 - 9 = 0$$

$$x = 3 \quad x = -3$$

15. Solve by using the quadratic formula:

$$-7x^2 - 5x = -1$$

$$x = \frac{5 \pm \sqrt{53}}{-14}$$

16. Solve by using the quadratic formula:

$$x^2 - 4x - 12 = 0$$

$$x = 6 \quad x = -2$$