Algebra 1
Final Exam Solutions

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MATH

Algebra 1 Final Exam Answer Key

1. (5 pts) A ■ C D E

2. (5 pts) A B C D ■

3. (5 pts) ■ B C D E

4. (5 pts) A ■ C D E

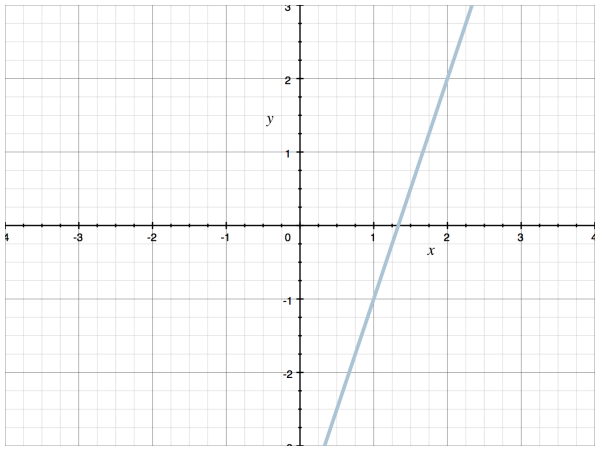
5. (5 pts) A B ■ D E

6. (5 pts) A B C ■ E

7. (5 pts) A B C ■ E

8. (5 pts) A ■ C D E

9. (15 pts)



10. (15 pts) $(6,2)$

11. (15 pts) $x = 4$ and $x = 6$

12. (15 pts) $x = 1$ and $x = -5/2$

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1. B. The Associative Property tells us that, when we add, we can group terms together in any order. The set of parentheses that moves is another clue that it's the Associative Property.

2. E. Plug 5 in for x, 1 in for y, and 2 in for z using parentheses.

$$x^0 + 3(5y - 2x + z^3) - 4y \div 2$$

$$(5)^0 + 3(5(1) - 2(5) + (2)^3) - 4(1) \div 2$$

Simplify using PEMDAS (remember anything raised to the 0 is 1).

$$1 + 3(5 - 10 + 8) - 4 \div 2$$

Simplify the inside of parentheses and the division.

$$1 + 3(-5 + 8) - 2$$

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

Simplify the multiplication and then add and subtract from left to right.

$$1 + 9 - 2$$

$$10 - 2$$

$$8$$

3. A. Distribute the 4 on the left and the negative sign on the right.

$$4(2a-3) = -(4a-15) + 9$$

$$8a - 12 = -4a + 15 + 9$$

Combine like terms.

$$8a - 12 = -4a + 24$$

Add $4a$ to both sides and add 12.

$$8a + 4a - 12 + 12 = -4a + 4a + 24 + 12$$

$$12a = 36$$

Divide both sides by 12.

$$\frac{12a}{12} = \frac{36}{12}$$

$$a = 3$$

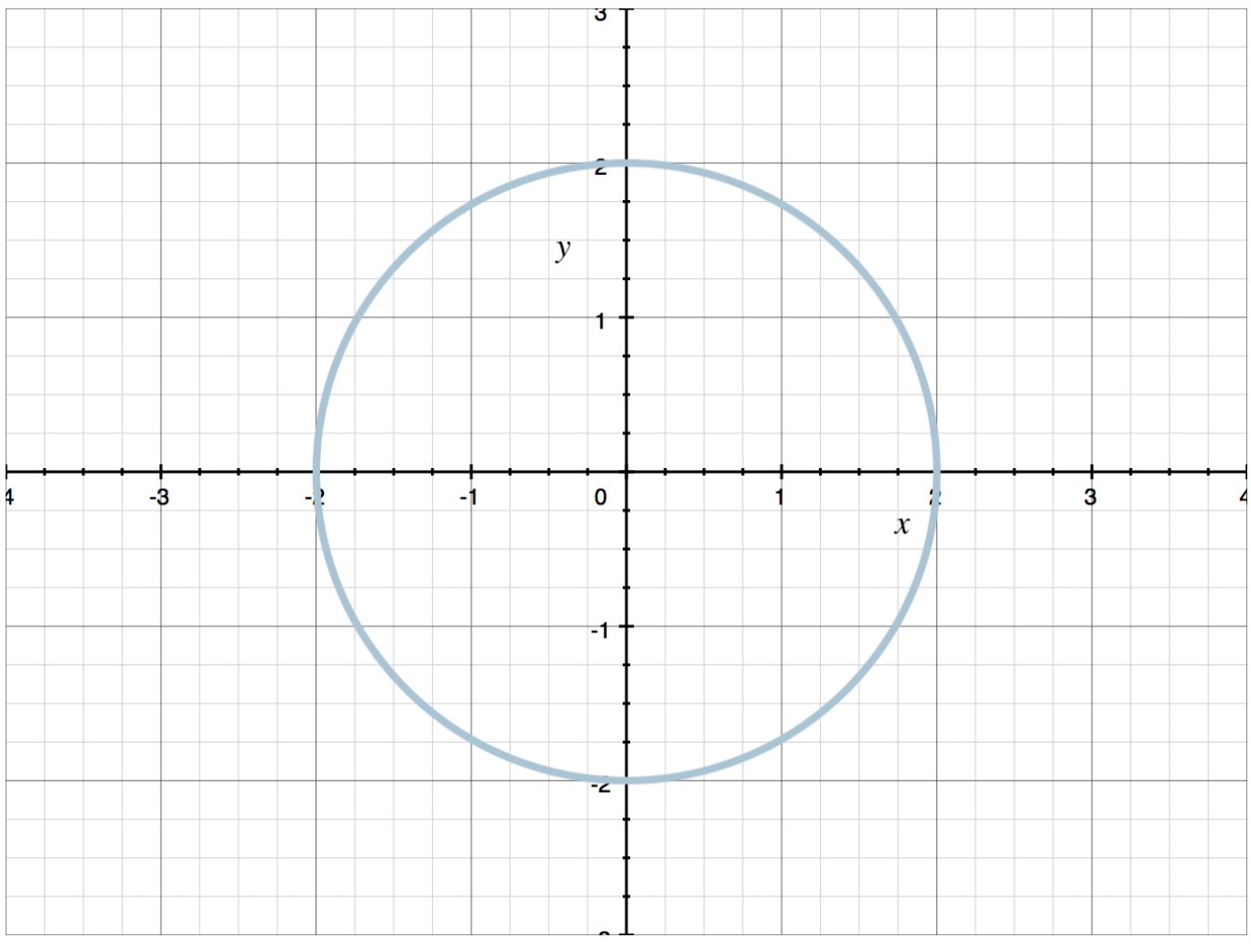
4. B. “Two less than” means that we’ll be subtracting 2 from whatever follows, which in this case is “the product of 3 and a number.” “Product” means to multiply, so we’ll subtract 2 from $3x$. The mathematical translation of this expression is:

$$3x - 2$$

5. C. You can plug any x-value into the function $f(x) = 3/x$, except for 0, because dividing by 0 is undefined. Therefore the domain goes from $-\infty$ to 0 and from 0 to ∞. Since 0 is not included, we use parentheses instead of brackets, and the domain is:

$$(-\infty,0) \cup (0,\infty)$$

6. D. All of the graphs pass the Vertical Line Test and are functions, except for answer choice D. That graph is a circle and isn't a function because it fails the Vertical Line Test. A vertical line anywhere inside the circle will pass through the circle at two points.



7. D. Subtract 5 from both sides of the inequality.

$$5 - 2x \geq 11$$

$$5 - 5 - 2x \geq 11 - 5$$

$$-2x \geq 6$$

Divide both sides by -2 and, since we're dividing by a negative, remember to switch the direction of the inequality from $\geq$ to $\leq$.

$$\frac{-2x}{-2} \leq \frac{6}{-2}$$

$$x \leq -3$$

8. B. Expand using the FOIL method.

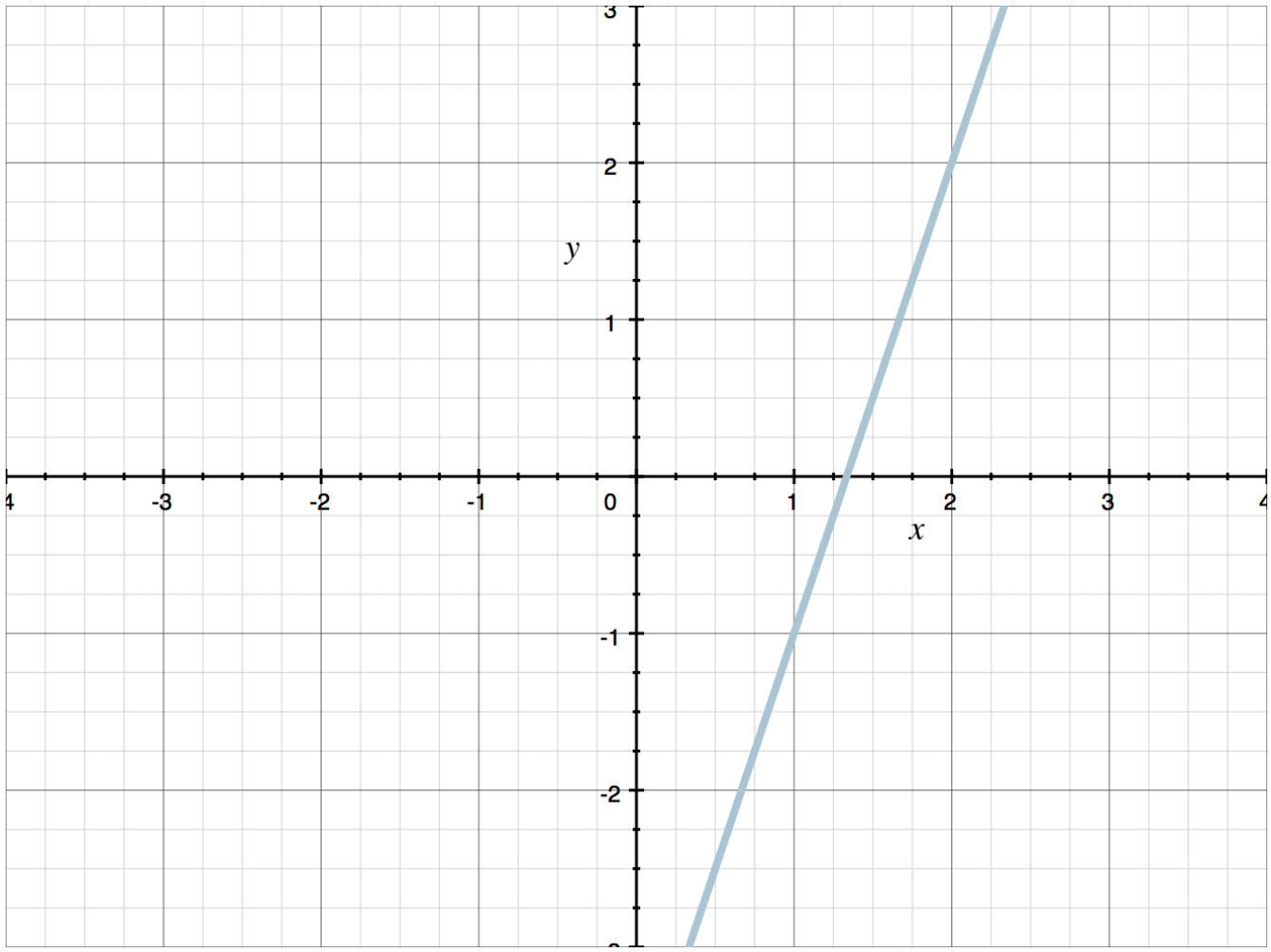
$$(x - 2)(x + 4)$$

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

$$x^2 + 2x - 8$$

9. Draw the x and y-axis and make sure to label tick marks and axes. The y-intercept for $y = 3x - 4$ is -4, so put a point on the y-axis at -4. The slope is $3/1$, which means from the y-intercept you need to go up 3 units and to the right 1 unit to find the next point on the graph.

Find one more point using the slope and draw a straight line that goes through the points and extends past them.



10. You can solve using substitution. Substitute $12 - 3y$ for x into the first equation and solve for y.

$$2x - 3y = 6$$

$$2(12 - 3y) - 3y = 6$$

$$24 - 6y - 3y = 6$$

$$24 - 9y = 6$$

$$24 - 24 - 9y = 6 - 24$$

$$-9y = -18$$

$$y = 2$$

Plug $y = 2$ into the second equation and solve for x.

$$x = 12 - 3(2)$$

$$x = 12 - 6$$

$$x = 6$$

The single solution is the point $(6,2)$.

11. Find the factors of 24 that add to be -10. Both factors will be negative.

$$-24 + -1 = -25$$

$$-12 + -2 = -14$$

$$-8 + -3 = -11$$

$$-6 + -4 = -10$$

Since $-6 + -4 = -10$, the factors of $x^2 - 10x + 24$ are

$$(x - 6)(x - 4)$$

Set each factor equal to 0 and solve for x.

$$x - 6 = 0$$

$$x = 6$$

and

$$x - 4 = 0$$

$$x = 4$$

The solutions are $x = 4$ and $x = 6$.

12. Use the quadratic formula to find the solutions. In this problem, $2x^2 + 3x - 5 = 0$, $a = 2$, $b = 3$, and $c = -5$.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-3 \pm \sqrt{3^2 - 4(2)(-5)}}{2(2)}$$

$$x = \frac{-3 \pm \sqrt{9 + 40}}{4}$$

$$x = \frac{-3 \pm \sqrt{49}}{4}$$

$$x = \frac{-3 \pm 7}{4}$$

Take each solution separately and simplify it.

$$x = -\frac{3}{4} + \frac{7}{4}$$

$$x = \frac{7 - 3}{4}$$

$$x = \frac{4}{4}$$

$$x = 1$$

and

$$x = -\frac{3}{4} - \frac{7}{4}$$

$$x = \frac{-3 - 7}{4}$$

$$x = -\frac{10}{4}$$

$$x = -\frac{5}{2}$$

The solutions are $x = 1$ and $x = -5/2$.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