Math 9 Final Exam review – part 1

1. Which value is equivalent to $\frac{-3}{-8}$?

a) $\frac{-3}{8}$ b) $-\frac{3}{8}$ c) $\frac{3}{-8}$ d) $\frac{3}{8}$

2. Which of these rational numbers are equivalent?

A: -4.2 B: -2.4 C: $-\frac{42}{10}$ D: $\frac{24}{10}$

a) A, C and D b) A and C c) A and D d) A and B

3. Which set of numbers is arranged in order from least to greatest?

a) $\frac{-11}{5}, \frac{-11}{-5}, -2\frac{2}{5}$ b) $\frac{-11}{-5}, \frac{-11}{5}, -2\frac{2}{5}$

c) $-2\frac{2}{5}, \frac{-11}{5}, \frac{-11}{-5}$ d) $-2\frac{2}{5}, \frac{-11}{-5}, \frac{-11}{5}$

4. Which sum or difference is about +16?

a) -2.3 - 18.4 b) 14.1 + -2.1

c) -4.1 - (-19.8) d) 23.98 + (-8.9)

5. What is the value of: $(2.4-5.7)\times[-5.1-(-1.8)]+0.2$

a) 16.23 b) 17.23 c) 17.83 d) 11.09

6. A square floor mat has a side length of 15 m. What is the area of the mat as a power?

a) 15^2 m^2 b) 15^3 m^3 c) 15^2 m^3 d) 2^{15} m^2

7. Determine the area of one face of a cube with a side length of 16 cm.

a) 4 cm^2 b) 256 cm^3 c) 256 cm^2 d) 64 cm^3

8. Which power does NOT represent 256?

a) 2^8 b) 4^4 c) 8^3 d) 16^2

9. Which statement is true?

a) $3.1^3 = 3.1 \times 3.1 \times 3.1$ b) $(-1)^6 = -1$

c) $-3^3 = (3)(3)(3)$ d) $-6^2 = 36$

10. Evaluate: $(-5)^4$

a) -625 b) -20 c) 625 d) -54

11. Simplify: $(2^2 \times 4^2)^3$

a) 4^{18} b) 2^{18} c) 2^{21} d) 2^{24}

12. Simplify: $\left(\frac{5^6}{5^2}\right)^4$

a) 5^{16} b) 5^{12} c) 5^{24} d) 5^5

13. Evaluate: $\sqrt{\frac{121}{256}}$

a) $\frac{11}{16}$ b) $\frac{121}{256}$ c) $\frac{14641}{65536}$ d) $\frac{16}{11}$

14. Express $\sqrt{\frac{15}{90}}$ to two decimal places

a) 0.17 b) 0.41 c) 0.08 d) 2.45

15. Between which two whole number does $\sqrt{29.3}$ lie?

a) 25 and 30 b) 10 and 20 c) 5 and 6 d) none of these

Short answer:

1. Where is $\frac{-18}{4}$ found on a number line? -3.2?

2. Which value is farther from zero: $-5\frac{1}{2}$ or 5.2? How do you know?

3. List three rational numbers between $-3\frac{1}{4}$ and $\frac{-27}{8}$

4. Use >, < or = to make true statements:

a) $\frac{-2}{7} \_\_\_\_ \frac{-1}{4}$ b) $\frac{3}{5} \_\_\_\_ \frac{2}{3}$ c) $-2\frac{1}{4} \_\_\_\_ -\frac{9}{4}$

5. Calculate:

a) $\frac{2}{5} - \left(-3\frac{1}{3}\right)$ b) $\frac{-6}{5}\left(\frac{3}{8}\right)\left(\frac{-10}{-9}\right)$ c) $4\frac{2}{7} \div \frac{6}{5}$

d) 3.2(-4.1) ÷ 2 + (3.4 x 3) e) $-3\frac{1}{5}+\frac{-4}{3}+4.5$ f) $5\frac{1}{3}-\left(2\times4\frac{1}{2}\right)+\frac{8}{3}\div2$

6. A rational number with a denominator of 9 is divided by $\frac{-2}{3}$. The result is multiplied by $\frac{4}{5}$ and then $\frac{-5}{6}$ is added. The final value is $\frac{1}{10}$. What was the original rational?

7. The difference between two rational numbers is $\frac{3}{5}$. The sum is $\frac{1}{3}$. What are the rational numbers?

8. How many perfect squares are there under 500? How many perfect cubes?

9. Evaluate each power:

-2^3 $(-3)^4$ -6.2^2 $(-2)^3$ -3^4

10. Arrange from largest to smallest:

-2^4 $(-2)^4$ $-(-2^2)$ $(-1)^{100}$ $(-1)^{31}$

11. Determine the exponent that makes each statement true:

$2^6 = 4^{\square}$ $6^6 = 216^{\square}$ $27^4 = 3^{\square}$

12. Express each as a power with a single exponent:

$10^6\,(10^7)$ $\frac{12^5}{12^3}$ $(6^3)^5 \div (6^2)^4$

$(3^4)^2(3^3)$ $\frac{(8^3)^2}{8^5}$ $\left(\frac{10^6}{10^2}\right)^3$

13. Express as a product or quotient of two powers

a) $(2 \times 3)^4$ b) $(3^2 \times 5^4)^3$ c) $\left(\frac{2}{3}\right)^6$ d) $\left(\frac{3^3}{7^2}\right)^2$

14. Express as a power with a single base:

a) 2×4 b) $(3^2 \times 9)^3$ c) $\left(\frac{5^2}{5}\right)^4$

15. Evaluate:

$4^3 + 3^2 \times 2^2 \div 2$ $7^2 \div \sqrt{4} - 4^2 \times 2^0$

16. Determine the square root for each to two decimal places:

$\sqrt{2.56}$ $\sqrt{0.81}$ $\sqrt{\frac{1}{4}}$ $\sqrt{0.04}$ $\sqrt{\frac{9}{25}}$

17. The area of a square is 36.5 cm^2. What is the length of the side of the square?

18. Which of these are perfect squares? 0.49, 4.9 or 0.0049 . Explain how you know.

Thinking:

1. If you were describing rational numbers to someone without just repeating the definition, what is the most important thing you could say to help them quickly understand what rational numbers are?

2. If you can order integers and you can order fractions, you have all the skills needed to order rational numbers. Agree or disagree?

3. Create a brief "instructional manual" to help someone with the rules for multiplying and dividing rational numbers

4. How do you place a negative rational on a number line?

5. How can you determine whether one rational number is greater than the other?

6. Why is it essential that the rules for order of operations for rational numbers be the same as the order of operations for integers?

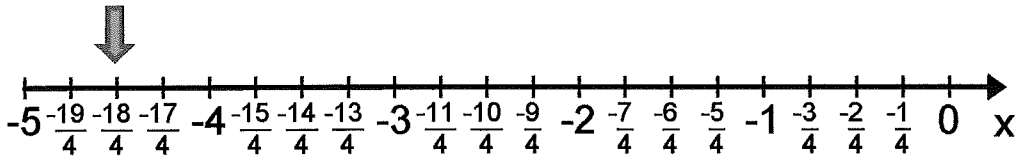
7. How can you model perfect squares and cubes?

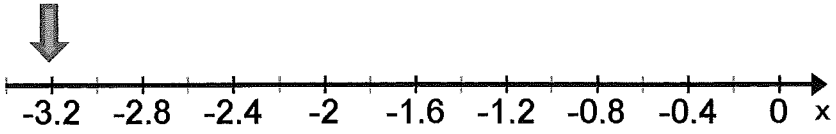
Answers:

1. D	6. A	11. B
2. B	7. C	12. A
3. C	8. C	13. A
4. C	9. A	14. B
5. D	10. C	15. C

Short ANSWER

1.

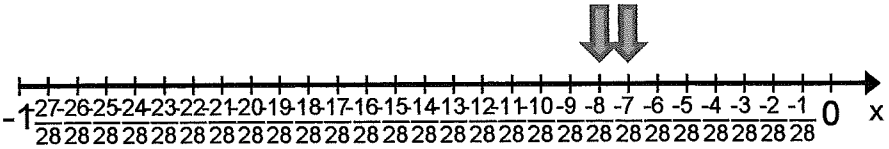




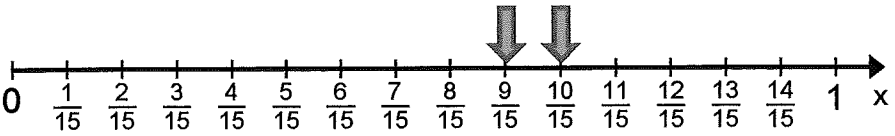
2. -5 ½ or -5.5 is bigger because it is further away from zero

3. $\frac{-53}{16}, \frac{-79}{24}, \frac{-80}{24}$ OR -3.26, -3.27. -3.28 etc...

4. a) $\frac{-2}{7} < \frac{-1}{4}$



b) $\frac{3}{5} < \frac{2}{3}$



c) $-2\frac{1}{4} = -\frac{9}{4}$

5. a) $a) \frac{56}{15} or 3\frac{11}{15}, b) -\frac{1}{2}, c) \frac{25}{7} or 3\frac{4}{7}, d) 3.64, e) -\frac{1}{30}, f) -\frac{7}{3} or -2\frac{1}{3}$

6. the numerator is -7

7. the two rational numbers are $\frac{7}{15} and \frac{2}{15}$

8. 22 perfect squares and 7 perfect cubes

9. -8, 81, -38.44, -81

10. Largest: $(-2)^4$, $-(-2^2)$, $(-1)^{100}$, $(-1)^{31}$, -2^4

11. 4^3, 216^2, 3^{12}

12. 10^{13}, 12^2, 6^7, 3^{11}, 8^1, 10^{12}

13. $2^4 \times 3^4$, $3^6 \times 5^{12}$, $\frac{2^6}{3^6}$, $\frac{3^6}{7^4}$

14. 2^3, 3^{12}, 5^4

15. 82, 8.5

16. 1.60, 0.90, 0.50, 0.20, 0.60

17. 6.04 m

18. 0.49 and 0.0049 are perfect squares

Math 9 Final exam review – part 2

Multiple choice

1. What is the value of $9a - 3ab + b^2$ when a = 5 and b = -3 ?

a. 9 b. -9 c. 84 d. 99

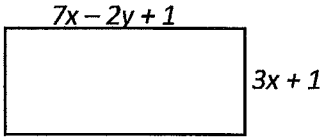
2. Which is not a polynomial?

a. $x - 5$ b. $\frac{1}{x}$ c. $5x$ d. $3x - 2y + 7$

3. What is the simplified form of $5x^2 + x - 3x^2 + 2x - y$?

a. $8x^2 + 2x - y$ b. $4x^2y$ c. $2x^2 + 3x - y$ d. $2x^2 + 2x - y$

4. What expression represents the perimeter of this rectangle?



a. $20x - 4y + 4$ b. $20x - 4y + 2$

c. $10x - 2y + 2$ d. $10xy$

5. What is the sum of $6x^2 + 4x + 3xy - 7$ and $-6xy + 3x^2 + 5$?

a. $13x^2 - 3xy - 2$ b. $9x^2 + 4x + 9xy + 12$ c. $13x^3 - 3x^2y^2 - 2$ d. $9x^2 + 4x - 3xy - 2$

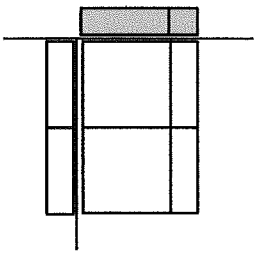
6. Which expression is equivalent to: $(3x^2 + 7x - 9) - (5x^2 + 4x + 5)$

a. $-2x^2 + 11x - 4$ b. $-2x^2 + 3x - 14$ c. $2x^2 + 3x - 14$ d. $2x^2 - 3x + 4$

7. Determine the missing polynomial if $\square \div 5 = 10x + 20$

a. $2x + 4$ b. $50x + 100$ c. $2x + 100$ d. $50x + 4$

8. What product does the model at the right show?



a. $2x(x - 1)$ b. $-2x(1 - x)$

c. $-2x(x + 1)$ d. $-2x(x - 1)$

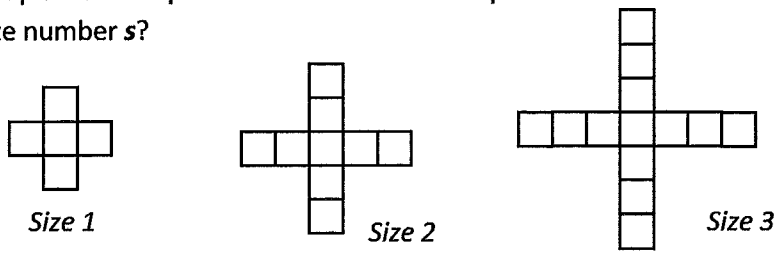
9. $(16y^2 - 8xy + 6y) \div 2y$ is:

a. $14y^2 - 4xy + 3$ b. $8y^3 - 4xy + 3$ c. $8y - 4x + 3$ d. $14y - 6x + 3$

10. Which of these products are equivalent?

a. $4(3x^2 - 2x - 1)$ b. $2(6x^2 - x - 2)$ c. $4x(3x - 2 - 1)$ d. $2(6x^2 - 4x - 2)$

11. The pattern of squares continues. Which equation below relates the number of squares, ***n***, to the size number ***s***?



a) $n = s + 4$ b) $n = 4s$ c) $n = 4s + 1$ d) $s = 4n$

12. Assuming the pattern 5, 7, 9, 11, ... continues, which equation best describes the pattern?

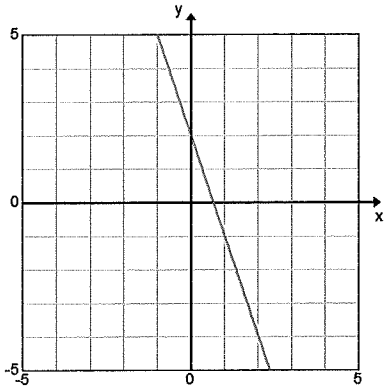
a. $y = 4x + 1$ b. $x = 2y + 3$ c. $y = x + 2$ d. $y = 2x + 3$

13. Which pattern can be described by the equation $y = 5x - 1$?

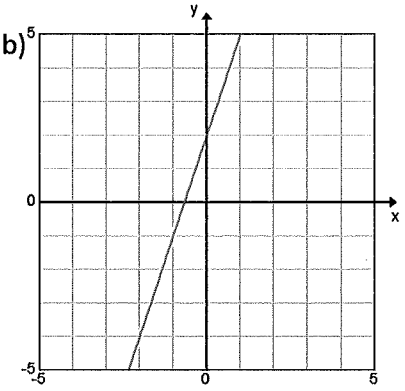
a. 0, 5, 10, 15 b. 4, 9, 14, 19 ... c. 5, 4, 3, 2 ... d. 4, 9, 13, 18 ...

14. Which graph represents the linear relation $y = -3x + 2$

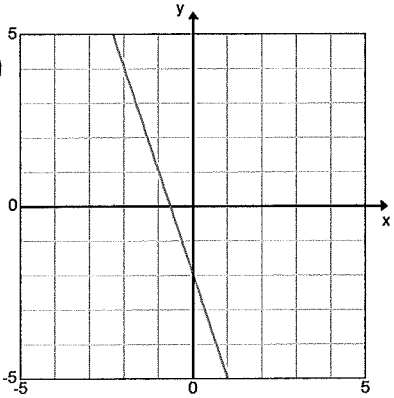
a)



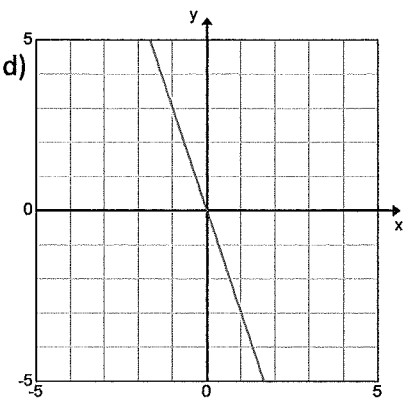
b)



c)

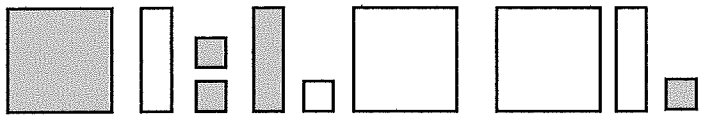


d)



Short answer:

1. Write the simplified polynomial for each set of algebra tiles:

a. 

b. 

2. For the polynomial, state its degree, the coefficient of the x term, and the constant: $3x^2 - 7x + 9$

3. Write a polynomial that has a degree of 2, a constant of 5 and a coefficient of -4

4. Model each polynomial. Gather like terms and simplify

a) $6x + 3x^2 + 2 - x^2 - 5x$

b) $(5x^2 - 4x + 7) + (-x^2 + 2x - 3)$

c) $9x + 3y + x^2 - (-2x^2 + y - 3x)$

d) $(3x^2 - 1) + (4x + 7) - (2x^2 - 5x)$

e) $5(3y - 6)$

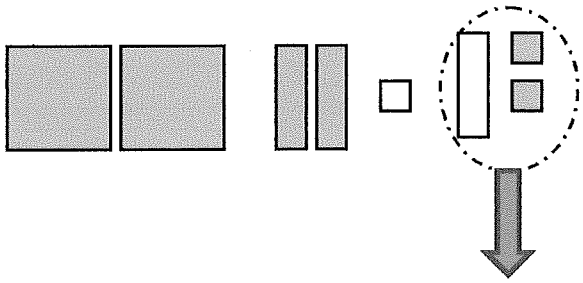
f) $-x(4x + 2)$

g) $3x(x - 4)$

h) $(4x^2 - 2x) \div x$

i) $(6x - 9) \div 3$

5. What is the polynomial subtraction that is being modeled?



6. List all of the simplified second degree polynomials that you can model with three algebra tiles.

7. The product of a monomial and a polynomial is $8x^2 + 6x$. What could the monomial and polynomial have been? Can you come up with other possibilities?

8. Make a table of values for the figure number and the number of toothpicks in a figure.

a) What is the expression for the number of toothpicks?

b) How many toothpicks are needed in the 20th figure?

c) Which figure number uses 63 toothpicks?

9. The cost to print brochures is the sum of a fixed cost of $250, plus $1.25 per brochure.

a) Write an equation that relates the total cost in dollars to the number of brochures.

b) What is the cost of printing 2500 brochures?

c) How many brochures can be printed for $625?

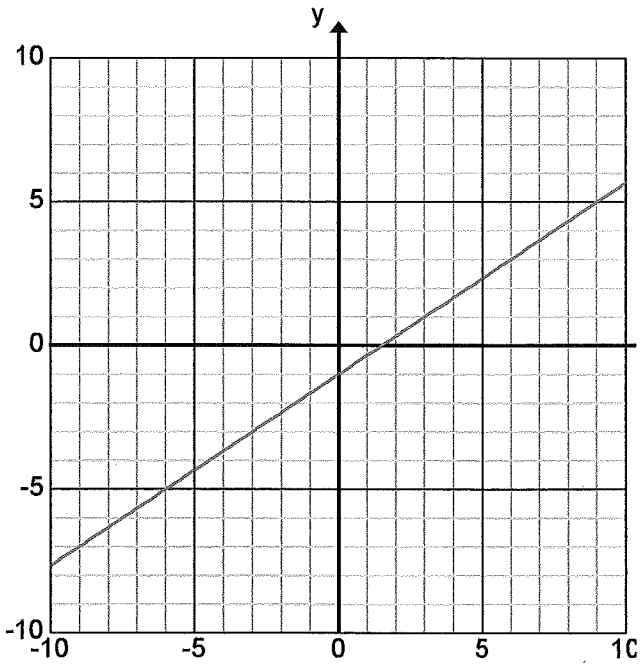
10. Each table represents a linear relation. Fill in the missing numbers and write an equation for each relation.

X	Y
1	6
2	-2
3	-10
4	

X	Y
1	
2	5
3	8
4	

X	Y
2	5
4	
6	-3
10	

11. Answer the following questions based on the graph to the right:
    a) What is the value for y when x = 3?
    b) What is the value for x when y = -5?
    c) What is the value for y when x = 12?



Thinking:

1. Bill said that y and y^2 are like terms since they both use a y. Do you agree? Explain.

2. Sketch a rectangle that would have
   a) a perimeter of $12x + 8$ b) the area of $3x^2 - 2x$

3. List a pair of second degree polynomials that have a difference of $5y^2 - xy + 7$

4. Explain why you combine only like terms when you add or subtract polynomials.

5. How is working with polynomials connected to your understanding of rational numbers and exponents? Explain and provided specific examples.

6. How can you determine if a pattern or situation represents a linear relation?

7. Why might you use a graph to extrapolate or interpolate, instead of using an algebraic equation or a table of values?

Part 2

Multiple Choice

1. D
2. B
3. C
4. A
5. D
6. B
7. B
8. C
9. C
10. A and D
11. C
12. D
13. B
14. A

Short Answer

1. a) $x^2 - x + 2 + x - 1 - 2x^2 - x + 1$

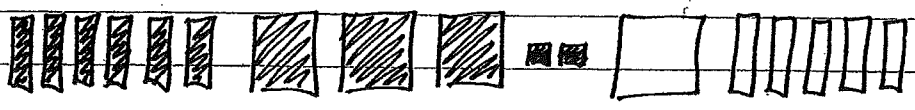
   → $-x^2 - x + 2$

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

   → $-2x^2 + 2x + 1$

2. degree = 2, constant = 9, coefficient on $x = -7$

3. $-4x^2 + x + 5$ or $x^2 - 4x + 5$

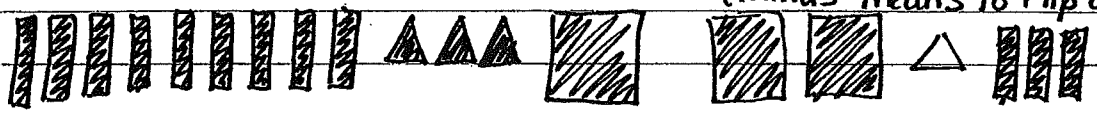
4. a) 

   → $2x^2 + x + 2$

b) $\underbrace{5x^2 - x^2}\ \underbrace{-4x + 2x}\ \underbrace{+7 - 3}$

$4x^2 - 2x + 4$

c) (minus means to flip over)



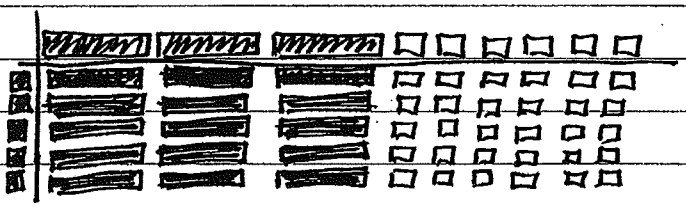
$12x + 2y + 3x^2$ or $3x^2 + 12x + 2y$

d) $3x^2 - 1 + 4x + 7 - 2x^2 + 5x$

$\underbrace{3x^2 - 2x^2} + \underbrace{4x + 5x}\ \underbrace{-1 + 7}$ collect like terms

$x^2 + 9x + 6$

e)



Area of a rectangle

$15y - 30$

f) $-x(4x + 2)$ distributive law

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

$-4x^2 + -2x$

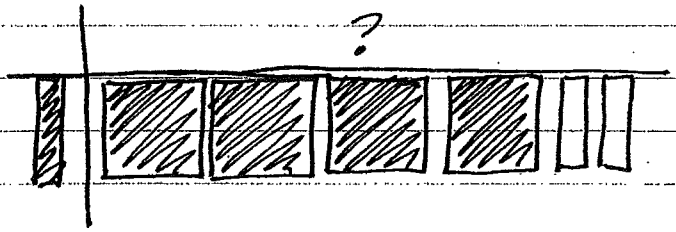
or $-4x^2 - 2x$

exponent laws $(-x')(4x')$

g) $3x(x - 4)$

$3x^2 - 12x$

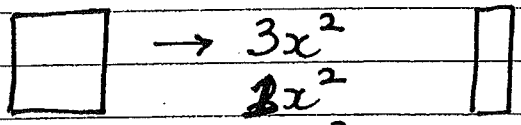
h)



$= 4x - 2$

i) $\frac{6x - 9}{3} \rightarrow \frac{6x}{3} - \frac{9}{3} \rightarrow 2x - 3$

5. $2x^2+2x-1-(-x+2)$

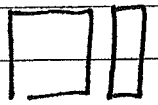
6. 

$3x^2$ $3x$ 3

$2x^2$ x $+1$

$-3x^2$ $-x$ -1

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



$2x^2+x$

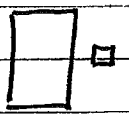
x^2+2x

$-2x^2+x$

$2x^2-x$

$-x^2+2x$

$-x^2-2x$



$2x^2+1$

x^2+2

$-2x^2+1$

$-2x^2-1$

$2x^2-1$

x^2-2

$-x^2-2$

$-x^2+2$

x^2+x+1

x^2-x+1

x^2-x-1

$-x^2+x+1$

$-x^2-x+1$

$-x^2-x-1$

7. $(\underline{\text{mono}})\cdot(\underline{\text{poly}}) = 8x^2+6x$

$2(4x^2+3x)$ Many answers.

or $2x(4x+3)$

8.

#	toothpicks
1	3
2	5
3	7

a) $t = 2n+1$

↑ toothpicks ↑ picture number.

b) $t = 2(20)+1 = 41$

c) $63 = 2n+1$

$-1 \quad -1$

$62 = 2n$

$n = 31^{st}$ figure

9. a) $C = 250 + 1.50n$

b) $C = 250 + 1.50(2500)$

$= 250 + 3750$

$C = \$4000$

c) $625 = 250 + 1.50n$

$-250 \quad -250$

$\frac{375}{1.50} = \frac{1.50n}{1.50}$

$250 = n$

10.

1	6	−8
2	−2	−8
3	−10	−8
4	(−18)	

1	(2)	−3
2	5	+3
3	8	+3
4	(11)	

	2	5	
+4	4	(+1)	−4
	6	−3	−8
+4	10	(−11)	

11. a) $x = 3$ then $y = 1$

b) $y = -5$ then $x = -6$

c) $x = 12$ then $y = (7)$

x	y	
0	−1	
3	1	+2
6	3	+2
9	5	+2
12	7	

(+3 from 3 to 6, +3 from 6 to 9)

"nice" points

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

$\frac{2}{3}(12) - 1$

$8 - 1$

7