

Algebra 1 – Unit 8 Study Packet

Adding, Subtracting, Multiplying, Dividing Polynomials

Skill #1 – Adding Polynomials

1. What is the solution to the following expression?
 $(4x^2 - 8) + (6x^2 + 5)$

$$\boxed{10x^2 - 3}$$

2. Which expression represents the sum of
 $(5x^2 - 7x + 4) + (x^2 + 8x - 10)$

$$\boxed{6x^2 + x - 6}$$

3. Which expression represents the sum of
 $(8x - 2x^2 - 5) + (3x^2 + x + 9)$

$$\boxed{x^2 + 9x + 4}$$

4. What is the solution to the following expression?
 $(4y^2 + 10y - 1) + (8y^2 + 11)$

$$\boxed{12y^2 + 10y + 10}$$

- Skill #1 Determine sum of polynomials.
 Need more practice (IXL – Z.4)

Skill #2 – Subtracting Polynomials

5. What is equivalent to
 $(8x^2 - 2x + 4) - (9x^2 - 6x + 1)$

$$8x^2 - 2x + 4 - 9x^2 + 6x - 1$$

$$\boxed{-x^2 + 4x + 3}$$

6. Which expression represents the difference of
 $(6x - 9x^2 + 12) - (7x - 1)$?

$$6x - 9x^2 + 12 - 7x + 1$$

$$\boxed{-9x^2 - x + 13}$$

7. What expression represents the difference of
 $(10x^2 + 8) - (-4x^2 + 11x)$?

$$10x^2 + 8 + 4x^2 - 11x$$

$$\boxed{14x^2 - 11x + 8}$$

8. What is equivalent to
 $(y^2 + 3y - 8) - (6y^2 + 8y + 14)$

$$y^2 + 3y - 8 - 6y^2 - 8y - 14$$

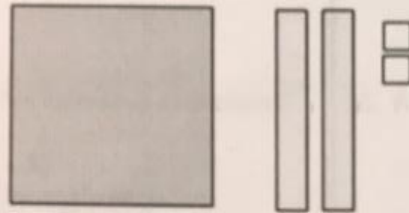
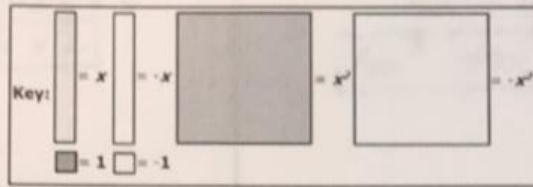
$$\boxed{-5y^2 - 5y - 22}$$

- Skill #2 Determine differences of polynomials.
 Need more practice (IXL – Z.4)

Skill #3 – Modeling Polynomials

9. What polynomial is shown in the following model?

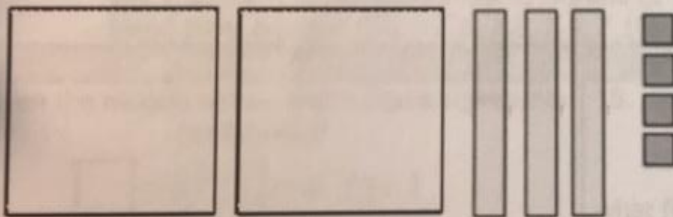
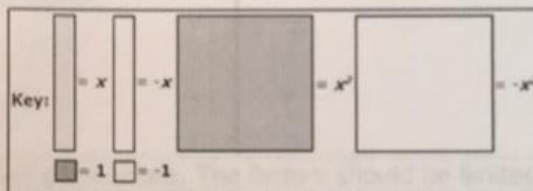
Look at model.



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

10. What polynomial is shown in the following model?

Look at model.



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

- Skill #3 Model sums and differences polynomials with concrete objects and their related pictorial and symbolic representations.
 Need more practice (IXL – Z.2, Z.3)

Skill #4 – Multiplying Polynomials

11. What is equivalent to the following expression?

$$4x(x^2 + 9)$$

$$\boxed{4x^3 + 36x}$$

12. What is equivalent to the following expression?

$$-8x(2x^2 - 3x)$$

$$\boxed{-16x^3 + 24x^2}$$

13. What is equivalent to the following expression?

$$(6x - 2)(3x - 1)$$

$$18x^2 - 6x - 6x + 2$$

$$\boxed{18x^2 - 12x + 2}$$

14. What is equivalent to the following expression?

$$(x - 7)(6x^2 + x - 10)$$

$$6x^3 + 2x^2 - 10x - 42x^2 - 7x + 70$$

$$\boxed{6x^3 - 40x^2 - 17x + 70}$$

15. What is equivalent to the following expression?

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

$$(3x - 4)(3x - 4)$$

$$9x^2 - 12x - 12x + 16$$

$$\boxed{9x^2 - 24x + 16}$$

16. What is equivalent to the following expression?

$$(y + 4)(4y - 9)$$

$$4y^2 - 9y + 16y - 36$$

$$\boxed{4y^2 + 7y - 36}$$

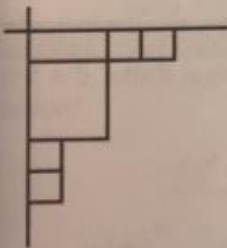
- Skill #4 Determine products of polynomials. The factors should be limited to five or fewer terms (i.e., $(4x + 2)(3x + 5)$ represents four terms and $(x + 1)(2x^2 + x + 3)$ represents five terms).
 Need more practice (IXL - Z.6, Z.8, Z.9, Z.10)

Skill #5 - Modeling Polynomial Multiplication and Division

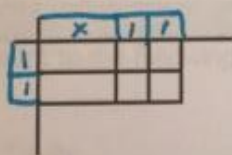
17. Given the models below, which figure represents $(x+2)(x+2)$?

$$\square = x^2 \quad \square = x \quad \square = 1$$

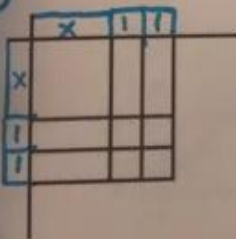
A



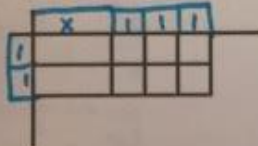
B



C



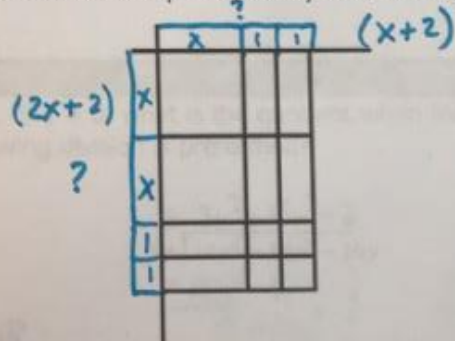
D



18. Given the models

$$\square = x^2 \quad \square = x \quad \square = 1$$

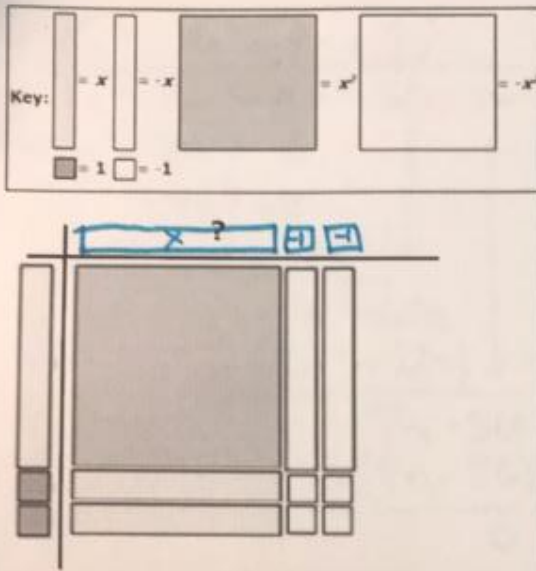
what factors are represented by the following figure?



- A $(2x + 2)(2x + 2)$
 B $(2x - 2)(2x - 2)$
 C $(2x + 2)(x + 2)$
 D $(2x - 2)(x - 2)$

19.

Look at model.

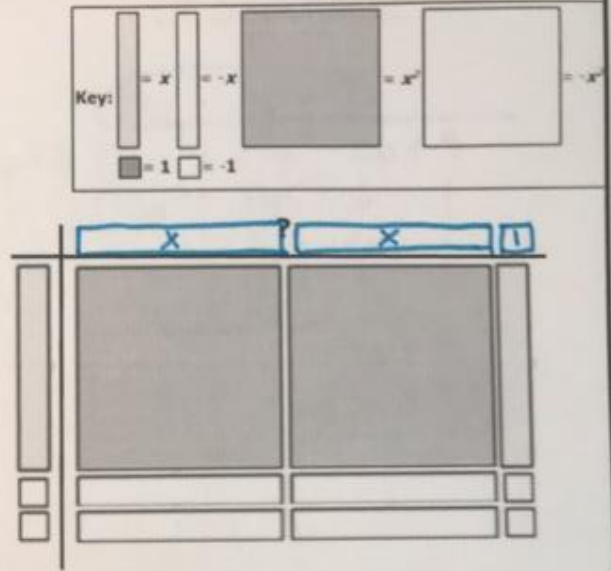


Which expression completes the model?

- A $2x + 2$
- B $x^2 - 4$
- C $x^2 - 2$
- D $x - 2$

20.

Look at model.



Which expression completes the model?

- A $2x + 1$
- B $2x^2 - 3x - 2$
- C $2x^2 - 4x - 2$
- D $2x - 1$

Skill #5 Model products and quotients of polynomials with concrete objects and their related pictorial and symbolic representations.
 Need more practice (IXL -Z.7)

Skill #6 - Dividing Polynomials

21. If $x \neq 0$, which is equivalent to the following expression?

$$\frac{-6x^6 - 3x^3 + 9x}{3x}$$

$$= \frac{-6x^6}{3x} + \frac{-3x^3}{3x} + \frac{9x}{3x}$$

$$= -2x^5 - x^2 + 3$$

22. If $y \neq 0$, what is the quotient when the following division is performed?

$$\begin{array}{r} 3y^3 + 4y^2 - 2 \\ 5y \overline{) 15y^4 + 20y^3 - 10y} \\ \underline{-15y^4} \\ 0 + 20y^3 \\ \underline{20y^3} \\ 0 - 10y \end{array}$$

-OR-

$$\frac{15y^4 + 20y^3 - 10y}{5y} = \frac{15y^4}{5y} + \frac{20y^3}{5y} - \frac{10y}{5y}$$

$$= 3y^3 + 4y^2 - 2$$

23. What equals

$$(n^4 - 17n^3 + 81n^2 - 65n - 56) \div (n - 8)?$$

$$\begin{array}{r} \overline{)n^3 - 9n^2 + 9n + 7} \\ n-8 \overline{)n^4 - 17n^3 + 81n^2 - 65n - 56} \\ \underline{-(n^4 - 8n^3)} \downarrow \\ -9n^3 + 81n^2 \downarrow \\ \underline{-(-9n^3 + 72n^2)} \downarrow \\ 9n^2 - 65n \downarrow \\ \underline{-(9n^2 - 72n)} \downarrow \\ 7n - 56 \downarrow \\ \underline{-(7n - 56)} \\ 0 \end{array}$$

24. Look at the expression. What is the solution?

$$\frac{10p^3 + 27p^2 - 6p + 9}{p + 3}$$

$$\begin{array}{r} \overline{)10p^2 - 3p + 3} \\ p+3 \overline{)10p^3 + 27p^2 - 6p + 9} \\ \underline{-(10p^3 + 30p^2)} \downarrow \\ -3p^2 - 6p \downarrow \\ \underline{-(-3p^2 - 9p)} \downarrow \\ 3p + 9 \downarrow \\ \underline{-(3p + 9)} \\ 0 \end{array}$$

25. Solve, if $a \neq 2$:

$$(a^3 + 8a - 24) \div (a - 2)$$

$$\begin{array}{r} \overline{)a^2 + 2a + 12} \\ a-2 \overline{)a^3 + 0a^2 + 8a - 24} \\ \underline{-(a^3 - 2a^2)} \downarrow \\ 2a^2 + 8a \downarrow \\ \underline{-(2a^2 - 4a)} \downarrow \\ 12a - 24 \downarrow \\ \underline{-(12a - 24)} \\ 0 \end{array}$$

26. What equals

$$(2x^4 - 22x^3 + 12x + 5) \div (2x + 2)?$$

$$\begin{array}{r} \overline{)x^3 - 12x^2 + 12x - 6 + \frac{17}{2x+2}} \\ 2x+2 \overline{)2x^4 - 22x^3 + 0x^2 + 12x + 5} \\ \underline{-(2x^4 + 2x^3)} \downarrow \\ -24x^3 + 0x^2 \downarrow \\ \underline{-(-24x^3 - 24x^2)} \downarrow \\ 24x^2 + 12x \downarrow \\ \underline{-(24x^2 + 24x)} \downarrow \\ -12x + 5 \downarrow \\ \underline{-(-12x - 12)} \\ 17 \end{array}$$

Skill #6

- Determine the quotient of polynomials, using a monomial or binomial divisor, or a completely factored divisor.
- Need more practice (IXL - GG.5)