

Name _____

Block _____

Date _____

Factoring Polynomials Study Guide (SEMESTER)

Factor each polynomial completely. You must show ALL work to earn ALL credit.

<p>1. $\frac{24x^2}{4} - \frac{54y^2}{6}$ $6(4x^2 - 9y^2)$ $6(2x+3y)(2x-3y)$</p>	<p>2. $\frac{3x^5}{3x^3} - \frac{39x^4}{3x^3} + \frac{90x^3}{3x^3}$ $3x^3(x^2 - 13x + 30)$ $3x^3(x-10)(x-3)$</p>																
<p>3. $\frac{14a^2b^2}{7ab} + \frac{35ab}{7ab} - \frac{21a^4b^3}{7ab}$ $7ab(2ab + 5 - 3a^3b^2)$</p>	<p>4. $\frac{(3xy + 3x)(-5y - 5)}{3x \cdot 3x}$ $3x(y+1) - 5(y+1)$ $(3x-5)(y+1)$</p>																
<p>5. $\frac{(2a^2 - 4a)(a - 2)}{2a \cdot 2a}$ $2a(a-2) + 1(a-2)$ $(2a+1)(a-2)$</p>	<p>6. $z^2 + 8z + 16$ $a=1 \quad b=8 \quad c=16$ $ac=16 \quad (z+4)(z+4)$</p> <table style="margin-left: auto; margin-right: auto;"> <tr><td style="border-right: 1px solid black; padding: 0 5px;">1</td><td style="padding: 0 5px;">16</td></tr> <tr><td style="border-right: 1px solid black; padding: 0 5px;">2</td><td style="padding: 0 5px;">8</td></tr> <tr><td style="border-right: 1px solid black; padding: 0 5px;">4</td><td style="padding: 0 5px;">4</td></tr> </table>	1	16	2	8	4	4										
1	16																
2	8																
4	4																
<p>7. $\frac{5x^2}{5} + \frac{45x}{5} + \frac{40}{5}$ $5(x^2 + 9x + 8)$ $5(x+8)(x+1)$</p>	<p>8. $x^2 - 14x - 13$ $a=1 \quad b=-14 \quad c=-13$ $ac=-13$</p> <table style="margin-left: auto; margin-right: auto;"> <tr><td style="border-right: 1px solid black; padding: 0 5px;">-1</td><td style="padding: 0 5px;">13</td></tr> <tr><td style="border-right: 1px solid black; padding: 0 5px;">1</td><td style="padding: 0 5px;">-13</td></tr> </table> <p style="text-align: right;">PRIME</p>	-1	13	1	-13												
-1	13																
1	-13																
<p>9. $\frac{16a^2}{4} + \frac{60b}{4} - \frac{100}{4}$ $4(4a^2 + 15a - 25)$ $4(4a^2 - 5a)(a+5)$ $4a(4a-5) + 5(4a-5)$ $4(4a-5)(a+5)$</p> <table style="margin-left: auto; margin-right: auto;"> <tr><td colspan="2" style="text-align: center;">ac=100</td></tr> <tr><td style="border-right: 1px solid black; padding: 0 5px;">-1</td><td style="padding: 0 5px;">100</td></tr> <tr><td style="border-right: 1px solid black; padding: 0 5px;">-2</td><td style="padding: 0 5px;">50</td></tr> <tr><td style="border-right: 1px solid black; padding: 0 5px;">-4</td><td style="padding: 0 5px;">25</td></tr> <tr><td style="border-right: 1px solid black; padding: 0 5px;">-5</td><td style="padding: 0 5px;">20</td></tr> <tr><td style="border-right: 1px solid black; padding: 0 5px;">-10</td><td style="padding: 0 5px;">10</td></tr> </table>	ac=100		-1	100	-2	50	-4	25	-5	20	-10	10	<p>10. $2x^2 + 7x + 5$ $ac=10$</p> <table style="margin-left: auto; margin-right: auto;"> <tr><td style="border-right: 1px solid black; padding: 0 5px;">1</td><td style="padding: 0 5px;">10</td></tr> <tr><td style="border-right: 1px solid black; padding: 0 5px;">2</td><td style="padding: 0 5px;">5</td></tr> </table> <p>$(2x^2 + 2x)(5x + 5)$ $2x(x+1) + 5(x+1)$</p>	1	10	2	5
ac=100																	
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2	5																

Factor each polynomial completely.

11. $25x^2 - 121$
 $(5x+11)(5x-11)$

12. If $4x^2 - 13x + 3$ is factored completely, one of the factors is?

- A. $2x - 3$
- B. $2x - 1$
- C. $4x - 3$
- D. $4x - 1$

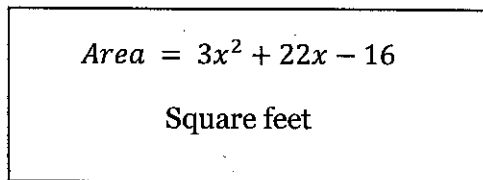
$ac = 12$

1	12
2	6
3	4

$(4x^2 - x)(-12x + 3)$
 $x(4x-1) - 3(4x-1)$

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

13. Given the area, find the dimensions of each rectangle.



$ac = -48$

-1	48
-2	24
-3	16
-4	12
-6	8

$(3x^2 - 2x)(+24x - 16)$
 $\begin{matrix} \times & \times & 8 & 8 \\ \times(3x-2) & + & 8(3x-2) \\ (x+8)(3x-2) \\ \text{L} & & \text{W} \end{matrix}$

14. The length of a rectangular courtyard is the expression $3x - 2$. If the area is given by, $3x^2 + 4x - 4$, find the width of the room.

$ac = -12$

-1	12
-2	6
-3	4

$(3x^2 - 2x)(+2x - 4)$
 $\begin{matrix} \times & \times & 2 & 2 \\ \times(3x-2) & + & 2(3x-2) \\ (3x-2)(x+2) \\ \downarrow \\ \text{W} \end{matrix}$

15. Which polynomial is prime?

- A. $8x^2 - 2x$
- B. $5x^2 + 6x + 1$
- C. $x^2 + 1$
- D. $9x^2 - 81$

16. Which expression is represents the completely factored form of $4x^4 - 144y^4$?

- A. $(2x^2 + 12y^2)(2x^2 - 12y^2)$
- B. $4(x^4 - 36y^4)$
- C. $4(x^2 + 6y^2)(x^2 - 6y^2)$
- D. $(x^2 + 6y^2)(x^2 - 6y^2)$

$4(x^4 - 36y^4)$
 $4(x^2 + 6y^2)(x^2 - 6y^2)$

17. Select the two factors of

$4x^2 - 17x - 15$
 $(4x^2 + 3x)(-5x - 15)$
 $x(4x+3) - 5(4x+3)$
 $(4x+3)(x-5)$

$ac = -60$

1	-60
2	-30
3	-20
4	-15
-6	10

18. Factor the expression completely;

$$\frac{(4x^3 + 12x^2)(-25x - 75)}{4x^2 \cdot 4x^2 \cdot 25 \cdot 25}$$

$$4x^2(x+3) - 25(x+3)$$

$$(4x^2 - 25)(x+3)$$

$$(2x+5)(2x-5)(x+3)$$

19. Simplify the expression below, then factor.

$$(2y-4)^2 - y(2y-2) + y^2 - 8$$

$$4y^2 - 16y + 16 - 2y^2 + 2y + y^2 - 8$$

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

1	24
2	12
3	8
4	6

$$\frac{(3y^2 - 12y)(-2y + 8)}{3y \quad 3y \quad -2 \quad -2}$$

$$3y(y-4) - 2(y-4)$$

$$(3y-2)(y-4)$$

20. A line $y = mx + b$, passes through the point $(6, 1)$ and is parallel to $2x - y = 6$. What is the value of b ?

$$1 = 2(6) + b$$

$$1 = 12 + b$$

$$-11 = b$$

$\downarrow \downarrow$
 $x \quad y$

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

$$y = 2x - 6$$

21. Principal Legrand has 21 coins totaling \$3.45. If he only has dimes, d , and quarters, q . Which system of equations can be used to determine the number of coins Principal Legrand has?

<p>A.</p> $d + q = 21$ $0.10d + 0.25q = 3.45$	<p>B.</p> $d + q = 3.45$ $0.10d + 0.25q = 21$
<p>C.</p> $d + q = 21$ $0.25d + 0.10q = 3.45$	<p>D.</p> $0.10d + 0.25q = 3.45$ $d + q = 3.45$

Use the correct system of equations to determine the number of coins Principal Legrand has.

$$\begin{aligned} \leftarrow \cdot 10d + 10q &= 2.10 & - \cdot 15q &= -1.35 & & 12 \text{ DIMES} \\ \cdot 10d + 25q &= 3.45 & q &= 9 & & 9 \text{ QUARTERS} \end{aligned}$$

22. Sally scored a 73, 87, 81, and 97 on her first four tests. If her goal is to have an 86% test average, what must she score on her fifth test?

$$\frac{73 + 87 + 81 + 97 + X}{5} = 86$$

$$338 + X = 430$$

$$X = 92$$

23. Vincent graphed a linear function. The function has a positive slope and a positive intercept. Which could be the function that Vincent graphed?

value of x
when
y=0
 $5x - 10(0) = 15$
 $5x = 15$
 $x = 3$

~~A.~~ $5x + 10y = 15$

↓ neg. slope

~~C.~~ $5x + 10y = -15$

↑

(B.) $5x - 10y = 15$

$-10y = -5x + 15$
 $y = \frac{1}{2}x - \frac{3}{2}$

D. $5x - 10y = -15$

$5x - 10(0) = 15$
 $5x = 15$
 $x = 3$

24. Compare the properties of each function.

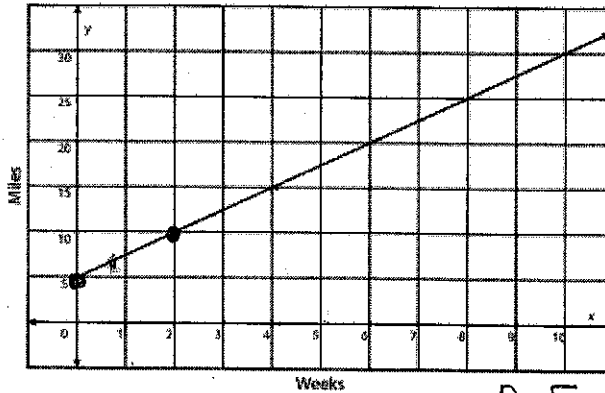
Function A

Sophie ran 8 miles last week and plans to run 2 miles each additional week.

$m = 2$
 $b = 8$

Function B

The following graph represents Kaelina's running plan.



$2.5 = m$
 $5 = b$

Which statement is true?

- ~~A.~~ Sophie ran at a faster rate and ran more mile than Kaelina last week.
- ~~B.~~ Kaelina ran at a slower rate and ran fewer miles than Sophie last week.
- (C.)** Sophie ran at slower rate and ran more miles than Kaelina last week.
- D. Kaelina ran at a faster rate and ran more miles than Sophie last week.

25. A company uses the formula $T = 581s + 150p$ to determine the total cost to purchase s computers and p printers. Which formula can be used to determine the number of printers purchased, given the total cost, T , and the number of computers purchased?

A. $s = \frac{T}{581} - 150p$

B. $s = T - \frac{150p}{581}$

(C.) $s = \frac{T - 150p}{581}$

D. $s = T - 150p - 581$

$\frac{T - 150p}{581} = \frac{581s}{581}$