

Name SINGLETON

Date _____

Unit 7: Factoring Polynomials STUDY GUIDE

Factor each polynomial completely. Show ALL work to receive ALL credit.

<p>1. $7x^2 - 21x$</p> $7x(x-3)$	<p>2. $5g^6 + 15g^5 + 25g^4$</p> $5g^4(g^2 + 3g + 5)$
<p>3. $28x^5y^3 + 14x^3y^2 - 35x^2y$</p> $7x^2y(4x^3y^2 + 2xy - 5)$	<p>4. $(3y^2 + 2y)(3y + 2)$</p> $y(3y+2)(3y+2)$ $\boxed{(y+1)(3y+2)}$
<p>5. $(bc - 4b)(6c - 24)$</p> $b(c-4)6(c-4)$ $\boxed{(b+6)(c-4)}$	<p>6. $x^2 + 6x + 9$</p> $a=1 \quad (x^2 + 3x)(3x + 9)$ $b=6$ $c=9 \quad x(x+3)3(x+3)$ $ac=9$ $\frac{3}{3}$ $\boxed{(x+3)^2}$
<p>7. $5x^2 + 40x + 60$</p> $5(x^2 + 8x + 12)$ $\begin{array}{l} (x^2 + 6x)(2x + 12) \\ x(x+6)2(x+6) \end{array}$ $\boxed{5(x+2)(x+6)}$ <p>$a=1$ $ac=\frac{12}{6}2$ $b=8$ $c=12$</p>	<p>8. $x^2 - 12x + 20$</p> $(x^2 - 10x)(-2x + 20)$ $x(x-10) - 2(x-10)$ $\boxed{(x-2)(x-10)}$ <p>$a=1$ $ac=\frac{20}{-10}-2$ $b=-12$ $c=20$</p>
<p>9. $3m^2 + 3m - 60$</p> $3(m^2 + m - 20)$ $\begin{array}{l} (m^2 + 5m)(4m - 20) \\ m(m+5) - 4(m+5) \end{array}$ $\boxed{3(m-4)(m+5)}$ <p>$a=1$ $ac=\frac{-20}{5}-4$ $b=1$ $c=-20$</p>	<p>10. $4x^2 + 15x + 9$</p> $a=4 \quad (4x^2 + 12x)(3x + 9)$ $b=15$ $c=9 \quad 4x(x+3)3(x+3)$ $ac=36$ $\frac{12}{3}$ $\boxed{(4x+3)(x+3)}$

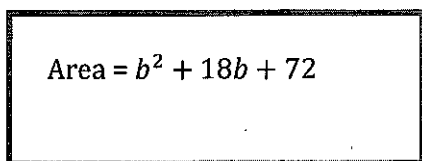
11. $9x^2 - 100$

$(3x - 10)(3x + 10)$

12. If $5a^2 + 18a - 8$ is factored completely, which of the following binomials is a factor?

- A. $(5a + 2)$ $a=5$ $b=18$ $c=-8$ $(5a^2+20a)(-2a-8)$
 $5a(a+4)-2(a+4)$
 B. $(3a - 2)$ $a=5$ $b=18$ $c=-8$ $(5a^2+20a)(-2a-8)$
 $5a(a+4)-2(a+4)$
 C. $(a + 6)$ $a=5$ $b=18$ $c=-8$ $(5a^2+20a)(-2a-8)$
 $5a(a+4)-2(a+4)$
 D. $(a + 4)$ $a=5$ $b=18$ $c=-8$ $(5a^2+20a)(-2a-8)$
 $5a(a+4)-2(a+4)$

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



$a=1$
 $b=18$
 $c=72$
 $ac=72$
 $12 \overline{) 72}$

$(b^2 + 12b)(b + 72)$
 $b(b+12) b(b+12)$

$(b+6)$ and $(b+12)$ are the dimensions

14. The length of a rectangular courtyard is given by the expression $4x - 5$. If the area is given by $4x^2 + 7x - 15$, find the width of the room.

$4x^2 + 7x - 15$ $a=4$ $b=7$ $c=-15$ $ac=-60$
 $12 \overline{) -60}$
 $(4x^2 + 12x)(-5x - 15)$
 $4x(x+3) - 5(x+3)$
 $(4x-5)(x+3)$

$\text{width} = x + 3$

15. Which polynomial is prime?

- A. $9x^2 - 49$ diff. of squares
 B. $2x^2 + 6x + 4$ GCF, AC Method
 C. $b^2 + 9$
 D. $10c^2 - 2c$ GCF

16. Which expression is equivalent to $k^2 - 144$?

- A. $(k - 36)(k + 4)$
 B. $(k - 36)(k - 4)$
 C. $(k - 12)(k - 12)$
 D. $(k - 12)(k + 12)$

17. Simplify then factor the expression:

$(3x - 4)^2 + 2x(-3x - 2) - 2x + 32$
 $9x^2 - 12x + 16 - 6x^2 - 4x - 2x + 32$

$3x^2 - 30x + 48$
 $3(x^2 - 10x + 16)$
 $(x^2 - 8x)(-2x + 16)$
 $x(x-8) - 2(x-8)$

$a=1$ $ac=16$
 $b=-10$ $-8 \overline{) 16}$
 $c=16$

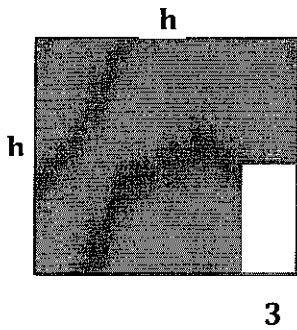
$3(x-2)(x-8)$

18. Factor the expression completely:

$2x^4 + 6x^3 - 8x^2 - 24x$
 $2x(x^3 + 3x^2 - 4x - 12)$
 $(x^3 + 3x^2)(-4x - 12)$
 $x^2(x+3) - 4(x+3)$
 $(x^2 - 4)(x+3)$

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

19. What expression represents the area of the shaded region in the figure below?



Large - Small
 $h(h) - 3(5)$

$$h^2 - 15$$

20. If the area of a rectangle can be represented by the polynomial $x^2 + 5x - 150$, what two expressions could represent the dimensions of the rectangle?

$$x^2 + 5x - 150$$

$$a=1 \quad ac = -150$$

$$b=5 \quad 15 \overline{) -150}$$

$$c = -150$$

$$(x^2 + 15x) - (10x + 150)$$

$$x(x + 15) - 10(x + 15)$$

$(x - 10)$ and $(x + 15)$
 are the dimensions

21. Drew graphed the linear function with an x-intercept of 6 and a y-intercept of -11. What function did he graph?

$(6, 0)$
 $(0, -11)$

$$m = \frac{-11 - 0}{0 - 6} = \frac{11}{6}$$

$b = -11$
 (given)

$$y = mx + b$$

$$y = \frac{11}{6}x - 11$$

22. A company uses the formula $T = 780p + 45c$ to determine the total cost to purchase p phones and c cases. What formula can be used to determine the number of cases purchased, given the total cost, T , and the number of phones purchased?

Solve for c

$$c = \frac{T - 780p}{45}$$

$$T = 780p + 45c$$

$$-780p - 780p$$

$$\frac{T - 780p}{45} = \frac{45c}{45}$$

23. A line, $y = mx + b$, passes through the point $(-4, 8)$ and is parallel to $y = -4x - 5$. What is the value of b ?

$m = -4$
 $(-4, 8)$

$$y - 8 = -4(x + 4)$$

$$y - 8 = -4x - 16$$

$$+8 \qquad +8$$

$$y = -4x - 8$$

Standard Form
 $\rightarrow 4x + y = -8$

24. Ted scored the following on his science tests this year: 78, 81, 64 & 70. If he wants a test average of 75%, what does he need to score on the next test? $x =$ next test score

$$\frac{293 + x}{5} = 75$$

$$82\%$$

$$293 + x = 375$$

$$-293 \quad -293$$

$$x = 82$$

25. Identify the number of solutions for each of the following systems:

Circle ONE answer per system

$\begin{cases} x - 7y = -21 \\ 2x - 14y = -42 \end{cases}$	$\begin{cases} 3x + 6y = 27 \\ x + 2y = 11 \end{cases}$	$\begin{cases} x - 4y = 12 \\ 3x - 5y = 15 \end{cases}$
<p>One solution</p> <p>No solution</p> <p><u>Infinitely many solutions</u></p>	<p>One solution</p> <p><u>No solution</u></p> <p>Infinitely many solutions</p>	<p><u>One solution</u></p> <p>No solution</p> <p>Infinitely many solutions</p>