

Homework: P1-2

Pre-Calc | Mr. Hurni

Name: _____

Date: _____

Perform the indicated operations:

1. $(-7x - 3) + (5x - 2) + (6x + 4)$

2. $(12x + 5) - (7x - 4) - (8x + 1)$

3. $3(a - 2) - 2(3a + 5) + 3(5a - 1)$

4. $(4x - 7)(5x + 6)$

5. $(-3x + 2)(4x - 3)$

6. $(7x - 3)(-5x + 1)$

7. $(x + 4)(x^2 - 3x - 7)$

8. $(5x - 3)^2$

9. $(3x + 7)^2$

10. $(2x - 1)^3$

11. $(3x + 5)^3$

12. $(x^2 - 2x - 3)(x^2 + 4x + 5)$

13. $(2x^2 - x - 2)(x^2 + 6x - 4)$

14. $\frac{5x^2 - 10x}{5}$

15. $\frac{24x^3y^4 - 48x^2y^3}{-6xy}$

16. $\frac{-56x^2y + 72x^3y^2}{8x^2}$

Evaluate

17. 5^{-3}

18. -3^{-4}

19. $\left(\frac{3}{4}\right)^{-2}$

20. $\frac{1}{\left(\frac{1}{3}\right)^{-2}}$

21. $-\sqrt{64}$

22. $\sqrt[3]{\frac{27}{8}}$

23. $\sqrt[5]{-\frac{1}{32}}$

24. $\sqrt{80}$

Perform the indicated operations and simplify. Express the final answer using positive exponents only.

25. $(3x^{-2}y^{-1})(4x^4y^2)$

26. $(5x^{2/3})(-6x^{1/2})$

27. $(3x^{-2/3}y^{1/5})^3$

28. $\frac{64x^{-2}y^3}{16x^3y^{-2}}$

29. $\left(\frac{-8x^2y^{-1}}{2x^{-1}y^2}\right)^2$

30. $\left(\frac{36a^{-1}b^4}{-12a^2b^5}\right)^{-1}$

31. $\frac{x^4y^3}{x^2y^5}$

32. $\frac{(3x^2)^2y^4}{3y^2}$

33. $\left(\frac{4}{x^2}\right)^3$

34. $\left(\frac{2}{xy^2}\right)^{-3}$

35. $\frac{(x^{-3}y^2)^{-4}}{(y^6x^4)^{-2}}$

36. $\left(\frac{4a^3b}{a^2b^3}\right)\left(\frac{3b^2}{2a^2b^4}\right)$

37. $(-3x^{3a-1})(2x^{2a+5})$

38. $(4a^n)^2\left(\frac{3}{2}a^{-n}\right)$

Factor each polynomial completely. Indicate any that are not factorable.

39. $9x^2 - 4y^2$

40. $3x^3 - 9x^2 - 120x$

41. $4x^2 + 20x + 25$

42. $2x^2 - 5x - 9$

43. $64x^3 - 27y^3$

44. $15x^2 - 14x - 8$

45. $3x^3 + 36$

46. $2x^2 - x - 8$

47. $3x^3 + 24$

48. $x^4 - 13x^2 + 36$

49. $8x^5 - 12x^2$

50. $54 - 2x^3$

51. $8x^6 - 125$

52. $6x^2 + 7x - 3$

53. $x^2 + 6xy - 5y^2$

54. $2x^2 - 5xy - 3y^2$

55. $14x^8 + 21x^4$

56. $4x^2 - 1$

57. $t^2 - 6t + 8$

58. $4x^2 + 14x - 8$

59. $3 - 12x^2$

60. $2x^2 + 7x + 6$

WKST P.1-P.2

(#1) $(-7x-3) + (5x-2) + (6x+4)$
 $= 4x - 1$

Watch out!
 (#2) $(12x+5) - (7x-4) - (8x+1)$
 $= 12x+5 - 7x+4 - 8x-1$
 $= -3x+8$

(#3) $3(a-2) - 2(3a+5) + 3(5a-1)$
 $= 3a-6 - 6a-10 + 15a-3$
 $= 12a-19$

(#4) $(4x-7)(5x+6)$
 $= 20x^2 + 24x - 35x - 42$
 $= 20x^2 - 11x - 42$

(#5) $(-3x+2)(4x-3)$
 $= -12x^2 + 9x + 8x - 6$
 $= -12x^2 + 17x - 6$

(#6) $(7x-3)(-5x+1)$
 $= -35x^2 + 7x + 15x - 3$
 $= -35x^2 + 22x - 3$

(#7) $(x+4)(x^2-3x-7)$ *small to big binomial to trinomial
 $= x^3 - 3x^2 - 7x + 4x^2 - 12x - 28$ *vertical alignment of like terms
 $= x^3 + x^2 - 19x - 28$

(#8) $(5x-3)^2$ ← what is being squared?
 $= (5x-3)(5x-3)$
 $= 25x^2 - 15x - 15x + 9$
 $= 25x^2 - 30x + 9$

(#9) $(3x+7)^2 = (3x+7)(3x+7)$
 $= 9x^2 + 21x + 21x + 49$
 $= 9x^2 + 42x + 49$

(#10) $(2x-1)^3$ ← what is being cubed?
 $= (2x-1)(2x-1)(2x-1)$
 $= (2x-1)(2x-1) \cdot (2x-1)$
 $= (4x^2 - 2x - 2x + 1)(2x-1)$

* Multiply 2 quantities at a time
 $= (4x^2 - 4x + 1)(2x-1)$
 $= 8x^3 - 8x^2 + 2x - 4x^2 + 4x - 1$
 $= 8x^3 - 12x^2 + 6x - 1$

$$\begin{aligned}
 \textcircled{\#11} \quad (3x+5)^3 &= (3x+5)(3x+5)(3x+5) \\
 &= (9x^2 + 15x + 15x + 25)(3x+5) \\
 &= (9x^2 + 30x + 25)(3x+5) \\
 &= 27x^3 + 90x^2 + 75x \\
 &\quad 45x^2 + 150x + 125 \\
 &= \boxed{27x^3 + 135x^2 + 225x + 125}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{\#12} \quad (x^2 - 2x - 3)(x^2 + 4x + 5) \\
 &= x^4 + 4x^3 + 5x^2 \\
 &\quad - 2x^3 - 8x^2 - 10x \\
 &\quad - 3x^2 - 12x - 15 \\
 &= \boxed{x^4 + 2x^3 - 6x^2 - 22x - 15}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{\#13} \quad (2x^2 - x - 2)(x^2 + 6x - 4) \\
 &= 2x^4 + 12x^3 - 8x^2 \\
 &\quad - x^3 - 6x^2 + 4x \\
 &\quad - 2x^2 - 12x + 8 \\
 &= \boxed{2x^4 + 11x^3 - 16x^2 - 8x + 8}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{\#14} \quad \frac{5x^2 - 10x}{5} &= \frac{\cancel{5}(x^2 - 2x)}{\cancel{5}} \\
 &= \boxed{x^2 - 2x}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{\#15} \quad \frac{24x^3y^4 - 48x^2y^3}{-6xy} \\
 &= \frac{\cancel{(-6xy)}(-4x^2y^3 + 8xy^2)}{\cancel{(-6xy)}} \\
 &= \boxed{-4x^2y^3 + 8xy^2}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{\#16} \quad \frac{-56x^2y + 72x^3y^2}{8x^2} \\
 &= \frac{\cancel{(8x^2)}(-7y^2 + 9xy^2)}{\cancel{(8x^2)}} \\
 &= \boxed{-7y^2 + 9xy^2}
 \end{aligned}$$

$$\textcircled{\#17} \quad 5^{-3} = \frac{1}{5^3} = \boxed{\frac{1}{125}}$$

$$\textcircled{\#18} \quad -3^{-4} = (-1)(3^{-4}) \\ = (-1)\left(\frac{1}{3^4}\right) = \boxed{-\frac{1}{81}}$$

$$\textcircled{\#19} \quad \left(\frac{3}{4}\right)^{-2} = \left(\frac{4}{3}\right)^2 = \boxed{\frac{16}{9}}$$

$$\textcircled{\#20} \quad \frac{1}{\left(\frac{1}{3}\right)^{-2}} = \frac{1}{\left(\frac{3}{1}\right)^2} = \boxed{\frac{1}{9}}$$

~~OR~~

$$\frac{3^{-2}}{4^{-2}} = \frac{4^2}{3^2}$$

OR

$$\frac{1}{\left(\frac{1}{3}\right)^{-2}} = \frac{\left(\frac{1}{3}\right)^2}{1} = \frac{1}{9}$$

$$\textcircled{\#21} \quad -\sqrt{64} = \boxed{-8}$$

$$\textcircled{\#22} \quad \sqrt[3]{\frac{27}{8}} = \boxed{\frac{3}{2}}$$

$$\textcircled{\#23} \quad \sqrt[5]{-\frac{1}{32}} = \boxed{-\frac{1}{2}}$$

$$\textcircled{\#24} \quad \sqrt{80} = \sqrt{16} \sqrt{5} \\ = \boxed{4\sqrt{5}}$$

$$\textcircled{\#25} \quad (3x^{-2}y^{-1})(4x^4y^2) \\ = \left(\frac{3}{x^2y}\right)(4x^4y^2) \\ = \frac{12x^4y^2}{x^2y} = \boxed{12x^2y}$$

$$\textcircled{\#26} \quad (5x^{\frac{2}{3}})(-6x^{\frac{1}{2}}) \\ = -30x^{\frac{2}{3}+\frac{1}{2}} = -30x^{\frac{4}{6}+\frac{3}{6}} \\ = \boxed{-30x^{\frac{7}{6}}}$$

$$\textcircled{\#27} \quad (3x^{-\frac{2}{3}}y^{\frac{1}{5}})^3 \\ = 3^3x^{-2}y^{\frac{3}{5}} = \boxed{\frac{27y^{\frac{3}{5}}}{x^2}}$$

$$\textcircled{\#28} \quad \frac{64x^{-2}y^3}{16x^3y^{-2}} = \frac{4y^3y^2}{x^3x^2} = \boxed{\frac{4y^5}{x^5}}$$

$$\textcircled{\#29} \quad \left(\frac{-8x^2y^{-1}}{2x^{-1}y^2}\right)^2 = \frac{64x^4y^{-2}}{4x^{-2}y^4} \\ = \frac{16x^4x^2}{y^4y^2} = \boxed{\frac{16x^6}{y^6}}$$

$$\textcircled{\#30} \quad \left(\frac{36a^{-1}b^4}{-12a^2b^5}\right)^{-1} = \left(\frac{-3b^4}{a^2a^{-1}b^5}\right)^{-1} \\ = \boxed{\frac{-3}{ab}}$$

$$\#31 \quad \frac{x^4 y^3}{x^2 y^5} = \boxed{\frac{x^2}{y^2}}$$

what is the base?

PEMDAS

$$\#32 \quad \frac{(3x^2)^2 y^4}{3y^2} = \frac{39x^4 y^4}{3y^2} = \boxed{3x^4 y^2}$$

$$\#33 \quad \left(\frac{4}{x^2}\right)^3 = \boxed{\frac{64}{x^6}}$$

$$\#34 \quad \left(\frac{2}{xy^2}\right)^{-3} = \left(\frac{xy^2}{2}\right)^3 = \boxed{\frac{x^3 y^6}{8}}$$

$$\#35 \quad \frac{(x^{-3} y^2)^{-4}}{(y^6 x^4)^{-2}} = \frac{(y^6 x^4)^2}{(x^{-3} y^2)^4} = \frac{y^{12} x^8}{x^{-12} y^8} = \boxed{x^{20} y^4}$$

$$\#36 \quad \left(\frac{4a^3 b}{a^2 b^3}\right) \left(\frac{3b^2}{2a^2 b^4}\right) = \frac{12a^3 b^3}{2a^4 b^7} = \boxed{\frac{6}{ab^4}}$$

$$\#37 \quad (-3x^{3a-1})(2x^{2a+5}) = -6x^{(3a-1)+(2a+5)} = \boxed{-6x^{5a+4}}$$

$$\#38 \quad (4a^n)^2 \left(\frac{3}{2} a^{-n}\right) = (16a^{2n}) \left(\frac{3}{2} a^{-n}\right) = \frac{48a^{2n}}{2a^n} = \boxed{24a^n}$$

$$\#39 \quad 9x^2 - 4y^2 \quad \text{difference of squares!} = \boxed{(3x+2y)(3x-2y)}$$

$$\#40 \quad 3x^3 - 9x^2 - 120x = 3x(x^2 - 3x - 40) = \boxed{3x(x-8)(x+5)}$$

$$\#41 \quad 4x^2 + 20x + 25 = (2x+5)(2x+5) = \boxed{(2x+5)^2}$$

$$\#42 \quad 2x^2 - 5x - 9 = (2x \quad)(x \quad) \quad \text{Not factorable}$$

$$\#43 \quad 64x^3 - 27y^3 \quad \text{difference of cubes!} = \boxed{(4x-3y)(16x^2 + 12xy + 9y^2)}$$

$$\#44 \quad 15x^2 - 14x - 8 = \boxed{(5x+2)(3x-4)}$$

$$\#45 \quad 3x^3 + 36$$

$$= 3(x^3 + 12)$$

$$\#46 \quad 2x^2 - x - 8$$

$$= (2x \quad)(x \quad) \quad \text{Not factorable}$$

$$\#47 \quad 3x^3 + 24$$

$$= 3(x^3 + 8)$$

$$= 3(x+2)(x^2 + 2x + 4)$$

$$\#48 \quad x^4 - 13x^2 + 36$$

$$= (x^2 - 9)(x^2 - 4)$$

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

$$\#49 \quad 8x^5 - 12x^2$$

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

$$\#50 \quad 54 - 2x^3$$

← difference of cubes!

$$= 2(27 - x^3)$$

$$= 2(3-x)(9+3x+x^2)$$

$$\#51 \quad 8x^6 - 125 \quad \leftarrow \text{difference of cubes}$$

$$= (2x-5)(4x^4 + 10x^2 + 25)$$

$$\#52 \quad 6x^2 + 7x - 3$$

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

$$\#53 \quad x^2 + 6xy - 5y^2$$

$$= (x-y)(x+5y) \quad \text{Not factorable}$$

$$\#54 \quad 2x^2 - 5xy - 3y^2$$

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

$$\#55 \quad 14x^8 + 21x^4$$

$$= 7x^4(2x^4 + 3)$$

$$\#56 \quad 4x^2 - 1$$

$$= (2x+1)(2x-1)$$

$$\#57 \quad t^2 - 6t + 8$$

$$= (t-4)(t-2)$$

$$\#58 \quad 4x^2 + 14x - 8$$

← FOIL → bnt

$$= 2(2x^2 + 7x - 4) \quad (2x-1)(2x+8)$$

$$= 2(2x-1)(x+4) \quad \text{so } 2(2x-1)(x+4)$$

$$\#59 \quad 3 - 12x^2$$

$$= 3(1 - 4x^2)$$

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

$$\#60 \quad 2x^2 + 7x + 6$$

$$= (2x+3)(x+2)$$