

Section 5.1b – Practice Problems

FOIL

EMERGING LEVEL QUESTIONS

Multiply, leave all answers in descending order

1. $(2x + 1)(3x + 2)$

$$6x^2 + 4x + 3x + 2$$

$$6x^2 + 7x + 2$$

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

$$6y^2 + 9y - 8y - 12$$

$$6y^2 + y - 12$$

3. $(3x^2 + 4)(x + 1)$

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

4. $(4y^2 + 3)(3y - 1)$

$$12y^3 - 4y^2 + 9y - 3$$

5. $(-3y - 4)(2y - 3)$

$$-6y^2 + 9y - 8y + 12$$

$$-6y^2 + y + 12$$

6. $(5x - y)(5x - y)$

$$25x^2 - 5xy - 5xy + y^2$$

$$25x^2 - 10xy + y^2$$

7. $(2x - 1)(2x^2 + 3x - 1)$

can't foil

$$4x^3 + 6x^2 - 2x - 2x^2 - 3x + 1$$

$$4x^3 + 4x^2 - 5x + 1$$

8. $(5x - 6)(2x^2 + 7x - 3)$

$$10x^3 + 35x^2 - 18x - 12x^2 - 42x + 18$$

$$10x^3 + 23x^2 - 57x + 18$$

9. $(3y - 2x)(4y^2 - 3xy + x^2)$

$$12y^3 - 9xy^2 + 3x^2y - 8xy^2 + 6x^2y - 2x^3$$

$$-2x^3 + 9x^2y - 17xy^2 + 12y^3$$

10. $(x^2 + 2y)(2x^2 + 3xy - y^2)$

$$2x^4 + 3x^3y - x^2y^2 + 2x^2y + 6xy^2 - 2y^3$$

no like terms

$$2x^4 + 3x^3y - x^2y^2 + 2x^2y + 6xy^2 - 2y^3$$

Multiply, leave all answers in descending order

11. $(a + b)^2$

$$(a+b)(a+b)$$

$$a^2 + ab + ab + b^2$$

$$a^2 + 2ab + b^2$$

12. $(2x + 1)^2$

$$(2x+1)(2x+1)$$

$$4x^2 + 2x + 2x + 1$$

$$4x^2 + 4x + 1$$

13. $(x - y)^2$

$$(x-y)(x-y)$$

$$x^2 - xy - xy + y^2$$

$$x^2 - 2xy + y^2$$

14. $(3x + 2y)^2$

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

$$9x^2 + 6xy + 6xy + 4y^2$$

$$9x^2 + 12xy + 4y^2$$

15. $(-x - 2y)^2$

$$(-x-2y)(-x-2y)$$

$$x^2 + 2xy + 2xy + 4y^2$$

$$x^2 + 2xy + 4y^2$$

16. $(-3x^2 + 2y^2)^2$

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

$$9x^4 - 6x^2y^2 - 6x^2y^2 + 4y^4$$

$$9x^4 - 12x^2y^2 + 4y^4$$

PROFICIENT LEVEL QUESTIONS

17. $(-a^3b + c^2d^2)^2$

$$(-a^3b + c^2d^2)(-a^3b + c^2d^2)$$

$$a^6b^2 - a^3bc^2d^2 - a^3bc^2d^2 + c^4d^4$$

$$a^6b^2 - 2a^3bc^2d^2 + c^4d^4$$

18. $(2a^2b^2 - 4c^3d)^2$

$$(2a^2b^2 - 4c^3d)(2a^2b^2 - 4c^3d)$$

$$4a^4b^4 - 8a^2b^2c^3d - 8a^2b^2c^3d + 16c^6d^2$$

$$4a^4b^4 - 16a^2b^2c^3d + 16c^6d^2$$

Multiply, leave all answers in descending order

19. $(a - b)(a + b)$

$$a^2 + ab - ab - b^2$$

$$\boxed{a^2 - b^2}$$

20. $(2x + 1)(2x - 1)$

$$4x^2 - 2x + 2x - 1$$

$$\boxed{4x^2 - 1}$$

21. $(x - y)(x + y)$

$$x^2 + xy - xy - y^2$$

$$\boxed{x^2 - y^2}$$

22. $(3x + 2y)(3x - 2y)$

$$9x^2 - 6xy + 6xy - 4y^2$$

$$\boxed{9x^2 - 4y^2}$$

23. $(-x - 2y)(-x + 2y)$

$$x^2 - 2xy + 2xy - 4y^2$$

$$\boxed{x^2 - 4y^2}$$

24. $(-x^2 - 2y^2)(-x^2 + 2y^2)$

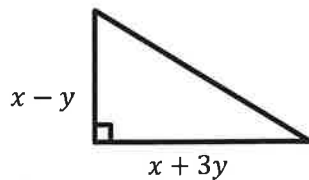
$$x^4 - 2x^2y^2 + 2x^2y^2 - 4y^4$$

$$\boxed{x^4 - 4y^4}$$

Calculate the area of the following figures

25. Right Triangle

$$A = \frac{1}{2}bh$$



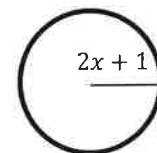
$$\frac{1}{2} \cdot (x+3y)(x-y)$$

$$\frac{1}{2} (x^2 - xy + 3xy - 3y^2)$$

$$\boxed{\frac{x^2 + 2xy - 3y^2}{2}}$$

26. Circle

$$A = \pi r^2$$



$$\pi(2x+1)^2$$

$$\pi(2x+1)(2x+1)$$

$$\pi(4x^2 + 2x + 2x + 1)$$

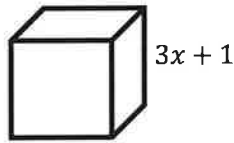
$$\pi(4x^2 + 4x + 1)$$

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

Calculate the volume of the following figures

27. Cube

$$V = s^3$$



$$(3x+1)^3$$

$$\underbrace{(3x+1)(3x+1)(3x+1)}_{\text{FOIL}}$$

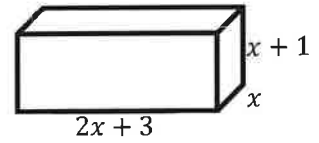
$$(9x^2 + 6x + 1)(3x + 1)$$

$$27x^3 + 18x^2 + 3x + 9x^2 + 6x + 1$$

$$27x^3 + 27x^2 + 9x + 1$$

28. Rectangle

$l \cdot w \cdot h$



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

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

$$2x^3 + 5x^2 + 3x$$

EXTENDING LEVEL QUESTIONS

Find each product

29. $(x + 1)^3$

$$(x+1)(x+1)(x+1)$$

$$(x^2 + x + x + 1)(x+1)$$

$$(x^2 + 2x + 1)(x+1)$$

$$x^3 + 2x^2 + x + x^2 + 2x + 1$$

$$x^3 + 3x^2 + 3x + 1$$

30. $(y - 3)^3$

$$(y-3)(y-3)(y-3)$$

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

$$(y^2 - 6y + 9)(y-3)$$

$$y^3 - 6y^2 + 9y - 3y^2 + 18y - 27$$

$$y^3 - 9y^2 + 27y - 27$$

31. $(2x + y)^3$

$$(2x+y)(2x+y)(2x+y)$$

$$(4x^2 + 2xy + 2xy + y^2)(2x+y)$$

$$(4x^2 + 4xy + y^2)(2x+y)$$

$$8x^3 + 8x^2y + 2xy^2 + 4x^2y + 4xy^2 + y^3$$

$$8x^3 + 12x^2y + 6xy^2 + y^3$$

32. $(3x - 2y)^3$

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

$$(9x^2 - 6xy - 6xy + 4y^2)(3x-2y)$$

$$(9x^2 - 12xy + 4y^2)(3x-2y)$$

$$27x^3 - 36x^2y + 12xy^2 - 18x^2y + 24xy^2 - 8y^3$$

$$27x^3 - 54x^2y + 36xy^2 - 8y^3$$