

$-\frac{2b}{10} + \frac{1b}{10}$

$\frac{5^4}{2^{12}} \left(\frac{3}{5}\right)^2$

8. Determine this difference.

a.  $-\frac{43}{10}$     b.  $-\frac{7}{10}$     c.  $\frac{7}{10}$     d.  $\frac{43}{10}$     (86)

9. Determine this product.

a.  $-\frac{11}{4}$     b.  $-\frac{15}{8}$     c.  $\frac{15}{8}$     d.  $\frac{11}{4}$

10. Determine this product.

a.  $-\frac{4}{5}$     b.  $-\frac{8}{13}$     c.  $-\frac{8}{13}$     d.  $-\frac{4}{5}$

11. The price of a share changed by  $-\$1.45$ . A person owns 190 shares. By how much did his change change in value?

a.  $-\$27.50$     b.  $-\$27.50$     c.  $+\$27.50$     d.  $-\$131.03$

12. Determine this quotient.

a.  $-\frac{7}{3}$     b.  $\frac{4}{33}$     c.  $-\frac{31}{4}$     d.  $-\frac{5}{7}$

13. Determine this quotient.

a.  $-\frac{11}{30}$     b.  $-\frac{11}{30}$     c.  $-\frac{10}{30}$     d.  $-\frac{10}{30}$

14. Evaluate.

a.  $\frac{11}{14}$     b.  $\frac{11}{14}$     c.  $\frac{11}{14}$     d.  $\frac{11}{14}$

15. A student has \$1200 in her savings account. She withdraws \$95 each week. A formula for calculating the amount of money remaining in her account is  $A = P - 95w$ , where  $P$  dollars is the original amount and  $w$  is the number of weeks she has been withdrawing money.

$$P = 1200 - 95(10)$$

$$= 1200 - 950$$

$$= 250$$

Determine the amount of money remaining in her account after 13 weeks.  
 a. \$63      b. \$1235      c. \$1216      d. \$1190

Short Answer

16. Order these numbers from least to greatest.  $-\frac{9}{6}$   
 $\frac{3}{4}, \frac{7}{9}, \frac{5}{6}, \frac{2}{3}$        $-0.83$        $-0.77$        $-0.79$   
 $-0.75$        $-0.77...$        $-0.83$        $-0.66...$        $-0.75$        $-0.74$   
 $-0.66$        $-0.63$

17. Determine this sum.  
 $-\frac{3}{4} + (-\frac{3}{5})$        $-\frac{17}{4} + \frac{5}{5}$        $-\frac{17}{4} + \frac{1}{1}$        $-\frac{17}{4} + \frac{1}{1}$        $-\frac{17}{4} + \frac{1}{1}$        $-\frac{17}{4} + \frac{1}{1}$   
 $-\frac{95}{20} + \frac{-12}{20}$        $-\frac{13}{5}$        $-\frac{110}{20} + \frac{28}{20} - \frac{65}{20}$

18. Determine this difference.  
 $\frac{5}{5} - (-\frac{7}{5})$        $\frac{127}{20}$        $2 \frac{7}{10}$        $\frac{110}{20} + \frac{28}{20} - \frac{65}{20}$

19. Evaluate this expression.  
 $\frac{11}{2} - (-\frac{7}{5}) + (-\frac{13}{4})$        $6 \frac{7}{20}$        $\frac{73}{20}$        $3 \frac{13}{20}$

20. Determine this product.  
 $(\frac{1}{2}) \cdot (-\frac{2}{3})$        $(\frac{7}{2}) \cdot (-\frac{11}{3})$        $(\frac{3}{2}) \cdot (-\frac{3}{2}) \cdot (-\frac{5}{7})$        $(\frac{22}{3}) \cdot (-\frac{4}{3}) \cdot (-\frac{5}{5})$

21. Determine this product.  
 $(\frac{3}{2}) \cdot (-\frac{3}{2}) \cdot (-\frac{3}{7})$        $-\frac{77}{6}$        $\frac{45}{28}$        $-\frac{4}{3} \times \frac{-3}{5}$

22. Determine this quotient.  
 $(-\frac{4}{3}) \div (-\frac{5}{8})$        $\frac{17}{28}$        $+\frac{12}{15}$        $\frac{4}{5}$

23. Determine this quotient.  
 $(-\frac{8}{3}) \div (-\frac{3}{5})$        $\frac{12}{28}$        $\frac{4}{5}$

24. Evaluate.  
 $\frac{2}{3} - (-\frac{7}{12}) \cdot (-\frac{4}{21})$        $\frac{2}{3} - (-\frac{7}{12}) \cdot (-\frac{4}{21})$        $\frac{15}{8} \times \frac{13}{5} - \frac{7}{4}$

25. Evaluate.  
 $\frac{1}{4} \cdot \frac{2}{3} - \frac{1}{4}$        $\frac{20}{48}$        $\frac{16}{48} - \frac{12}{48}$        $\frac{180}{72} - \frac{7}{7}$        $\frac{18}{7} - \frac{7}{7}$        $\frac{11}{7}$

26. Evaluate:  $\left[\frac{1}{3} + \frac{3}{5}\right] + \left[\left(-\frac{5}{8}\right) \times \frac{12}{25}\right]$

27. Evaluate:  $\left[\frac{8}{9} \times \left(-\frac{5}{12}\right)\right] + \left(-\frac{4}{5}\right)$

**Problem**

28. Melissa earns \$45.25 working in a coffee shop, and \$18.25 for babysitting. She spends \$31.64 on art supplies and \$15.48 on a computer game.

a) Write an addition statement to represent Melissa's income and expenditure.

b) How much money does Melissa have left? a)  $45.25 + 18.25 - 31.64 - 15.48$

29. Evaluate this expression. Show your work.

$-2\frac{3}{4} - (-4\frac{1}{3}) - 2\frac{5}{6}$  b)  $16.38$

30. A fishing resort has 21 cabins, all of which need to be repainted. The average cost of painting a cabin is \$490.47.

a) Write a multiplication statement with rational numbers to determine the cost of painting the cabins.

b) The resort has a budget of \$10,524.00.

a) Write an addition statement to represent Melissa's income and expenditure.  
 b) How much money does Melissa have left? a)  $45.25 + 15.25 - 31.64 = 15.48$

29. Evaluate this expression. Show your work.  
 $-2\frac{3}{4} - (-4\frac{1}{3}) - 2\frac{5}{6}$  b)  $16.38$

30. A fishing resort has 21 cabins, all of which need to be repainted.  
 The average cost of painting a cabin is \$490.47.  
 a) Write a multiplication statement with rational numbers to determine the cost of painting the cabins.  
 b) The resort has a budget of \$10 524.00.  
 How much money will be left in the budget after all the cabins are painted?

31. Evaluate. Show your work.

$$\left[1\frac{5}{7} \times \left(-3\frac{5}{6}\right)\right] + \left[\left(-2\frac{1}{10}\right) + 0\frac{7}{8}\right]$$

$$\left[\frac{12}{7} \times -\frac{23}{6}\right] \div \left[-\frac{21}{10} \div \frac{7}{8}\right]$$

$$-\frac{46}{7} \div \left[\frac{-21}{10} \times \frac{8}{7}\right]$$

$$-\frac{46}{7} \div -\frac{12}{5}$$

$$-\frac{46}{7} \times -\frac{5}{12}$$

$$+\frac{115}{42}$$

(29)  $-2\frac{3}{4} - (-4\frac{1}{3}) - 2\frac{5}{6}$

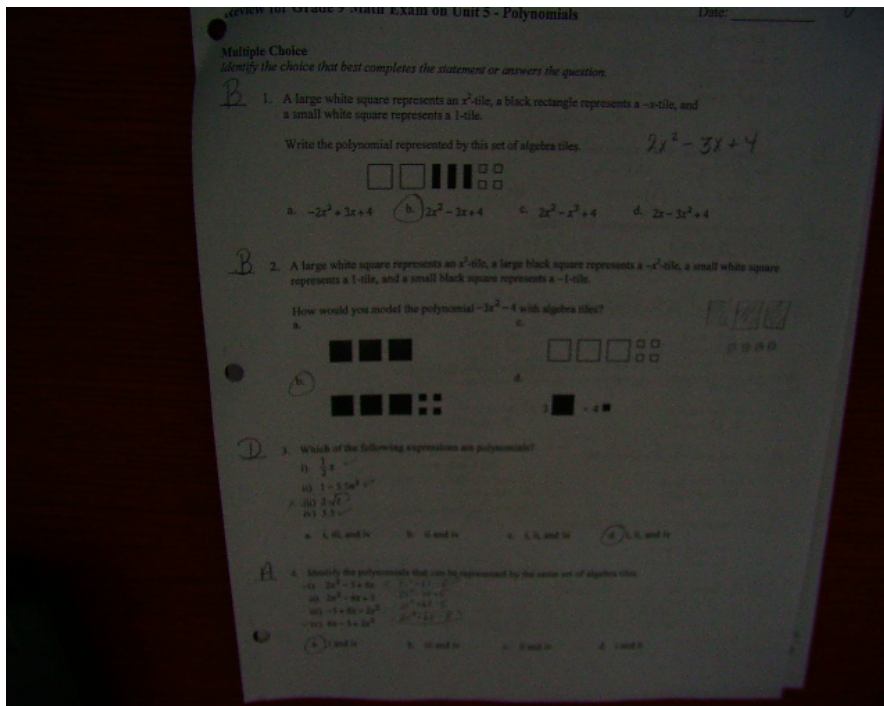
$$-\frac{11}{4} - (-\frac{13}{3}) - \frac{17}{6}$$

$$-\frac{11}{4} + \frac{13}{3} - \frac{17}{6}$$

$$\frac{-33}{12} + \frac{52}{12} - \frac{34}{12}$$

$$\frac{-15}{12}$$

(30) a)  $21 \times \$490.47$





**D** 5. Identify the polynomial that is equivalent to  $4 - 6v - 7v^2$ .

i)  $7v^2 + 6v - 4$   
 ii)  $4 + 7v^2 - 6v$   $7v^2 - 6v + 4$   
 iii)  $-7v^2 - 6v + 4$   
 iv)  $-7v^2 - 4 + 6v$   $-7v^2 + 6v - 4$

a. iv      b. ii      c. i      **d. iii**

**B** 6. Combine like terms. Sketch algebra tiles if it helps.

$\frac{3x+10}{2} + \frac{7x-4}{2}$        $10x + 6$

a.  $13x + 3$       **b.  $10x + 6$**       c.  $16x$       d.  $10x - 6$

**B** 7. Combine like terms. Sketch algebra tiles if it helps.

$9x^2 - 3x - 6x^2$        $3y^2 - 5x$

a.  $-2x^2$       **b.  $3x^2 - 5x$**       c.  $2x^2 - 4x$       d.  $3x^2 + 5x$

**B** 8. Simplify  $\sqrt{12x^2 - 3x} + \sqrt{6x^2 - 3x}$        $4x^2 - 3x - 3$

a.  $4x^2 - 3x + 3$       c.  $4x^2 + 3x + 3$   
 b.  $4x^2 - 3x - 3$       d.  $4x^2 - 3x^2 - 3$

**C** 9. Add:  $(2x^2 - 6) + (5x^2 - 8x - 4)$        $7x^2 - 8x - 10$

a.  $10x^2 - 8x - 24$       c.  $7x^2 - 8x - 10$   
 b.  $7x^2 - 14x - 4$       d.  $7x^2 - 8x + 10$

**A** 10. Add:  $(-3x^2 + 7 - 3x) + (5 + x^2 + 8x)$        $-2x^2 + 3x + 8$

a.  $-2x^2 + 3x + 8$       c.  $-4x^2 - 3x + 8$   
 b.  $-2x^2 - 3x + 8$       d.  $-4x^2 + 3x + 8$

**C** 11. Subtract:  $(3x - 7x^2 + 2) - (4x^2 - 3 + 6x)$        $-11x^2 - 3x + 7$

a.  $-11x^2 - 3x - 7$       c.  $-11x^2 - 3x + 7$   
 b.  $-11x^2 - 9x - 3$       d.  $11x^2 - 3x - 7$

**D** 12. Subtract:  $(2y^2 - 3x^2 + 4) - (5x^2 - 2x + 6y^2)$        $-y^2 - 5x^2 - 2x + 4$

a.  $-5y^2 - 3x^2 + 2x - 4$       c.  $-y^2 - 5x^2 - 2x + 4$   
 b.  $5y^2 - 3x^2 + 12$       d.  $3y^2 - 5x^2 - 2x + 12$

13. Multiply:  $7(2x^2 - 5x)$   $14x^2 - 35x$

a.  $14x^2 - 5x$     b.  $14x^2 + 2x$     c.  $14x^2 - 35x$     d.  $9x^2 - 2x$

14. Multiply:  $(-2)(4c^2 - 6c - 7)$   $-8c^2 + 12c + 14$

a.  $-8c^2 - 12c - 14$     b.  $2c^2 - 8c - 9$     c.  $-8c^2 + 12c + 14$     d.  $-3c^2 - 6c - 7$

15. Divide:  $\frac{20p - 28}{4}$   $\frac{20p}{4} - \frac{28}{4}$

a.  $5p - 28$     b.  $5p - 7$     c.  $20p - 24$     d.  $16p - 24$

16. Divide:  $\frac{-20p^2 - 16p}{-4p}$   $\frac{-20p^2}{-4p} - \frac{16p}{-4p} = 5p^2 + 4$

a.  $5p^2 - 16p$     b.  $5p^2 + 4$     c.  $80p^2 - 64$     d.  $5p + 4p$

**Sort Answer**

17. A large white square represents an  $x^2$ -tile, a large black square represents a  $-x^2$ -tile, a white rectangle represents an  $x$ -tile, a black rectangle represents a  $-x$ -tile, a small white square represents a  $1$ -tile, and a small black square represents a  $-1$ -tile.

Write the simplified polynomial.

$= 2x^2 - 1x + 2$

18. Combine like terms. Sketch algebra tiles if it helps.

$(3x^2 - 2x + 6) + (-2x^2 + 3x - 6) = 7x^2 - 3x - 6$

19. Add:  $(13x^2 - 2x + 4) + (2x^2 + 2x - 9)$

$= 15x^2 - 2x + 4 + 2x^2 + 2x - 9 = 17x^2 - 5$

20. Write the perimeter of this rectangle as a polynomial in simplest form.

Rectangle with length  $6x + 10$  and width  $6x + 10$ .

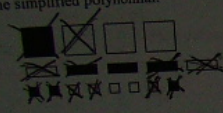
Perimeter:  $2(6x + 10) + 2(6x + 10) = 4(6x + 10) = 24x + 40$



a.  $5p^2 - 16p$       b.  $5p + 4$       c.  $80p^2 - 64$       d.  $5p + 4p$

17. A large white square represents an  $x^2$ -tile, a large black square represents a  $-x^2$ -tile, a white rectangle represents an  $x$ -tile, a black rectangle represents a  $-x$ -tile, a small white square represents a  $1$ -tile, and a small black square represents a  $-1$ -tile.

Write the simplified polynomial.


 $= 2x^2 - 1x + 2$

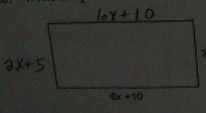
18. Combine like terms. Sketch algebra tiles if it helps.

$3x^2 - 6x + 4x^2 + 3x - 6 = 7x^2 - 3x - 6$

19. Add:  $(10x^2 - 7x + 9) + (-7x^2 - 2x - 9)$

$= 3x^2 - 9x = -9$

20. Write the perimeter of this rectangle as a polynomial in simplest form.


 $2(6x+10) + 2(2x+5)$ 
 $= 12x+20+4x+10$ 
 $= 16x+30$

21. Subtract:  $(9x^2 - 6x + 4) - (5x^2 - 4x - 5)$

22. Subtract:  $(4x^2 + 9x - 3) - (x^2 - 11x + 5)$

23. Multiply:  $5(-2x^2 - 5)$

24. Multiply:  $-2(-3 + 2x - 5x^2)$

25. Divide:  $\frac{12m - 20m^2}{-4m}$

26. Determine the product:  $(-2x)(4x + 3y - 5z)$

27. Determine the quotient:  $(-10x^2 + 4xy - 6xz) \div (-2x)$

28. a) Write the multiplication sentence modelled by this rectangle.  
 b) Determine the area of the rectangle when  $x = 12$ .  
 Show your work.

29. The area of a rectangular deck, in square metres, is given by the polynomial  $40p^2 + 24p$ .  
 The deck is 8p metres wide.  
 a) Write a polynomial to represent the length of the deck.  
 b) Determine the length, width, and area of the deck when  $p = 4$  m.

Handwritten solutions:

21.  $9x^2 - 6x + 4 - 5x^2 + 4x + 5 = 4x^2 - 2x + 9$

22.  $4x^2 + 9x - 3 - x^2 + 11x - 5 = 3x^2 + 20x - 8$

23.  $5(-2x^2 - 5) = -10x^2 - 25$

24.  $-2(-3 + 2x - 5x^2) = +16 - 4x + 10x^2 = 10x^2 - 4x + 16$

25.  $\frac{12m - 20m^2}{-4m} = \frac{12m}{-4m} - \frac{20m^2}{-4m} = -3 + 5m$

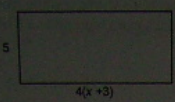
26.  $(-2x)(4x + 3y - 5z) = -8x^2 - 6xy + 10xz$

27.  $\frac{-10x^2 + 4xy - 6xz}{-2x} = \frac{-10x^2}{-2x} + \frac{4xy}{-2x} - \frac{6xz}{-2x} = 5x - 2y + 3z$

28. a)  $5[4(x+3)]$   
 b)  $5[4(x+3)] = 5[4x+12] = 20x+60$   
 Let  $x=12$   
 $20(12)+60 = 240+60 = 300$

29. a)  $40p^2 + 24p$   
 b)  $40(4)^2 + 24(4) = 640 + 96 = 736$

28. a) Write the multiplication sentence modelled by this rectangle.  $= 5x - 2y + 3z$   
 b) Determine the area of the rectangle when  $x = 12$ .  
 Show your work.



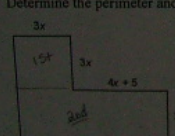
a)  $5 [4(x+3)]$   
 b)  $5 [4(x+3)]$   
 $5 [4x+12]$   
 $20x + 60$  Let  $x = 12$   
 $20(12) + 60$   
 $240 + 60 = 300$

29. The area of a rectangular deck, in square metres, is given by the polynomial  $40p^2 + 24p$ .  
 The deck is  $8p$  metres wide.  
 a) Write a polynomial to represent the length of the deck.  
 b) Determine the length, width, and area of the deck when  $p = 4$  m.

a)  $40p^2 + 24p$   
 $\frac{40p^2 + 24p}{8p}$   
 $L = 5p + 3$

b) Length  $5p + 3$   
 $5(4) + 3 = 23$   
 Width  $8p$   
 $8(4) = 32$   
 Area  $L \times W$   
 $23 \times 32 = 736$

30. a) Determine a polynomial for the perimeter of the shape below.  
 b) Determine a polynomial for the area of the shape below.  
 c) Determine the perimeter and area when  $x = 6$  cm.



b)  $(3x)(3x) + (3x)(4x+5)$   
 $9x^2 + 12x^2 + 15x$   
 $= 21x^2 + 15x$

c)  $26x + 10$   
 $26(6) + 10 = 158$

a)  $(3x) + (3x) + (4x+5) + (3x) + (3x+4x+5) + (3x+3x)$   
 $(3x) + (3x) + (4x+5) + (3x) + (3x+4x+5) + (3x+3x)$   
 $26x + 10$