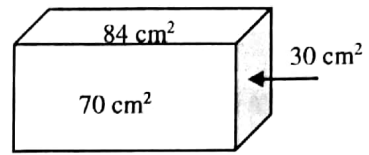


1. The surface area of each face of a rectangular prism are shown. What are the dimensions of this prism?

- a) 3 cm x 7 cm x 10 cm
- ~~c) 5 cm x 6 cm x 7 cm~~
- b) 5 cm x 6 cm x 14 cm
- d) 6 cm x 10 cm x 14 cm

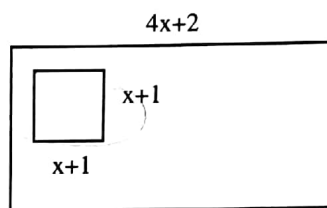


2. Expand and simplify the following polynomial expression:  $(4x + 1)(3x - 2) + 2(x - 3)$

- a)  $12x^2 + 13x - 5$
  - b)  $12x^2 - 3x + 4$
  - c)  $12x^2 - 3x - 8$
  - ~~d)  $12x^2 + 13x - 8$~~
- Handwritten work:*  $(4x + 1)(3x - 2) + 2(x - 3) = 12x^2 - 8x + 3x - 2 + 2x - 6 = 12x^2 - 3x - 8$

3. Write an expression for the area of the shaded region in its simplest form.

- a)  $7x^2 - 2x - 3$
- b)  $7x^2 + 2x - 1$
- c)  $7x^2 + 10x - 1$
- d)  $7x^2 - 3$



*Handwritten work:*  
 $A = (4x + 2)(2x - 1) - (x + 1)(x + 1)$   
 $= 8x^2 - 2 - (x^2 + 2x + 1)$   
 $= 8x^2 - 2 - x^2 - 2x - 1$   
 $= 7x^2 - 2x - 3$

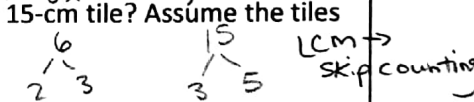
4. Simplify the following expression by combining like terms, then factor:  $2 + 8x^2 - 8x + 4x^2 - 12x - 10$

- a)  $2(3x - 2)(x + 1)$
- b)  $4(x - 2)(3x + 1)$
- c)  $4(3x - 2)(x + 1)$
- d)  $4(6x + 1)(x - 1)$

*Handwritten work:*  
 $2 + 8x^2 - 8x + 4x^2 - 12x - 10$   
 $= 12x^2 - 20x - 8$   
 $= 4(3x^2 - 5x - 2)$   
 $= 4(3x + 1)(x - 2)$

5. What is the side length of the smallest square that could be tiled using a 6-cm by 15-cm tile? Assume the tiles cannot be cut.

- a) 30 cm
- b. 10 cm
- c. 90 cm
- d. 3 cm



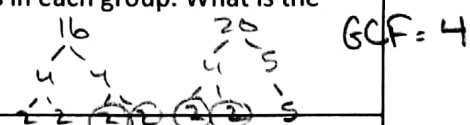
6. Which integer can replace      so that the following trinomial can be factored:  $2y^2 + \underline{\quad}y - 9$

- a) -7
- ~~b) 9~~
- ~~c) 11~~
- ~~d) 18~~

*Handwritten work:*  
 $ac = -18$   
 $b = ?$   
 one positive one negative

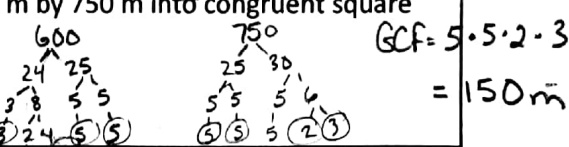
7. There are 16 male students and 20 female students in a Grade 10 math class. The teacher wants to divide the class into groups with the same number of males and the same number of females in each group. What is the greatest number of groups the teacher can make?

- a. 8
- b. 16
- c. 4
- d. 12



8. A developer wants to subdivide a rectangular plot of land measuring 600 m by 750 m into congruent square lots. What is the side length of the largest possible square?

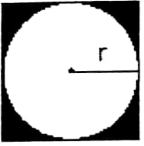
- a) 75 m
- b) 30 m
- c) 50 m
- d) 150 m



9. Expand and simplify:  $(f + 5g)(2f - 5g + 7)$

- a)  $2f^2 + 5fg + 7f - 25g^2 + 35g$
- ~~c)  $2f^2 + 5fg + 7f + 25g^2 + 35g$~~

*Handwritten work:*  
 $(f + 5g)(2f - 5g + 7) = 2f^2 - 5fg + 7f + 10fg - 25g^2 + 35g$   
 $= 2f^2 + 5fg + 7f + 35g - 25g^2$   
~~b)  $2f^2 - 15fg + 7f - 25g^2 + 35g$~~   
~~d)  $2f^2 - 5fg + 7f - 25g^2 + 35g$~~

<p>10. Determine the greatest common factor of 56 and 88.</p> <p>a. 7                      b. 77                      c. 616</p>	<p>d. 8</p> <p>56: 2, 2, 2, 7 88: 2, 2, 2, 11 GCF = <math>2^3 = 8</math></p>
<p>11. Determine the least common multiple of 78 and 102.</p> <p>a. 1326                      b. 6                      c. 2652</p>	<p>d. 7956</p> <p>78: 2, 3, 13 102: 2, 3, 17 LCM = <math>2 \cdot 3 \cdot 13 \cdot 17 = 1326</math> <math>&lt; 1326</math></p>
<p>12. Which expression represents the area of the shaded region?</p> <div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <math display="block">A = (2r \cdot 2r) - \pi r^2</math> <math display="block">= 4r^2 - \pi r^2</math> <math display="block">= r^2(4 - \pi)</math> </div> </div> <p>a. <math>2r(2r - \pi)</math>      b. <math>r^2(4 - \pi)</math>      c. <math>r^2(1 - \pi)</math>      d. <math>r(r - 2\pi)</math></p>	
<p>13. Write the prime factorization of 630.</p> <p>a. <del><math>2 \cdot 5 \cdot 7 \cdot 9</math></del>      b. <del><math>2 \cdot 5 \cdot 63</math></del>      c. <del><math>2 \cdot 3 \cdot 5 \cdot 7</math></del>      d. <math>2 \cdot 3^2 \cdot 5 \cdot 7</math></p>	

**Constructed Response**

1. Use factoring to determine whether 729 is a perfect square, a perfect cube, or both.

$\sqrt{729} = \sqrt{3 \cdot 243}$   
 $= \sqrt{3 \cdot 3 \cdot 81}$   
 $= \sqrt{3 \cdot 3 \cdot 3 \cdot 9}$   
 $= \sqrt{3 \cdot 3 \cdot 3 \cdot 3 \cdot 3}$

yes perfect square      yes perfect cube

2. Factor the following:

- |  |  |   |
|--|--|---|
| a) $44a + 99a^2$<br>$11a(4 + 9a)$                                  | b) $-33b^2 + 99b + 77$<br>$-11(3b^2 - 9b - 7)$<br><i>ac = -21, b = -9, Nope</i>  | c) $v^2 - 13v + 36$<br>$(v - 4)(v - 9)$   |
| d) $-24 - 2x + x^2 \rightarrow x^2 - 2x - 24$<br>$(x - 6)(x + 4)$  | e) $-3b^2 + 15b + 18$<br>$-3(b^2 - 5b - 6)$<br>$-3(b - 6)(b + 1)$  | f) $-5m^2 + 20m + 60$<br>$-5(m^2 - 4m - 12)$<br>$-5(m - 6)(m + 2)$  |
| g) $25x^2 + 40x + 16$<br>$(5x + 4)(5x + 4)$<br>$= (5x + 4)^2$      | h) $2m^2 + 15m + 7$ <i>ac = 14, b = 15, 14 * 1</i><br>$2m^2 + 14m + 1m + 7$<br>$= 2m(m + 7) + 1(m + 7)$<br>$= (m + 7)(2m + 1)$ | i) $25m^2 - 30mn + 9n^2$<br>$(5m - 3n)(5m - 3n)$<br>$= (5m - 3n)^2$   |
| j) $121a^2 + 110a + 25$<br>$(11a + 5)(11a + 5)$<br>$= (11a + 5)^2$ | k) $16p^2 - 81q^2$<br>$(4p - 9q)(4p + 9q)$   | l) $8x^2 - 18x - 5$ <i>ac = -40, b = -18</i><br>$8x^2 - 20x + 2x - 5$<br>$4x(2x - 5) + 1(2x - 5)$<br>$= (4x + 1)(2x - 5)$ |

3. Find an integer to replace  $\square$  so that this trinomial is a perfect square.

$64v^2 - \square vw + 81w^2$   
 $(8v - 9w)(8v - 9w)$   
 $64v^2 - 72vw + 81w^2$   
 $144vw$

4. The area of a square is represented by the trinomial  $36m^2 + 84mn + 49n^2$ . Determine an expression for the perimeter of the square.

$$A = (\underset{\substack{\uparrow \\ \text{side}}}{6m+7n})(\underset{\substack{\uparrow \\ \text{side}}}{6m+7n})$$

$$P = 4 \cdot \text{side} \\ = 4(6m+7n) \\ = 24m + 28n$$

5. A builder wants to cover a wall measuring 9 ft. by 15 ft. with square pieces of plywood.

a) What is the side length of the largest square that could be used to cover the wall?

Assume the squares cannot be cut.

$$\begin{array}{c} 9 \\ \swarrow \searrow \\ 3 \quad 3 \end{array} \quad \begin{array}{c} 15 \\ \swarrow \searrow \\ 3 \quad 5 \end{array}$$

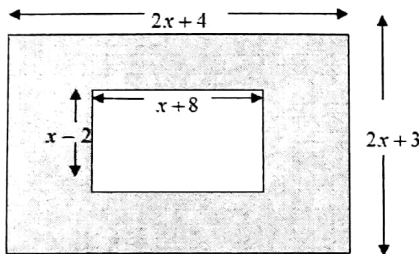
GCF = 3  
Largest sidelength is 3ft

b) How many square pieces of plywood would be needed?

$$LCM = 3^2 \cdot 5 \\ 9 \cdot 5$$

$$= 45$$

6. A picture and its frame have dimensions as shown.



a) Find an expression for the area of the frame. Simplify.

$$A = \text{outside} - \text{inside} \\ = (2x+4)(2x+3) - [(x+8)(x-2)] \\ = 4x^2 + 6x + 8x + 12 - [x^2 + 6x - 16] \\ = 4x^2 + 14x + 12 - x^2 - 6x + 16$$

$$= 3x^2 + 8x + 28$$

b) Determine the area of the frame when  $x=15$  cm.

if  $x=15$

$$A = 3(15)^2 + 8(15) + 28 \\ = 823 \text{ cm}^2$$

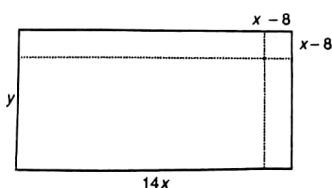
7. The perimeter of a square is represented by the expression  $20a + 16b$ . Write a simplified expression to represent the area of the square.

$$P = 4s \\ \frac{20a+16b}{4} = \frac{4s}{4}$$

$$s = 5a + 4b$$

$$A = (5a+4b)(5a+4b) \\ = 25a^2 + 40ab + 16b^2$$

8. A rectangle has length  $14x$  and width  $y$ . Strips of width  $x-8$  are cut from the rectangle as shown. Write an expression that represents the area of the rectangle that remains.



$$A = (14x - [x-8])(y - (x-8)) \\ = (13x+8)(y-x+8)$$

$$= 13xy - 13x^2 + 104x + 8y - 8x + 64 \\ = -13x^2 + 96x + 13xy + 8y + 64$$