

# Lesson 5: Factoring Review

Friday, August 31, 2018 2:37 AM

# Factoring Polynomial Expressions Lesson #5: Factoring Review

## Guidelines for Factoring a Polynomial Expression

If we are asked to factor a polynomial expression, the following guidelines should help us to determine the best method.

1. Look for a common factor. If there is one, take out the common factor and look for further factoring.
2. If there is a binomial expression, look for a difference of squares.
3. If there is a trinomial expression of the form  $x^2 + bx + c$ , look for factoring by inspection.
4. After factoring, check to see if further factoring is possible.



Polynomial expressions of the form  $ax^2 + bx + c$  will be discussed in the next math course.



Factor the following.

a)  $9x^2 - 36$

$$\begin{array}{r|l} -36 & -16 \\ \hline x & \pm \end{array}$$

b)  $x^2 - 16x - 36$

$$\begin{array}{r|l} -27 & -26 \\ \hline x & \pm \\ 1 & -27 \end{array} \quad -26$$

c)  $-x^2 + 26x + 27$

d)  $x^2 - 3x - 5x + 15$

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

$$= (x+2)(x-18) = -(x^2 - 26x - 27) = -(x+1)(x-27)$$

*decomposition*  
 • group them  
 • factor out each GCF  
 $x(x-3) - 5(x-3)$   
 • factor out GCF

$$= \cancel{x(x-3)} - \cancel{5(x-3)} = (x-3)(x-5)$$

### Complete Assignment Questions #1 - #9

## Assignment

1. Factor.

a)  $x^2 - 49$

b)  $x^2 - 8x + 15$

c)  $8x^2 + 32$

d)  $-a^2 + 64$

e)  $e^2 - 3e + 4$

f)  $v^2 + 7v + 10$

g)  $a^2 + 2ab - 35b^2$

h)  $4 - 25t^2$

i)  $x^2 + 16$



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2. Factor.

a)  $a^2 - 64b^2$

b)  $108 - 3z^2$

c)  $-x^2 - 5x - 4$

d)  $625p^2 - 1$

e)  $-3x^2 - 3x + 36$

f)  $8v^2 - 32v - 96$

3. Factor.

a)  $b^2 - 16 - 6b + 24$

b)  $x^3 - 81x$

c)  $-256 + t^2$

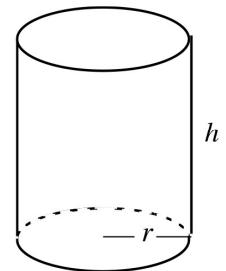
d)  $12 - 4x - x^2$

e)  $x^2 - 8xy - 33y^2$

4. The surface area of a cylinder is given by the formula

$A = 2\pi r^2 + 2\pi rh$ , where  $r$  is the radius of the base and  $h$  is the height of the cylinder.

a) Calculate the surface area, to the nearest  $0.01 \text{ cm}^2$ , of a cylinder which has vertical height  $14.5 \text{ cm}$  and base diameter  $11 \text{ cm}$ .



b) Write the formula for  $A$  in factored form.

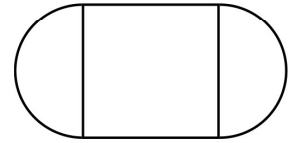
c) Calculate, using the factored form of  $A$ , the surface area of the cylinder to the nearest  $0.01 \text{ cm}^2$ .

d) Which method a) or c) is simpler to use?

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5. A square of side  $2r$  cm has semicircles drawn externally on each of two opposite sides.



Find expressions in factored form for

- a) the external perimeter of the shape      b) the area of the shape

**Multiple  
Choice**

Use the following information to answer the next two questions.

**In questions #6 -#7 one or more of the four responses may be correct.  
Answer**

- A. if only 1 and 2 are correct
- B. if only 1, 2, and 3 are correct
- C. if only 3 and 4 are correct
- D. if some other response or combination of responses is correct

6. The set of factors of  $5x^2 - 10x - 15$  contains

1.  $x - 1$                       2.  $x + 3$                       3.  $x + 1$                       4.  $x - 3$

7.  $x + 4$  is a factor of

1.  $-x^2 - 6x - 8$               2.  $48 - 3x^2$               3.  $3x^2 + 12x$               4.  $x^2 + 16$



8.  $\pi r^3 + 3\pi r$  is equivalent to

- A.  $3\pi^2 r^4$
- B.  $3\pi(r^2 + r)$
- C.  $\pi r(2r + 3)$
- D.  $\pi r(r^2 + 3)$

**Numerical Response**

9. Triangle  $PQR$  is right angled at  $P$ . The area of the triangle is  $\frac{1}{2}x^2 + 10x + 18$  cm<sup>2</sup>, where  $x$  is a positive integer.

If the length of  $PQ$  is 10 cm, then the length of  $PR$ , is \_\_\_\_\_ cm.

(Record your answer in the numerical response box from left to right)

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**Answer Key**

- |                                |                                     |  |   |   |  |  |
|--------------------------------|-------------------------------------|--|---|---|--|--|
| 1. a) $(x - 7)(x + 7)$         | b) $(x - 5)(x - 3)$                 | c) $8(x^2 + 4)$  |   |   |  |  |
| d) $-(a + 8)(x - 8)$           | e) not factorable                   | f) $(v + 5)(v + 2)$  |   |   |  |  |
| g) $(a + 7b)(a - 5b)$          | h) $(2 - 5t)(2 + 5t)$               | i) not factorable  |   |   |  |  |
| 2. a) $(a - 8b)(a + 8b)$       | b) $3(6 - z)(6 + z)$                | c) $-(x + 4)(x + 1)$   |   |   |  |  |
| d) $(25p - 1)(25p + 1)$        | e) $-3(x - 3)(x + 4)$               | f) $8(v + 2)(v - 6)$   |   |   |  |  |
| 3. a) $(b - 2)(b - 4)$         | b) $x(x - 3)(x + 3)$                | c) $(t - 4)(t + 4)$  |   |   |  |  |
| d) $-(x - 2)(x + 6)$           | e) $(x - 11y)(x + 3y)$              |  |   |   |  |  |
| 4. a) $691.15$ cm <sup>2</sup> | b) $A = 2\pi r(r + h)$              | c) $691.15$ cm <sup>2</sup>  |   |   |  |  |
|                                | d) c) is simpler                    |  |   |   |  |  |
| 5. a) $2r(\pi + 2)$ cm.        | b) $r^2(\pi + 4)$ cm <sup>2</sup> . |  |   |   |  |  |
| 6. C                           | 7. B                                | 8. D   |   |   |  |  |
|                                |                                     | 9. <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="width: 25px; height: 20px; text-align: center;">2</td><td style="width: 25px; height: 20px; text-align: center;">6</td><td style="width: 25px; height: 20px;"></td><td style="width: 25px; height: 20px;"></td></tr></table> | 2 | 6 |  |  |
| 2                              | 6                                   |  |   |   |  |  |



