

Factoring and Applications Lesson #8: Practice Test

1. One factor of $4x^2 - 25y^2$ is

- A. $4x - 25y$ B. $4x - 5y$
C. $2x - 25y$ **D. $2x - 5y$**

$$(2x-5y)(2x+5y)$$

2. One factor of $6x^2 - 5x - 4$ is $-\frac{7}{5}x - 24$

- A. $2x - 1$ **B. $3x - 4$**
C. $6x - 1$ D. $3x + 4$

$$6x^2 - 8x + 3x - 4$$

$$2x(3x-4) + 1(3x-4)$$

$$(2x+1)(3x-4)$$

3. When factored, the trinomials $x^2 - 8xy + 15y^2$ and $x^2 - 2xy - 15y^2$ have one binomial factor in common. This factor is

- A. $x - 5y$** B. $x + 3y$
C. $x - 3y$ D. $x + 5y$

$$(x-5y)(x-3y) \rightarrow (x-5y)(x+3y)$$

Numerical Response

1. The expression $15x^2 + 14x - 8$ can be written in the form $(ax - b)(cx + d)$ where $a, b, c,$ and d are all positive integers.

$$\begin{array}{r} + \quad x \\ 14 \quad -120 \\ 20, -6 \end{array}$$

Write the value of a in the first box. Write the value of b in the second box.
Write the value of c in the third box. Write the value of d in the fourth box.

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

5	2	3	4
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$$15x^2 + 20x - 6x - 8$$

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

$$\begin{array}{cccc} (5x-2)(3x+4) \\ \underset{a}{5} \quad \underset{b}{-2} \quad \underset{c}{3} \quad \underset{d}{4} \end{array}$$

Numerical Response

2. Consider the trinomial $\sqrt{4a^2 + kab + 49b^2}$, where k is a natural number.

In order for $\sqrt{4a^2 + kab + 49b^2}$ to represent a perfect square trinomial, the value of k must be _____.

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

2	8		
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$$2(7)(2) = 28$$

4. Which of the following is a factor of $4x^2 - 144y^2$?

- A. $2x + 72y$
- B. $2x - 36y$
- C. $x + 6y$
- D. $x - 18y$

$$4 \sqrt{144} = \frac{144}{2} = 72$$

$$4(x^2 - 36y^2)$$

$$4(x - 6y)(x + 6y)$$

5. Which of the following is not a factor of $a^4 - 13a^2 + 36$?

- A. $a + 9$
- B. $a - 2$
- C. $a + 2$
- D. $a - 3$

$$(a^2 - 9)(a^2 - 4)$$

$$(a - 3)(a + 3)(a - 2)(a + 2)$$

6. The equation $25x^2 - 9 = 0$ is satisfied by

- A. $x = \frac{5}{3}$ only
- B. $x = \frac{3}{5}$ only
- C. $x = \pm \frac{5}{3}$
- D. $x = \pm \frac{3}{5}$

$$(5x - 3)(5x + 3)$$

$$\pm \frac{3}{5}$$

7. Consider the following expressions:

1: $4x^2 - 36xy + 81y^2$

2: $10x^2 + 43xy - 9y^2$

3: $8x^4y^2 - 162x^2y^4$

Which of these expressions has $2x + 9y$ as one of its factors?

- ~~A.~~ # 2 only
- B. # 3 only
- ~~C.~~ # 1 and # 2 only
- D. # 2 and # 3 only

#1 $(2x - 9y)^2$

#3 $2x^2y^2(4x^2 - 81y^2)$

$(2x - 9y)(2x + 9y)$

#2 $10x^2 + 45xy - 2xy - 9y^2$
 $5x(2x + 9y) - y(2x + 9y)$
 $(5x - y)(2x + 9y)$

8. The solution to the equation $6x^2 - 18x = 0$ is

A. $x = 3$ only

B. $x = -3$ only

C. $x = 0, 3$

D. $x = -3, 0$

$$6x(x-3) = 0$$

$$x = 0, 3$$

9. The roots of the equation $1 + 4x - 21x^2 = 0$ are

A. $-\frac{1}{3}, \frac{1}{7}$

B. $-\frac{1}{7}, \frac{1}{3}$

C. $-3, 7$

D. $-7, 3$

$$1 + 7x - 3x - 21x^2$$

$$1(1+7x) - 3x(1+7x)$$

$$(1-3x)(1+7x)$$

$$x = \frac{1}{3} \quad x = -\frac{1}{7}$$

10. The factored form of $p^2 - (q-r)^2$ is

A. $(p-q-r)(p+q+r)$

B. $(p-q-r)(p+q-r)$

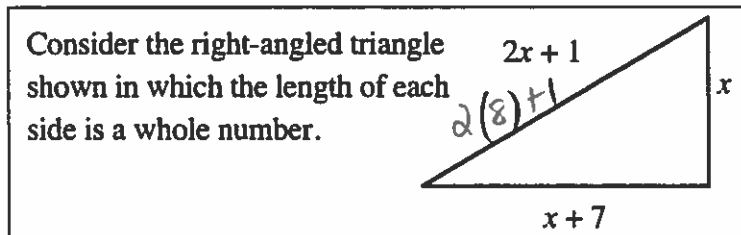
C. $(p-q+r)(p+q-r)$

D. $(p-q+r)(p+q+r)$

$$[p - (q-r)][p + (q-r)]$$

$$(p-q+r)(p+q-r)$$

Use the following information to answer the next question.



$$x^2 + (x+7)^2 = (2x+1)^2$$

Numerical Response

3. The length of the hypotenuse is _____.

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

1	7		
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$$x^2 + (x^2 + 14x + 49) = 4x^2 + 4x + 1$$

$$2x^2 + 14x + 49 = 4x^2 + 4x + 1$$

$$= 2x^2 - 10x - 48$$

~~$x = 8$~~

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$$2(x^2 - 5x - 24) = (x-8)(x+3)$$

11. Which one of the following is a factor of $4(3x + 1)^2 - 9(x + 2)^2$?

A. $3x - 14$

B. $3x + 8$

C. $9x + 8$

D. $21x + 22$

$$\begin{aligned} & [2(3x+1) - 3(x+2)] [2(3x+1) + 3(x+2)] \\ & (6x+2 - 3x-6) (6x+2 + 3x+6) \\ & (3x-4) (9x+8) \end{aligned}$$

Use the following information to answer the next question.

Chantelle is asked to factor the expression $4x^2 - 16xy + 16y^2$. Part of her work is shown below.

$4x^2 - 16xy + 16y^2 = (2x - 4y)(2x - 4y)$	Line 1
$= (2x - 4y)^2$	Line 2
$= 2(x - 2y)^2$	Line 3

$$\begin{aligned} & (2x-4y)(2x-4y) \\ & = 2(x-2y) \cdot 2(x-2y) \\ & = 4(x-2y)^2 \end{aligned}$$

12. A. Answer A if her work is correct.
 B. Answer B if her first mathematical error is in Line 1.
 C. Answer C if her first mathematical error is in Line 2.
D. Answer D if her first mathematical error is in Line 3.

Numerical Response

4. The expression $8(2a + 3)^2 + 14(2a + 3) + 3$ can be written in factored form as $(4a + K)(8a + L)$. The value of the product KL is _____.

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

$$\begin{aligned} & 8A^2 + 14A + 3 \quad \begin{array}{r} + \\ \times \\ \hline 14 \end{array} \begin{array}{r} x \\ 24 \end{array} \\ & 8A^2 + 12A + 2A + 3 \\ & 4A(2A+3) + 1(2A+3) \end{aligned}$$

$$\begin{aligned} & (4A+1)(2A+3) \\ & [4(2a+3)+1][2(2a+3)+3] \\ & (8a+12+1)(4a+6+3) \\ & (8a+13)(4a+9) \\ & \quad \quad \quad \underline{K} \quad \quad \quad \underline{L} \end{aligned}$$

$13(9)$

13. The extraneous root in the radical equation $(x-3) = \sqrt{30-2x}$ is

A. 7

~~B. 3~~

C. -3

~~D. -7~~

$$x^2 - 6x + 9 = 30 - 2x$$

$$x^2 - 4x - 21 = 0$$

$$(x-7)(x+3)$$

$$x = 7, -3$$

$$7-3 = \sqrt{30-2(7)}$$

$$4 = 4 \quad \checkmark$$

$$-3-3 = \sqrt{30-2(-3)}$$

$$=-6 \quad \sqrt{36} \quad \times$$

14. The equation $12t^2 + 17t - 5 = 0$ is satisfied by $t = a$ and by $t = -b$, where $a, b > 0$.

The value of a is

A. $\frac{1}{4}$

B. $\frac{3}{5}$

C. $\frac{5}{3}$

D. 4

$$\frac{t}{17} \frac{x}{-60}$$

$$201-3$$

$$12t^2 - 3t + 20t - 5$$

$$3t(4t-1) + 5(4t-1)$$

$$(3t+5)(4t-1) = 0$$

$$t = -5/3 \quad t = 1/4$$

Use the following information to answer the next two questions.

Consider the radical equation shown.

$$\sqrt{2+x} = 10 - \sqrt{x}$$

$$x \geq -2 \quad x \geq 0$$

15. All the restrictions on the value of the variable are

A. $x \geq 0$

B. $x \geq -2$

C. $x \geq 0$ and $x \leq 2$

D. $x \geq 2$

Numerical Response

5. The solution to the equation, to the nearest whole number, is (Record your answer in the numerical response box from left to right.)

2	4	1	1
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$$2+x = 100 - 20\sqrt{x} + x$$

$$(98)^2 = (-20\sqrt{x})^2$$

$$9604 = 400x$$

$$24.01 = x$$

Written Response - 5 marks

1. Consider the radical equation $\sqrt{a-1} + \sqrt{3a-5} = 2$.

- Determine the restrictions on the value of the variable a .

- Explain why, in the process of solving this radical equation algebraically, an extraneous root may appear.

- Algebraically, determine the root(s) of the radical equation.

Answer Key

1. D 2. B 3. A 4. C 5. A 6. D 7. D 8. C
 9. B 10. C 11. C 12. D 13. C 14. A 15. A

Numerical Response

1.

5	2	3	4
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 2.

2	8		
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 3.

1	7		
---	---	--	--

 4.

1	1	7	
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 5.

2	4		
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Written Response

1. • $a \geq \frac{5}{3}$
- The solution process involves squaring both sides of the equation and solving. However, if the squares of two quantities are equal, it does not necessarily mean that the two quantities are equal. An extraneous root may appear.
 - $a = 2$