

Beurling Academy

September 10, 2012

Mathematics—secondary 4 (SCI)

Test #1: Review of exponents

69%
64%

2729
/42

Name: Stu

Multiple Choice. Circle the best answer.

(10)

1 Which of the following is FALSE?

A) $a^4 \times a^3 = a^7$

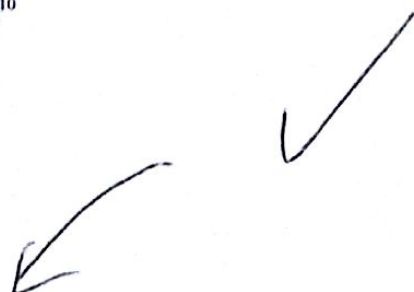
C) $a^{3-3} = 1$

B) $a^0 = a^6 + a^2$

D) $b^{-3} = \frac{b^7}{b^{10}}$

2 What do you get by simplifying the following expression?

$$\frac{6a^4 \times -3a^6}{-2a \times -3a^7}$$



~~A) $-3d^2$~~

C) $-3d^6$

B) $-3d^4$

D) $-3d^{31}$

-16 17

3 Which of the following expressions is equivalent to $\frac{3^7 \times 5^{-4}}{3 \times 5^{-2}}$?

A) $3^6 \times 5^6$

C) $3^7 \times 5^6$

B) $3^6 \times 5^{-12}$

D) $\frac{15^3}{15^{-7}}$

12

4 If $x = -1$, which of the following expressions is equal to -12 ?

6/10

A) $-x^2$

C) $(-x)^2$

B) $-x^2$

D) x^2

5 If $a = 0$ and $b = 0$, which of the following expressions is equivalent to $\frac{(ab^{-1})^2}{ab^2}$?

A) $\frac{1}{a^2}$

C) 1

B) $\frac{1}{a}$

D) $\frac{1}{a^3 b^2}$

Calculate the following powers.

6 A) $0.2^3 = 0.008$ B) $-2^3 = -8$ C) $(-2)^3 = -8$ D) $-2^0 = 1$ (2)

6/8

Show all of your work for this section.

7

A) $\frac{8a^3b}{12ab^4}$

$$\frac{2a^3b^1}{3a^1b^4} =$$

$$= \frac{2a^2b^{-3}}{3b^3} = \frac{2a^2}{3b^3}$$

B) $\left(\frac{4}{5}a^3b^2\right)\left(\frac{15}{16}ab^4\right)$

$$\frac{60a^{3+1}b^{2+4}}{80} = \frac{3a^4b^6}{4}$$

8

A) $(3x^2y^3)^2(2x^3y^2)^2$

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

$$(2)^2(x^3)^2(y^2)^2 =$$

$$9x^4y^6 \cdot 2^2x^6y^4 =$$

$$9x^4y^6 \cdot \frac{1x^2y^4}{2^2} =$$

B) $\frac{-2a^3b^2}{3ab^5} \cdot \frac{3a^2b^4}{4ab^6}$

$$\frac{-2a^5b^2 \cdot 3a^2b^4}{3ab^5 \cdot 4ab^6} =$$

$$\frac{-6a^7b^6}{4a^2b^{11}} = \frac{-3a^5b^{-5}}{2} = \frac{2a^5b^{-5}}{2}$$

$\frac{2a^5}{b^5}$

9

A) $\frac{3a^{-2}b^{-2}}{4ab^{-2}}$

$$\frac{3a^{-2}b^{-2}}{4a^1b^{-2}} =$$

$$\frac{3a^{-2}b^2}{4a^3b^2} = \frac{3}{4a^5}$$

B) $\left(\frac{3x^2}{2y}\right)^2 \cdot \left(\frac{2x^3}{3y^2}\right)^3$

$$\frac{(3)^2(x^2)^2}{(2^2)(y)^2} \cdot \frac{(2^3)(x^3)^3}{(3)^3(y^2)^3} =$$

$$\frac{9x^4}{4y^2} \cdot \frac{8x^9}{27y^6} =$$

$$\frac{72x^{13}}{108y^8}$$

↑ reduce

10

Express $8^7 \times 4^4 \times 2^3$ as a power of 2.

$$8^7 \times 256 \times 32 = x$$

$$\sqrt{x} = 2^2$$

- 3

11

Calculate, if possible

0/3

(3)

A) $\sqrt{\frac{-8}{125}}$

 $\times -1$

B) $(-8)^{1/3} (-8)^3$
 -2^3

 $\times -1$

C) $49^{1/2} =$

 7^2 just 7
 $\times -1$

44010

Beurling Academy
October 9, 2012
Mathematics—Cycle 2, Year 2 (SCI)
Test #2: Algebraic expressions

Name: Stu

Date: _____

- 1) Did you use the right information?
- 2) Did you make the correct calculations?
- 3) Did you lay out your steps in an organized manner?
- 4) Is your work neat and clear?
- 5) Did you justify and explain your work?

1

POLYNOMIALS REVISITED

Perform the following operations, expressing your results in simplest form. Your answers should be expressed without negative exponents:

<p>a) $\frac{57x^3y^3z^2}{3x^2yz^{-1}}$</p> <p>$= \frac{57xy^2z^5}{3}$</p> <p>$= \dots$</p> <p style="text-align: right;">-0.5</p>	<p>b) $3(2x-3)^2$</p> <p>$= 3(2x-3)(2x-3)$</p> <p>$= 3(2x-3)(2x-3)$</p> <p>$= 4x^2 - 6x - 6x + 9$</p> <p>$= 4x^2 - 12x + 9$</p> <p style="text-align: right;">8/10</p>
<p>c) $\frac{2}{3}x^2 - \frac{1}{4}x^2 - x^2$</p> <p>$\frac{2}{3}x^2 - \frac{1}{4}x^2 - x^2 =$</p> <p>$-\frac{2x^2}{3} - \frac{1x^2}{4}$</p> <p>$= \frac{8x^2}{12} - \frac{3x^2}{12} - \frac{12x^2}{12}$</p> <p>$= \frac{5x^2}{12}$</p> <p style="text-align: right;">-1</p>	<p>d) $(2a^2b^{-1})^2(2^3a^{-2}b^{-3})$</p> <p>$= (2^2)(a^2)^2(b^{-1})^2 \cdot (2^3 a^{-2} b^{-3})$</p> <p>$= \frac{4a^4 \cdot b}{b^2 a^2 b^3}$</p> <p>$= \frac{32a^2}{b^5}$</p> <p style="text-align: right;">✓</p>
<p>e) $\left(\frac{3a^{-2}b^3}{ab^{-1}}\right)^{-2}$</p> <p>$(3)^{-2}(a^{-2})^{-2}(b^3)^{-2}$</p> <p>$(a)^2(b^{-1})^{-2}$</p> <p>$= \frac{a^4 b^{-6}}{9(6)b^2}$</p> <p style="text-align: right;">-0.5</p>	<p style="text-align: right;">8/10</p>

$= \frac{a^4}{9 \cdot 6 \cdot b^2}$

$= \frac{a^4}{54b^2}$

FACTORING FUN

Factor the following polynomials completely:

<p>a) $x^2 - 9x - 52$</p> <p>$= x^2 - 4x + 13x - 52$ $\therefore -52$</p> <p>$= x(x^2 - 13x + 4x - 52)$ $\therefore -9$</p> <p>$= x(x^2 - 13x + 4x - 52)$ -52</p> <p>$= x(x-13) + 4(x-13)$ $2 \overline{) -26}$</p> <p>$= (x+4)(x-13)$ $\overline{) -24}$</p> <p>$x^2 - 13x + 4x - 52 = x^2 - 9x - 52$</p>	<p>b) $(x-y)^2 - (x-z)^2$</p> <p>$= (x-y)(x-y) - (x-z)(x-z)$</p> <p>$= (x-y)(x-y) - (x-z)(x-z)$</p> <p>$= (x-y)(x-y) - (x-z)(x-z)$</p> <p>$= (x-y)(x-y) - (x-z)(x-z)$</p>
<p>c) $6ax + 3bx - 4ab - 2b^2$</p> <p>$= 3x(2a + b) - 2b(2a + b)$</p> <p>$= 3x(2a + b) - 2b(2a + b)$</p> <p>$= (2a + b)(3x - 2b)$</p>	<p>d) $3m^4 - 3m^2$</p> <p>$= 3m^2(3m^2 - 3)$</p> <p>$= 3m^2(3m^2 - 3)$</p> <p>$= 3m^2(\sqrt{3}m + 1)(\sqrt{3}m - 1)$</p>
<p>e) $(7x^5y^2 + 21x^3y^3 + 14xy^4)$</p> <p>$= 7xy^2(7x^4y^2 + 3x^2y^3 + 2y^4)$</p> <p>$= 7xy^2(x^4 + 3x^2y + 2y^2)$</p>	<p>f) $6x^2 + 5x - 4$</p> <p>$= 6x^2 + 8x - 3x - 4$</p> <p>$= (6x^2 + 8x) - (3x + 4)$</p> <p>$= 2x(3x + 4) - 1(3x + 4)$</p> <p>$= (3x + 4)(2x - 1)$</p> <p>$= 6x^2 + 5x - 4$</p>

5/10

ANOTHER DIMENSION

The volume of a right prism with a rectangular base is $2x^3 - 13x^2 + 17x + 12$.

The height of the prism is $x - 3$.

What are the possible dimensions of its base?



$$V = 2x^3 - 13x^2 + 17x + 12$$

$$h = (x - 3)$$

$$\begin{array}{r}
 2x^2 - 7x - 4 \\
 x-3 \overline{) 2x^3 - 13x^2 + 17x + 12} \\
 \underline{2x^3 - 6x^2} \\
 - 7x^2 + 17x \\
 \underline{-7x^2 + 21x} \\
 -4x + 12 \\
 \underline{-4x + 12} \\
 0 \\
 0
 \end{array}$$

Factor

$$2x^2 - 7x - 4$$

$$(2x^2 - 1x)(8x - 4)$$

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

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

$$\begin{array}{r}
 -8 \\
 \hline
 1 \quad -8
 \end{array}$$

$$\begin{aligned}
 2x^2 - x + 8x - 4 \\
 = 2x^2 + 7x - 4
 \end{aligned}$$

9/10

FAIR AND SQUARE

Which of the following trinomials are perfect squares?

If they are perfect squares, factor them.

If they are not perfect squares, explain why they are not.

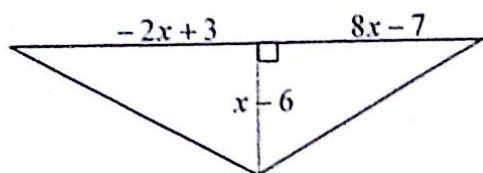
a)	$x^2 - 12x + 36$	$(x-6)^2$
b)	$x^2 + 4x + 16$	
c)	$4x^2 + 20x - 25$	
d)	$9x^2 + 24x + 16$	
e)	$x^2 - x + 49$	

0/10

5

FIGURATIVELY SPEAKING

Determine the simplified algebraic expression that represents the area of the figure below.



$$A_T = \frac{(8x-7)(x-6)}{2} + \frac{(2x+3)(x-6)}{2}$$

$$= \frac{8x^2 - 48x - 7x + 42}{2} + \frac{2x^2 - 12x + 3x - 18}{2}$$

$$= \frac{8x^2 - 55x + 42}{2} + \frac{2x^2 - 9x - 18}{2}$$

$$= \frac{4x^2 - 55}{2} + 21 + \frac{x^2 - 9x - 9}{2}$$

$$\frac{-2x+3 + 8x-7}{2} (x-6)$$

$$= (6x-4)(x-6)$$

$$\frac{6x^2 - 36x - 4x + 24}{2}$$

$$= \frac{6x^2 - 40x + 24}{2}$$

$$3x^2 - 20x + 12$$