

1) (2 points) What does it mean to factor?

garlic

2) (2 points) What is the first step of factoring?

pesto

3) (3 points each) Find the GCF of the following:

a) x^2y^3, x^5y^3, x^4y^2

$$x^2y^2$$

b) $-16p^7, 8p^5q, 40p^8q^2$

$$8p^5 \text{ (or } -8p^5)$$

4) (3 points each) Factor out the GCF from the following:

a) $50y^2 - 50xy^2 + 5x^2y^2$

$$5y^2(10 - 10x + x^2)$$

b) $5t^2(x+6) - (x+6)$

$$(5t^2 - 1)(x + 6)$$

5) (4 points each) Factor completely:

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

$$(x - 6)(x + 2)$$

b) $x^2 + 10x + 25$

$$(x + 5)^2$$

c) $(x^3 - 7x^2) \div (6x - 42)$

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

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

d) $(2a^2 + ab) \div (-6a - 3b)$

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

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

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6) (3 points each) S'more factoring completely:

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

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

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

c) $x^4 - 625$

$$(x^2 + 25)(x^2 - 25)$$

$$(x^2 + 25)(x+5)(x-5)$$

b) $-5w^4 - 15w^3 + 90w^2$

$$-5w^2(w^2 + 3w - 18)$$

$$-5w^2(w-3)(w+6)$$

d) $8x^3 - 8$

$$8(x^3 - 1)$$

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

7) (1 point each) Match the factored form to the expanded form:

T $(a+b)^2$

A: $a^2 - 2ab + b^2$

A $(a-b)^2$

B: $a^2 - b^2$

C $(a+b)(a-b)$

C: $a^3 + b^3$

O $(a+b)(a^2 - ab + b^2)$

D: $a^2 + 2ab + b^2$

S $(a-b)(a^2 + ab + b^2)$

E: $a^3 - b^3$

8) (3 points each) Solve the following equations for the variable:

a) $(8x+7)(5x-2) = 0$

$$8x+7=0$$

$$5x-2=0$$

$$x = -\frac{7}{8}$$

$$x = \frac{2}{5}$$

b) $x^2 + 6x + 5 = 0$

$$(x+5)(x+1) = 0$$

$$x = -5 \quad x = -1$$

c) $-2x^4 - 28x^3 - 96x^2 = 0$

$$-2x^2(x^2 + 14x + 48) = 0$$

$$-2x^2(x+6)(x+8) = 0$$

$$x = 0, -6, -8$$

d) $10x^2 + 11x + 3 = 0$

$$(5x+3)(2x+1) = 0$$

$$x = -\frac{3}{5} \quad x = -\frac{1}{2}$$

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9) (5 points) The product of two consecutive odd whole numbers is 47 more than their sum. What are the two odd numbers?

$x = \text{first odd \#}$
 $x+2 = \text{second odd \#}$

$$(x)(x+2) = 47 + x + x + 2$$

$$x^2 + 2x = 2x + 49$$

$$x^2 - 49 = 0$$

$$(x-7)(x+7) = 0$$

$x = 7$ $x = -7$ ✗

$x+2 = 9$

10) (5 points) While mid-air, a cow gymnast calculates that the distance her hooves off the ground can be approximated by the function $h(t) = -16t^2 + 72t + 88$ where t is time in seconds and h is height in feet. At what time will the cow's hooves land on the ground?

$$-16t^2 + 72t + 88 = 0$$

$$-8(t+1)(2t-11) = 0$$

$t = -1$ ✗

$t = 11/2 = 5.5 \text{ seconds}$

11) (3 points) How do you find the domain of a rational function?

Carefully

12) (4 points) Find the domain of the function $f(x) = \frac{x^2 + 4x + 4}{x^2 + 9x + 8}$.

$$x^2 + 9x + 8 = 0$$

$$(x+8)(x+1) = 0$$

$x \neq -8, -1$

13) (5 points each) Perform the indicated operation. You may leave the answer in factored form:

a) $\frac{x^2 - 2x - 3}{x^2 - 6x - 7} \cdot \frac{x^2 - 5x - 14}{4x^2 + 8x}$

$$\frac{(x-3)(x+1)}{(x-7)(x+1)} \cdot \frac{(x-7)(x+2)}{4x(x+2)}$$

$\frac{x-3}{4x}$

b) $\frac{10x - 50}{x^2 + 6x + 9} \div \frac{x^2 - 25}{x^2 + 8x + 15}$

$$\frac{10(x-5)}{(x+3)^2} \cdot \frac{(x+2)(x+5)}{(x+5)(x-5)}$$

$\frac{10}{x+3}$

14) (3 points each) For the rational expressions $\frac{5}{x^2 - 4}$ and $\frac{7}{8x + 16}$, ...

a) Find the LCD of their denominators:

$$(x+2)(x-2)$$

$$8(x+2)$$

$\text{LCD} = 8(x+2)(x-2)$

b) Rewrite each fraction to have the LCD that you found as the new denominator:

$$\frac{5}{x^2 - 4} = \frac{40}{8(x+2)(x-2)}$$

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

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