PC11 Ch 3 Hand-in Partial Key

Friday, January 20, 2023 3:02 PM

PC11 Ch 3 Hand-in 2023

PreCalc 11 Chapter 3 Assignment – hand in for completion marks

Name: Key

Complete the following questions showing all work and steps where applicable.

1. For each expression below, decide which type of factoring is needed, then put the number of the expression in the appropriate column. (You are not required to give the factorization of the expressions.)

Expressions	A GCF only, no further factoring possible	B GCF if there is one, then difference of squares	C GCF if there is one, then trinomial factoring
1. $21x^2y^2 - 4xy^3 + 2xy^2$ 2. $x^2 + 3x - 40$ 3. $(x-y)^2 - 49$ 4. $x^2 + 7x - 8$ 5. $25 - x^2$ 6. $5x^2 + 15x$ 7. $2x^2 + 8$ 8. $7x^2 - 14x - 21$ 9. $3x^2 - 27$ 10. $5x^2 + 6x + 1$	1, 6, 7	3, 5, 9	2, 4, 8, 10

2. Fully factor each of the following. Expand your answers to check they are correct.

a) $-8x^3y + 12x^5y^4 - 30x^2y^2$

$-2x^2y(4x - 6x^3y^3 + 15y)$

check: $-2x^2y(4x - 6x^3y^3 + 15y)$

$= -8x^3y + 12x^5y^4 - 30x^2y^2$

b) $x^2 - 3x - 28$

No answer given - you can do it!!

c) $6x^2 + 4x - 66$

$= 2(3x^2 + 2x - 33)$

$AC = 3(-33) = -99$

$P = -99$

$S = 2$

$11, -9$

$= 2(3x^2 + 11x - 9x - 33)$

$= 2[x(3x + 11) - 3(3x + 11)]$

$= 2(3x + 11)(x - 3)$

check: $2(3x+11)(x-3)$

$= 2(3x^2 - 9x + 11x - 33)$

$= 2(3x^2 + 2x - 33)$

$= 6x^2 + 4x - 66$ ✓

3. Fully factor each of the following. You do not have to expand your answers to check.

a) $4(x+2)^2 - 25(y-1)^2$

- no GCF
- this is a difference of squares

Let $A = x+2$, $B = y-1$

$\Rightarrow 4A^2 - 25B^2$

$= (2A+5B)(2A-5B)$

$= (2(x+2)+5(y-1))(2(x+2)-5(y-1))$

$= (2x+4+5y-5)(2x+4-5y+5)$

$= (2x+5y-1)(2x-5y+9)$

b) $0.2x^2 + 0.1x - 1.5$

No answer given - you can do it!!

c) $2(x-1)^2 - 5(x-1) - 12$

Let $u = x-1$

$= 2u^2 - 5u - 12$

$AC = 2(-12) = -24$

$P = -24$

$S = -5$

$-8, 3$

$= 2u^2 - 8u + 3u - 12$

$= 2u(u-4) + 3(u-4)$

$= (u-4)(2u+3)$

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

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

$= (x-5)(2x+1)$

4. Solve the following quadratic equations by **factoring** (not by using the quadratic formula).

a) $x^2 - 7x + 12 = 0$

$(x-4)(x-3) = 0$

$x-4=0$ → $x=4$

$x-3=0$ → $x=3$

b) $2x^2 + 3x = 12 - 7x$

$+7x \quad +7x$

$2x^2 + 3x + 7x = 12$

$-12 \quad -12$

$2x^2 + 10x - 12 = 0$

$2(x^2 + 5x - 6) = 0$

$2(x-1)(x+6) = 0$

$x-1=0$ → $x=1$

$x+6=0$ → $x=-6$

c) $10x^2 + x + 3 = 0$

$AC = 10(-3) = -30$

$P = -30$

$S = 1$

$6, -5$

$10x^2 + 6x - 5x - 3 = 0$

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

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

$5x+3=0$

$5x=-3$

$x = \frac{-3}{5}$

$2x-1=0$

$2x=1$

$x = \frac{1}{2}$

d) $3x^2 - 4x = 7$

No answer given - you can do it!!

5. Solve the following quadratic equations. Verify each solution. For part (a), begin by giving the restrictions.

a) $\left(\sqrt{x+11}\right)^2 = (x+5)^2$

$x+11 \geq 0$

$x \geq -11$

$x+11 = (x+5)(x+5)$

$x+11 = x^2+10x+25$

$0 = x^2+9x+14$

$0 = (x+2)(x+7)$

$x=-2$ $\quad$ ~~$x=-7$~~

check $x=-2$

LS	RS
$\sqrt{-2+11}$	$-2+5$
$\sqrt{9}$	3
3	✓

check $x=-7$

LS	RS
$\sqrt{-7+11}$	$-7+5$
$\sqrt{4}$	-2
2 ≠	

no

b) $(x-4)^2 - 15 = 21$

$+15 \quad +15$

$(x-4)^2 = 36$

$\sqrt{(x-4)^2} = \pm\sqrt{36}$

$x-4 = \pm 6$

$x = 4 \pm 6$

$4+6 = 10$

$4-6 = -2$

check:

LS	RS
$(10-4)^2 - 15$	21
$(6)^2 - 15$	✓
$36 - 15$	
21 ✓	

LS	RS
$(-2-4)^2 - 15$	21
$(-6)^2 - 15$	✓
$36 - 15$	
21 ✓	

6. Determine the discriminant of the following, then use it to determine whether the equation has NO, ONE, or TWO real roots:

a) $-9x^2 - 12x - 5 = 0$

$D = b^2 - 4ac$

$a = -9$
$b = -12$
$c = -5$

$D = (-12)^2 - (4)(-9)(-5)$
$= 144 - 180$
$= -36$
$D < 0$, so NO real roots

b) $5x^2 - 3x - 7 = 0$

No answer given - you can do it!!

7. Determine what value of k is needed for each option, for this equation: $2x^2 + 8x + k = 0$

a) The equation has no real roots

$D = b^2 - 4ac$
$= 8^2 - (4)(2)k$
$= 64 - 8k$

$\Rightarrow D < 0$
$64 - 8k < 0$
$\frac{-8k}{-8} < \frac{-64}{-8}$

$k > 8$

b) The equation has exactly one real root

$\Rightarrow D = 0$
$64 - 8k = 0$
$\frac{-8k}{-8} = \frac{-64}{-8}$

$k = 8$

c) The equation has two real roots

$\Rightarrow D > 0$
$64 - 8k > 0$
$\frac{-8k}{-8} > \frac{-64}{-8}$

$k < 8$

8. **Solve** the following equations, using the quadratic formula. Give solutions in simplest form. Do not convert answers to decimals.

a) $5x^2 + 16x + 3 = 2x^2 + 10x + 7$

$-2x^2 \quad -10x \quad -7 \quad -2x^2 \quad -10x \quad -7$

$3x^2 + 6x - 4 = 0$

$a = 3$
$b = 6$
$c = -4$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-6 \pm \sqrt{(6)^2 - (4)(3)(-4)}}{2(3)}$$

$$= \frac{-6 \pm \sqrt{36 + 48}}{6}$$

$$= \frac{-6 \pm \sqrt{84}}{6}$$

$$= \frac{-6 \pm \sqrt{4 \cdot 21}}{6}$$

$$= \frac{-6 \pm 2\sqrt{21}}{6}$$

$$= \frac{2(-3 \pm \sqrt{21})}{2(3)}$$

$$= \frac{-3 \pm \sqrt{21}}{3}$$

$$x = \frac{-3 + \sqrt{21}}{3} \qquad x = \frac{-3 - \sqrt{21}}{3}$$

b) $x(x - 6) + 3(x + 11) = 40$

No answer given -
you can do it!! (start by distributing,
then collecting all terms to one side)