Math11U - Functions

U1L3 - Factoring Practice (part of Asynch 1)

Factor by finding the Common Factor.

gross question.

1) $360xamy + 40xam^2 - 135m^2ay - 15m^3a$

$= 5am(72xy + 8xm - 27my - 3m^2)$

2) $196xy - 252x + 252by - 324b$

$= 4(49xy - 63x + 63by - 81b)$

Factor by grouping.

3) $8n^3 - 10n^2 - 20n + 25$

$= 2n^2(4n-5) - 5(4n-5)$

$= (4n-5)(2n^2-5)$

4) $6v^3 + 3v^2 + 10v + 5$

$= 3v^2(2v+1) + 5(2v+1)$

$= (2v+1)(3v^2+5)$

Factor each Difference of Squares completely.

5) $4x^2 - 1$

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

6) $4x^2 - 9$

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

7) $25a^2 - 4$

$= (5a-2)(5a+2)$

8) $16b^2 - 1$

$= (4b-1)(4b+1)$

9) $x^2 - 4$

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

10) $16n^2 - 25$

$= (4n-5)(4n+5)$

$(a+b)^2$

$a^2 + 2ab + b^2$

Factor each Perfect Square completely.

11) $25n^2 - 40n + 16$

root: $5n$ root 4 $(5n)(4) = 20n$. doubled! $40n$

$= (5n - 4)^2$

sign in middle. root of 1st root of 3rd

12) $9k^2 - 12k + 4$

$\Rightarrow (3k-2)^2$

×	+
$(9)(4)$	-12
$=36$	

$-6, -6 \Rightarrow$ Square

13) $m^2 + 2m + 1$

×	+
1	2

1, 1 Square!

$= (m+1)^2$

14) $16m^2 - 24m + 9$

×	+
144	-24

$-12, -12$

$= 16m^2 - 12m - 12m + 9$

$= 4m(4m-3) - 3(4m-3)$

$= (4m-3)(4m-3) = (4m-3)^2$

Factor each completely. Note - check for common factors and some might not be factorable!

15) $n^3 + 5n^2$

$= n^2(n+5)$

16) $n^2 + 8n + 12$

×	+
12	8

6, 2

$=(n+6)(n+2)$

when there is a "1" on the "squared term" you can just use these numbers

17) $4n^2 - 36n + 56$

Always check for common factors

$= 4(n^2 - 9n + 14)$

×	+
+14	−9

−7, −2.

$= 4(n-7)(n-2)$

18) $v^2 + 14v - 90$

×	+
−90	+14

no such #'s!

does not factor!

(dnf)

19) $x^4 - 3x^3 - 4x^2$

$= x^2(x^2 - 3x - 4)$

×	+
−4	−3

−4, +1

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

20) $x^2 + 2x - 8$

×	+
−8	+2

$= (x+4)(x-2)$ 4, −2

21) $n^2 - 3n + 3$

×	+
+3	−3

no such #'s

d. n. f.

22) $n^4 - 10n^3$

$= n^3(n - 10)$

Factor each completely. Note - there are no common factors here.

23) $3a^2 + 17a + 10$

$= 3a^2 + 15a + 2a + 10$ (Two By Two!)

$= 3a(a+5) + 2(a+5)$

$= (a+5)(3a+2)$

×	+
+30	+17

15, 2

24) $2n^2 + 11n - 40$

$= 2n^2 + 16n - 5n - 40$

$= 2n(n+8) - 5(n+8)$

$= (n+8)(2n-5)$

×	+
$2\times(-40)$ -80	11

80

1 80

2 40

4 10

5 16

16, −5

25) $2x^2 - 3x - 2$

$= 2x^2 + x - 4x - 2$

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

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

×	+
−4	−3

−4, +1

26) $7n^2 - 17n - 12$

$= 7n^2 + 4n - 21n - 12$

$= n(7n+4) - 3(7n+4)$

$= (7n+4)(n-3)$

×	+
$(7)(-12)$ $=-84$	−17

84

1 84

2 42

3 28

4 21

−21, +4

27) $9k^2 + 46k - 48$

$= 9k^2 + 54k - 8k - 48$

$= 9k(k+6) - 8(k+6)$

$= (k+6)(9k-8)$

×	+
$(9)(-48)$ -432	+46

432

1 432

2 216

3 144

4 108

6 72

8 54

54, −8

28) $9n^2 - 86n + 45$

$= 9n^2 - 81n - 5n + 45$

$= 9n(n-9) - 5(n-9)$

$= (n-9)(9n-5)$

×	+
405	−86

405

1 405

3 135

5 81

9 45

−81, −5

29) $10a^2 + 91a - 90$

$= 10a^2 - 9a + 100a - 90$

$= a(10a-9) + 10(10a-9)$

$= (10a-9)(a+10)$

×	+
−900	91

900

1 900

2 450

3 300

4 225

5 180

6 150

9 100

100, −9

30) $9b^2 - 16b + 7$

$= 9b^2 - 9b - 7b + 7$

$= 9b(b-1) - 7(b-1)$

$= (b-1)(9b-7)$

×	+
63	−16

−9, −7

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

$6x^2 + 10x - 9x - 15$

$= 6x^2 + 1x - 15$

$\times \quad + \quad *$