Unit 3 Pretest Review Unit 3

MPM2D

Jensen

1) Expand and simplify each of the following

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

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

$= x^2+x-6$

b) $(y+6)(y+2)$

$= y^2+2y+6y+12$

$= y^2+8y+12$

c) $(x+4)(x-5)$

$= x^2-5x+4x-20$

$= x^2-x-20$

d) $(x-8)(x-6)$

$= x^2-6x-8x+48$

$= x^2-14x+48$

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

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

$= x^2-4y^2$

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

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

$= 2x^2-5x-3$

g) $(2x-7y)(2x-5y)$

$= 4x^2-10xy-14xy+35y^2$

$= 4x^2-24xy+35y^2$

h) $(3-2s)(2-3s)$

$= 6-9s-4s+6s^2$

$= 6s^2-13s+6$

i) $2(x-7)(2x+1)$

$= (2x-14)(2x+1)$

$= 4x^2+2x-28x-14$

$= 4x^2-26x-14$

j) $(x+3)(x+6)-2(x+1)$

$= x^2+6x+3x+18-2x-2$

$= x^2+7x+16$

k) $-(m+7)(m-1)+4(2m+1)(3m-4)$

$= -(m^2-m+7m-7)+4(6m^2-8m+3m-4)$

$= -(m^2+6m-7)+4(6m^2-5m-4)$

$= -m^2-6m+7+24m^2-20m-16$

$= 23m^2-26m-9$

l) $-6(2x+1)(6x+1)+3(4x-3)^2$

$= -6(12x^2+2x+6x+1)+3(16x^2-12x-12x+9)$

$= -6(12x^2+8x+1)+3(16x^2-24x+9)$

$= -72x^2-48x-6+48x^2-72x+27$

$= -24x^2-120x+21$

2) Factor each of the following, if possible

a) x^2+3x

$= x(x+3)$

b) $2x^2+10x$

$= 2x(x+5)$

c) $3x^2+6x$

$= 3x(x+2)$

d) $3x+6y$

$= 3(x+2y)$

e) $17ac-34ad$

$= 17a(c-2d)$

f) $16x^2y^2-24xy$

$= 8xy(2xy-3)$

g) $27x^3y^3+18x^2y^2+9xy$

$= 9xy(3x^2y^2+2xy+1)$

h) $2x(x+7)+3(x+7)$

$= (x+7)(2x+3)$

i) $a(b-7)+2(b-7)$

$=(b-7)(a+2)$

j) $4s(r+u)-3(r+u)$

$=(r+u)(4s-3)$

k) $y(x+s)+z(x+s)$

$=(x+s)(y+z)$

l) $ax+ay+3x+3y$

$=a(x+y)+3(x+y)$

$=(x+y)(a+3)$

m) $4x^2+6xy+12y+8x$

$=4x^2+8x+6xy+12y$

$=4x(x+2)+6y(x+2)$

$=(x+2)(4x+6y)$

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

n) $9x^2-6x+6x-4$

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

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

o) $16x^2-12xy-12xy+9y^2$

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

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

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

p) $3x^2+6x-2x+10$

Not possible

3) Factor each of the following, if possible

a) $x^2 + 5x + 6$

$2 \times 3 = 6$
$2 + 3 = 5$

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

b) $x^2 + 12x + 27$

$9 \times 3 = 27$
$9 + 3 = 12$

$= (x+9)(x+3)$

c) $x^2 - 3x - 18$

$-6 \times 3 = -18$
$-6 + 3 = -3$

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

d) $d^2 - 12d + 35$

$-7 \times -5 = 35$
$-7 + -5 = -12$

$= (d-7)(d-5)$

e) $c^2 - 11c + 30$

$-6 \times -5 = 30$
$-6 + -5 = -11$

$= (c-6)(c-5)$

f) $x^2 - x - 72$

$-9 \times 8 = -72$
$-9 + 8 = -1$

$= (x-9)(x+8)$

g) $3x^2 - 12x - 36$

$= 3(x^2 - 4x - 12)$

$-6 \times 2 = -12$
$-6 + 2 = -4$

$= 3(x-6)(x+2)$

h) $-2x^2 + 2x + 4$

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

$-2 \times 1 = -2$
$-2 + 1 = -1$

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

i) $6x^2 - 42x + 72$

$= 6(x^2 - 7x + 12)$

$-4 \times -3 = 12$
$-4 + -3 = -7$

$= 6(x-4)(x-3)$

j) $2x^2 + 7x + 3$

$6 \times 1 = 6$
$6 + 1 = 7$

$= 2x^2 + 6x + 1x + 3$
$= 2x(x+3) + 1(x+3)$
$= (x+3)(2x+1)$

k) $6x^2 + 11x + 4$

$8 \times 3 = 24$
$8 + 3 = 11$

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

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

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

l) $6x^2 + 10x - 4$

$6 \times -1 = -6$
$6 + -1 = 5$

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

$= 2(3x^2 + 6x - 1x - 2)$

$= 2[3x(x + 2) - 1(x + 2)]$

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

m) $2d^2 - 11d - 6$

$-12 \times 1 = -12$
$-12 + 1 = -11$

$= 2d^2 - 12d + 1d - 6$

$= 2d(d - 6) + 1(d - 6)$

$= (d - 6)(2d + 1)$

n) $6x^2 - 29x + 35$

$-14 \times -15 = 210$
$-14 + -15 = -29$

$= 6x^2 - 14x - 15x + 35$

$= 2x(3x - 7) - 5(3x - 7)$

$= (3x - 7)(2x - 5)$

o) $4r^2 - 20r + 25$

$-10 \times -10 = 100$
$-10 + -10 = -20$

$= 4r^2 - 10r - 10r + 25$

$= 2r(2r - 5) - 5(2r - 5)$

$= (2r - 5)(2r - 5)$

$= (2r - 5)^2$

p) $-6x^2 - 34x + 12$

$18 \times -1 = -18$
$18 + -1 = 17$

$= -2(3x^2 + 17x - 6)$

$= -2(3x^2 + 18x - 1x - 6)$

$= -2[3x(x + 6) - 1(x + 6)]$

$= -2(x + 6)(3x - 1)$

q) $6x^2 - 5xy - 4y^2$

$-8 \times 3 = -24$
$-8 + 3 = -5$

$= 6x^2 - 8xy + 3xy - 4y^2$

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

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

r) $x^4 - 7x^2 - 18$

$-9 \times 2 = -18$
$-9 + 2 = -7$

$= (x^2)^2 - 7(x^2) - 18$

Let $k = x^2$

$= k^2 - 7k - 18$

$= (k - 9)(k + 2)$

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

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

4) Expand each of the following

a) $(x+3)^2$

$= (x+3)(x+3)$

$= x^2+3x+3x+9$

$= x^2+6x+9$

b) $(x-6)^2$

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

$= x^2-6x-6x+36$

$= x^2-12x+36$

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

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

$= 9x^2+6xy+6xy+4y^2$

$= 9x^2+12xy+4y^2$

d) $(3x+y)(3x-y)$

$= 9x^2-3xy+3xy-y^2$

$= 9x^2-y^2$

e) $(v-2)(v+2)$

$= v^2+2v-2v-4$

$= v^2-4$

f) $(x+6)(x-6)$

$= x^2-6x+6x-36$

$= x^2-36$

5) Factor each of the following

a) x^2-25

$= (x)^2-(5)^2$

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

b) y^2-49

$= (y)^2-(7)^2$

$= (y-7)(y+7)$

c) $36x^2-y^2$

$= (6x)^2-(y)^2$

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

d) $x^2+14x+49$

$7 \times 7 = 49$

$7+7 = 14$

$= (x+7)(x+7)$

$= (x+7)^2$

e) x^2-6x+9

$-3 \times -3 = 9$

$-3+-3 = -6$

$= (x-3)(x-3)$

$= (x-3)^2$

f) $4x^2-12xy+9y^2$

$-6 \times -6 = 36$

$-6+-6 = -12$

$= 4x^2-6xy-6xy+9y^2$

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

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

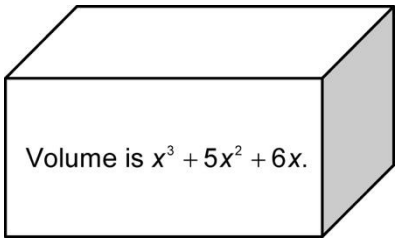
$= (2x-3y)^2$

6) Determine expressions to represent the dimensions of this rectangular prism.

$V = x(x^2 + 5x + 6)$

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

$2 \times 3 = 6$
$2 + 3 = 5$



Length $= x$
Width $= x+2$
Height $= x+3$

7) A square has side length $4a$. One dimension is increased by 6 and the other is decreased by 6.

a) Write an algebraic expression to represent the area of the resulting rectangle.

$A = (4a+6)(4a-6)$

b) Expand this expression and simplify.

$A = 16a^2 - 24a + 24a - 36$

$A = 16a^2 - 36$

ANSWERS:

1)a) x^2+x-6 **b)** $y^2+8y+12$ **c)** x^2-x-20 **d)** $x^2-14x+48$ **e)** x^2-4y^2 **f)** $2x^2-5x-3$ **g)** $4x^2 - 24xy + 35y^2$
h) $6s^2 - 13s + 6$ **i)** $4x^2 - 26x - 14$ **j)** $x^2 + 7x + 16$ **k)** $23m^2 - 26m - 9$ **l)** $-24x^2 - 120x + 21$

2)a) $x(x+3)$ **b)** $2x(x+5)$ **c)** $3x(x+2)$ **d)** $3(x + 2y)$ **e)** $17a(c - 2d)$ **f)** $8xy(2xy - 3)$ **g)** $9xy(3x^2y^2 + 2xy + 1)$ **h)** $(x + 7)(2x + 3)$
i) $(b - 7)(a + 2)$ **j)** $(r + u)(4s - 3)$ **k)** $(x + s)(y + z)$ **l)** $(a + 3)(x + y)$ **m)** $2(x + 2)(2x + 3y)$ **n)** $(3x+2)(3x-2)$ **o)** $(4x-3y)^2$ **p)** not factorable

3)a) $(x+3)(x+2)$ **b)** $(x+3)(x+9)$ **c)** $(x-6)(x+3)$ **d)** $(d - 5)(d - 7)$ **e)** $(c - 5)(c - 6)$ **f)** $(x - 9)(x + 8)$ **g)** $3(x - 6)(x + 2)$
h) $-2(x - 2)(x + 1)$ **i)** $6(x - 4)(x - 3)$ **j)** $(x + 3)(2x + 1)$ **k)** $(2x + 1)(3x + 4)$ **l)** $2(x + 2)(3x - 1)$ **m)** $(d - 6)(2d + 1)$
n) $(2x - 5)(3x - 7)$ **o)** $(2r - 5)(2r - 5)$ **p)** $-2(3x-1)(x+6)$ **q)** $(3x-4y)(2x+y)$ **r)** $(x - 3)(x + 3)(x^2 + 2)$

4)a) x^2+6x+9 **b)** $x^2 - 12x + 36$ **c)** $9x^2 + 12xy + 4y^2$ **d)** $9x^2-y^2$ **e)** $v^2 - 4$ **f)** $x^2 - 36$

5)a) $(x-5)(x+5)$ **b)** $(y-7)(y+7)$ **c)** $(6x-y)(6x+y)$ **d)** $(x+7)^2$ **e)** $(x-3)^2$ **f)** $(2x - 3y)^2$

6) $x(x+3)(x+2)$

7)a) $(4a+6)(4a-6)$ **b)** $16a^2-36$