

**Section 5.2a – Practice Problems****EMERGING LEVEL QUESTIONS**

Factor out the greatest common factor

1.  $18x^3 - 27x$

GCF:  $9x$

$9x(2x^2 - 3)$

2.  $24a^3 + 18a$

GCF:  $6a$

$6a(4a^2 + 3)$

3.  $\frac{1}{3}y^2 - \frac{4}{3}y$

GCF:  $\frac{1}{3}y$

$\frac{1}{3}y(y - 4)$

4.  $3x^2 + 3x - 6$

GCF:  $3$

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

5.  $8b^2 - 4b + 20$

GCF:  $4$

$4(2b^2 - b + 5)$

6.  $5c^5 - 10c^3 + 15c$

GCF:  $5c$

$5c(c^4 - 2c^2 + 3)$

7.  $12x^3y + 6xy^2$

GCF:  $6xy$

$6xy(2x^2 + y)$

8.  $6x^7 - 9x^6 - 57x^5 + 3x^4$

GCF:  $3x^4$

$3x^4(2x^3 - 3x^2 - 19x + 1)$

Factor

9.  $x(2x + 1) + 3(2x + 1)$

$$\underbrace{x(2x + 1) + 3(2x + 1)}_{\text{Factor}}$$
  

$$\boxed{(2x+1)(x+3)}$$

10.  $x(x + 1) + (x + 1)$

$$\underbrace{x(x + 1) + (x + 1)}_{\text{Factor}}$$
  

$$\boxed{(x+1)(x+1)}$$

11.  $3y(3y + 1) - 2(3y + 1)$

$$\underbrace{3y(3y + 1) - 2(3y + 1)}_{\text{factor}}$$
  

$$\boxed{(3y+1)(3y-2)}$$

12.  $6y^2(y - 3) + 5(y - 3)$

$$\underbrace{6y^2(y - 3) + 5(y - 3)}_{\text{Factor}}$$
  

$$\boxed{(6y^2+5)(y-3)}$$

13.  $a(a + 2b) + b(a + 2b)$

$$\boxed{(a+2b)(a+b)}$$

14.  $3c(1 - 2d) - 2d(1 - 2d)$

$$\boxed{(3c-2d)(1-2d)}$$

15.  $x(x - 1) - 3(1 - x)$

$$\begin{aligned} & \xrightarrow{(1-x)} \\ & x(x-1) - 3(-1)(x-1) \quad \rightarrow -1(-1+x) \\ & \quad \quad \quad \quad \quad \quad \quad \rightarrow -1(x-1) \\ & x(x-1) + 3(x-1) \\ & \boxed{(x+3)(x-1)} \end{aligned}$$

16.  $(x + 1)(x + 1) - 3(x + 1)$

$$(x+1)$$

## PROFICIENT LEVEL QUESTIONS

Factor by grouping

17.  $x^2 + xy + 2x + 2y$

$$x(x+y) + 2(x+y)$$

$$(x+y)(x+2)$$

18.  $a^2 + ab - 2a - 2b$

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

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

19.  $6y^2 + 12y - 3y - 6$

$$6y(y+2) - 3(y+2)$$

$$(6y-3)(y+2)$$

20.  $a^2 - 5a + ab - 5b$

$$a(a-5) + b(a-5)$$

$$(a-5)(a+b)$$

21.  $x^2 + 2x - 2y - xy$

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

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

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

22.  $1 + b - a - ab$

$$1(1+b) - a(1+b)$$

$$(1+b)(1-a)$$

23.  $2x^3 + 12x^2 - 5x - 30$

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

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

24.  $x^3 + 5x^2 - 3x - 15$

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

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

25.  $2x^3 - 6x^2 - 9x + 27$

$$2x^2(x-3) - 9(x-3)$$

$$(x-3)(2x^2-9)$$

26.  $3b^3 + a^2b - 3a - ab^4$

$$3b(b^2+a^2) - 3a(b^4-1)$$

Doesn't work by rearranging

$$3b^3 - 3a + a^2b - ab^4$$

$$3(b^3-a) - ab(-a+b^3)$$

$$3(b^3-a) - ab(b^3-a)$$

$$(b^3-a)(3-ab)$$

**EXTENDING LEVEL QUESTION**

27. Determine the shaded area in factored form, if the circles are each of radius  $r$ .

Area of whole shaded square

$$(4r)^2 = 16r^2$$

Area of 1 circle

$$\pi r^2 \text{ we have 4}$$

so  $4\pi r^2$  for all.

$$\text{Area of shaded} : 16r^2 - 4\pi r^2$$

$$4r^2(4-\pi)$$

