

Show all work for partial credit.

1. Divide. Simplify and write answer using positive exponents only. $\frac{3a^2 - 8a^3}{2a^3}$

$$\frac{3a^2}{2a^3} - \frac{8a^3}{2a^3} = \boxed{\frac{3}{2a} - 4}$$

Factor completely each of the following problems 2-13. If it is prime, say "Prime".

2. $4x^2y - 10x^3y^4$

$$\boxed{2x^2y(2 - 5xy^3)}$$

3. $3x(x-1) - 2(x-1)$

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

4. $6ax + 3a + 16x + 8$

$$3a(2x+1) + 8(2x+1) = \boxed{(2x+1)(3a+8)}$$

5. $18x^2 - 9x - 20$

$$= 18x^2 + 15x - 24x - 20$$

$$3x(6x+5) - 4(6x+5) = \boxed{(6x+5)(3x-4)}$$

6. $20x^2 + 4x - 3$

$$= 20x^2 - 6x + 10x - 3$$

$$2x(10x-3) + 1(10x-3) = \boxed{(10x-3)(2x+1)}$$

7. $x^2 - 25$

$$= \boxed{(x+5)(x-5)}$$

difference of 2 squares!

18
x20
360
1.360
2.180
3.120
4.90
5.72
6.60
8.45
9.40
10.36
12.30
15.24
18.20

8. $x^2 + 25$ sum of 2 squares Prime

9. $x^2 - 10x + 25$ perfect square trinomial $(x-5)^2$

$\begin{array}{r} 25 \\ 1 \cdot 25 \\ -5 \cdot 5 \end{array}$ $x^2 - 5x - 5x + 25$
 $x(x-5) - 5(x-5) = (x-5)(x-5)$

10. $x^2 + 24x - 25$
 $\begin{array}{r} 25 \\ -1 \cdot 25 \\ 5 \cdot 5 \end{array}$ $= x^2 - 1x + 25x - 25$
 $x(x-1) + 25(x-1) = \boxed{(x-1)(x+25)}$

11. $2x^2 + 4x - 16$ $GCF=2$ $= 2(x^2 + 2x - 8)$
 $\begin{array}{r} 8 \\ 1 \cdot 8 \\ -2 \cdot 4 \end{array}$ $2(x^2 - 2x + 4x - 8)$
 $2[x(x-2) + 4(x-2)] = \boxed{2(x-2)(x+4)}$

12. $x^3 + 3x^2 - x - 3$
 $x^2(x+3) - 1(x+3) = (x+3)(x^2-1)$ \rightarrow diff of 2 squares
 $= \boxed{(x+3)(x+1)(x-1)}$

13. $3x^2 - 5x + 10$
 $\begin{array}{r} 30 \\ -1 \cdot 30 \\ -2 \cdot 15 \\ -3 \cdot 10 \\ -5 \cdot 6 \end{array}$ } No pairs that add to $-5x$! Thus, PRIME

Solve each of the following problems 14-15.

14. $x^2 + 5x + 4 = 0$
 $x^2 + 1x + 4x + 4 = 0$
 $x(x+1) + 4(x+1) = 0$
 $(x+1)(x+4) = 0$
 $x+1=0 \quad x+4=0$
 $\boxed{x=-1 \quad x=-4}$

15. $2x^2 + 7x + 3 = 0$
 $\begin{array}{r} 6 \\ +1 \cdot 6 \\ 2 \cdot 3 \end{array}$ $2x^2 + 1x + 6x + 3 = 0$
 $x(2x+1) + 3(2x+1) = 0$
 $(2x+1)(x+3) = 0$
 $2x+1=0 \quad x+3=0$
 $\boxed{x=-\frac{1}{2} \quad x=-3}$