Mth 098 – Intermediate Algebra – **Practice Exam 4 Solutions**

1. A cubic trinomial has three terms with a highest exponent of three. An example would be: $2x^3 - 5x + 8$

2. $\left(6y^2 - 9y + 4\right) - \left(-2y^2 - y - 8\right)$
$= 6y^2 - 9y + 4 + 2y^2 + y + 8$
$= 8y^2 - 8y + 12$

3. $\left(2x^3 + 3\right)\left(x^2 + 3x - 2\right)$
$= 2x^3\left(x^2 + 3x - 2\right) + 3\left(x^2 + 3x - 2\right)$
$= 2x^5 + 6x^4 - 4x^3 + 3x^2 + 9x - 6$

4. $(2x - 5)(x + 7)$
$= 2x^2 + 14x - 5x - 35$
$= 2x^2 + 9x - 35$

5. $(2a - 5)^2$
$= (2a)^2 - 2(2a)(5) + 5^2$
$= 4a^2 - 20a + 25$

6. $(3s + 5t)(3s - 5t)$
$= (3s)^2 - (5t)^2$
$= 9s^2 - 25t^2$

7. $(a + 3b)^2$
$= a^2 + 2(a)(3b) + (3b)^2$
$= a^2 + 6ab + 9b^2$

8.

$$\begin{array}{r l}
 & a \quad -1 \\
a+3 \,\big) & \overline{a^2 + 2a - 13} \\
 & \underline{a^2 + 3a} \\
 & \quad -a - 13 \\
 & \quad \underline{-a - 3} \\
 & \qquad -10
\end{array}
\quad \text{or} \quad
\begin{array}{r|rrr}
-3 & 1 & 2 & -13 \\
 & & -3 & 3 \\
\hline
 & 1 & -1 & -10
\end{array}$$

The answer is then $a - 1 - \dfrac{10}{a+3}$.

9.

$$\begin{array}{r l}
 & 2x + \;4 \\
3x+2 \,\big) & \overline{6x^2 + 16x + 15} \\
 & \underline{6x^2 + 4x} \\
 & \quad 12x + 15 \\
 & \quad \underline{12x + 8} \\
 & \qquad\quad 7
\end{array}$$

So the answer is $2x + 4 + \dfrac{7}{3x+2}$.

10. $\dfrac{15x^3y - 25xy^3}{5xy}$
$= \dfrac{15x^3y}{5xy} - \dfrac{25xy^3}{5xy} = 3x^2 - 5y^2$

11. $-12t^2 + 48t - 36$
$= -12\left(t^2 - 4t + 3\right)$
$= -12(t - 3)(t - 1)$

12. $x^2 + 2x - 24 = (x + 6)(x - 4)$

13. $8y^3 - 4y^2 - 10y + 5$
$= 4y^2(2y - 1) - 5(2y - 1)$
$= (2y - 1)\left(4y^2 - 5\right)$

14. $9b^2 - 25$
$= (3b)^2 - 5^2$
$= (3b+5)(3b-5)$

15. $8b^2 - 2b - 3$
$(8)(-3) = -24 \quad \Rightarrow \quad -6, 4$
$8b^2 - 2b - 3$
$= 8b^2 - 6b + 4b - 3$
$= 2b(4b-3) + (4b-3)$
$= (4b-3)(2b+1)$

16. $4x^2 - 20xy + 25y^2$
$= (2x)^2 - 2(2x)(5y) + (5y)^2$
$= (2x-5y)^2$

17. prime

18. $a^6 + 3a^3 - 10$
$= (a^3)^2 + 3(a^3) - 10$
$= (a^3+5)(a^3-2)$

19. $y^4 - 81$
$= (y^2)^2 - 9^2$
$= (y^2+9)(y^2-9)$

20. $x^2 + x - 12 = 0$
$\Rightarrow \quad (x+4)(x-3) = 0$
$\Rightarrow \quad x+4=0 \quad or \quad x-3=0$
$\Rightarrow \quad x=-4 \qquad x=3$

21. $9a^2 = -18a$
$\Rightarrow \quad 9a^2 + 18a = 0$
$\Rightarrow \quad 9a(a+2) = 0$
$\Rightarrow \quad 9a = 0 \quad or \quad a+2=0$
$\Rightarrow \quad a = 0 \qquad a = -2$

22. When the ball hits the ground, its height above the ground is zero, so we set $h(t)=0$ and solve for *t*.
$h(t) = -5t^2 + 10t + 15 = 0 \quad \Rightarrow \quad -5(t^2 - 2t - 3) = 0 \quad \Rightarrow \quad -5(t-3)(t+1) = 0$
$\Rightarrow \quad t-3=0 \quad or \quad t+1=0$
$\Rightarrow \quad t=3 \quad or \quad t=-1$
Obviously, $t=-1$ is not a possibility, so $t=3$ is the only answer. Therefore, we can say that the ball hit the ground 3 seconds after being thrown into the air.