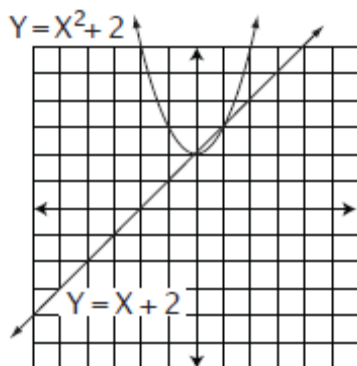


Algebra 2 Pre/Post Placement Test

Answer Key

1. $(X^7 \div X^3) + (X^2 X^2) = (X^{7-3}) + (X^{2+2}) =$
 $X^4 + X^4 = 2X^4$
2. $\frac{A^5 B^{-3}}{B^3 A^2} = A^5 B^{-3} A^{-2} B^{-3} =$
 $A^{5+(-2)} B^{-3+(-3)} = A^3 B^{-6}$ or $\frac{A^3}{B^6}$
3. $\left(\frac{8}{27}\right)^{-\frac{1}{3}} = \left(\frac{27}{8}\right)^{\frac{1}{3}} = \frac{27^{\frac{1}{3}}}{8^{\frac{1}{3}}} = \frac{3}{2}$ or $1\frac{1}{2}$
4. $2\sqrt{5} + 7\sqrt{5} = (2+7)\sqrt{5} = 9\sqrt{5}$
5. $\frac{X}{3+i} = \frac{X(3-i)}{(3+i)(3-i)} = \frac{3X - Xi}{9 - i^2} =$
 $\frac{3X - Xi}{9 - (-1)} = \frac{3X - Xi}{10}$ or $\frac{X(3-i)}{10}$
6. $\frac{3}{1+\sqrt{3}} = \frac{3(1-\sqrt{3})}{(1+\sqrt{3})(1-\sqrt{3})}$
 $= \frac{3-3\sqrt{3}}{1-3} = \frac{3-3\sqrt{3}}{-2}$
7. $\frac{5}{6X} + \frac{4}{3Y} = \frac{5(Y)}{6X(Y)} + \frac{4(2X)}{3Y(2X)} = \frac{5Y + 8X}{6XY}$
8. $5Q^{-1}RQ^2 + 3QR - R = 5Q^{-1+2}R + 3QR - R =$
 $5QR + 3QR - R = 5QR + 3QR - R = 8QR - R$
9. $(.0009)(.027) =$
 $(9.0 \times 10^{-4})(2.7 \times 10^{-2}) =$
 $(9.0 \times 2.7)(10^{-4} \times 10^{-2}) =$
 $24.3 \times 10^{-6} = 2.43 \times 10^{-5}$
 If significant digits are taken into account:
 2.0×10^{-5} (either answer is correct)
10. $\frac{3,700,000}{.002} = \frac{3.7 \times 10^6}{2.0 \times 10^{-3}} =$
 $(3.7 \times 10^6) \div (2.0 \times 10^{-3}) =$
 $(3.7 \div 2.0)(10^6 \div 10^{-3}) =$
 1.85×10^9
 2.0×10^9 with significant digits
11. $2X^2 - 9X = 35$
 $2X^2 - 9X - 35 = 0$
 $X = \frac{-(-9) \pm \sqrt{(-9)^2 - 4(2)(-35)}}{2(2)} =$
 $\frac{9 \pm \sqrt{81 - (-280)}}{4} = \frac{9 \pm \sqrt{361}}{4} = \frac{9 \pm 19}{4}$
 $X = \frac{9+19}{4} \quad X = \frac{9-19}{4}$
 $X = \frac{28}{4} \quad X = \frac{-10}{4}$
 $X = 7 \quad X = -\frac{5}{2}$
 $X = -2\frac{1}{2}$
12. $X^2 + 4X - 4 = -3X$
 $X^2 + 7X - 4 = 0$
 $X = \frac{-(7) \pm \sqrt{(7)^2 - 4(1)(-4)}}{2(1)} =$
 $\frac{-7 \pm \sqrt{49 - (-16)}}{2} = \frac{-7 \pm \sqrt{65}}{2}$
13. sketch parabola and line
 (see graph on next page)
 $Y = X^2 + 2$
 $Y = X + 2 \Rightarrow (X^2 + 2) = X + 2$
 $X^2 - X = 0$
 $(X)(X - 1) = 0$
 $X = 0$
 $Y = X + 2 \Rightarrow Y = (0) + 2$
 $Y = 2$
 solution 1: (0, 2)
 $X - 1 = 0$
 $X = 1$
 $Y = X + 2 \Rightarrow Y = (1) + 2$
 $Y = 3$
 solution 2: (1, 3)



14. sketch circle and hyperbola

$$\begin{aligned} X^2 + Y^2 &= 1 \\ X^2 - Y^2 &= 1 \\ \hline 2X^2 &= 2 \\ X^2 &= 1 \\ X &= \pm 1 \end{aligned}$$

X = 1:

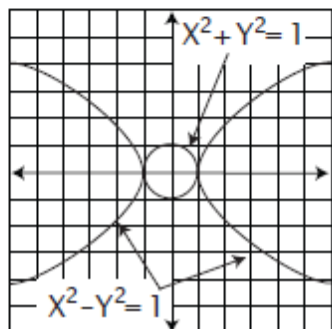
$$\begin{aligned} X^2 + Y^2 = 1 &\Rightarrow (1)^2 + Y^2 = 1 \\ 1 + Y^2 &= 1 \\ Y^2 &= 0 \\ Y &= 0 \end{aligned}$$

solution 1: (1, 0)

X = -1:

$$\begin{aligned} X^2 + Y^2 = 1 &\Rightarrow (-1)^2 + Y^2 = 1 \\ 1 + Y^2 &= 1 \\ Y^2 &= 0 \\ Y &= 0 \end{aligned}$$

solution 2: (-1, 0)



15. $15\% \times \$1,565 = .15 \times \$1,565 = \$234.75$ off

$$\$1,565 - \$234.75 = \$1,330.25$$

16. Weight of NaCl = $23 + 35 = 58$

$$\frac{\text{Na}}{\text{NaCl}} = \frac{23}{58} \approx .40 = 40\%$$

17. $\frac{C}{D} = \frac{5}{18} \Rightarrow \frac{(10)}{D} = \frac{5}{18}$

$$10(18) = 5D$$

$$2(18) = D$$

$$D = 36 \text{ dogs}$$

18. $\frac{10 \text{ km}}{1} \times \frac{.62 \text{ mi}}{1 \text{ km}} = (10)(.62 \text{ mi}) = 6.2 \text{ mi}$

19. $D_M = R_M T_M \Rightarrow D_M = (55)(9)$
 $D_M = 495 \text{ mi}$

$$D_A = R_A T_A$$

$$(495) = (45) T_A \Rightarrow \begin{cases} D_A = D_M \\ R_A = 45 \end{cases}$$

$$T_A = 11 \text{ hours; arrived at 7:00 PM}$$

20.

$$-10(D + Q = 15) \Rightarrow -10D - 10Q = -150$$

$$100(.10D + .25Q = 3.15) \Rightarrow \frac{10D + 25Q = 315}{15Q = 165}$$

$$15Q = 165$$

$$Q = 11 \text{ quarters}$$

$$D + Q = 15 \Rightarrow D + (11) = 15$$

$$D = 4 \text{ dimes}$$

21. integers are N, N + 2, and N + 4

$$3(N) + 2(N + 2) - (N + 4) = 16$$

$$3N + 2N + 4 - N - 4 = 16$$

$$4N = 16$$

$$N = 4$$

*Note that in this line, the entire quantity

(N + 4) is subtracted.

Think of it as

distributing -1 across

the two terms inside

the parentheses.

Integers are 4, 6 and 8.

22. $M_T = 10\%$ mixture; $M_S = 60\%$ mixture

$$-10(M_T + M_S = 100) \Rightarrow -10M_T - 10M_S = -1,000$$

$$100(.10M_T + .60M_S = .45(100)) \Rightarrow \frac{10M_T + 60M_S = 4,500}{50M_S = 3,500}$$
$$M_S = 70 \text{ lb}$$

$$M_T + M_S = 100 \Rightarrow M_T + (70) = 100$$
$$M_T = 30 \text{ lb}$$

23. $R + 6 = 2(A + 6)$

$$R + 6 = 2A + 12$$

$$R = 2A + 6$$

$$(A - 4)(3) = R - 4$$

$$3A - 12 = R - 4$$

$$3A - 8 = R \Rightarrow 3A - 8 = (2A + 6)$$

$$A = 14 \text{ years old}$$

$$R = 2A + 6 \Rightarrow R = 2(14) + 6$$

$$R = 28 + 6$$

$$R = 34 \text{ years old}$$

24. $D_D = R_D T_D$

$$D_D = (B + W) T_D$$

$$(26) = (B + (5))(T_D) \Rightarrow \begin{cases} D_D = 26 \\ W = 5 \end{cases}$$

$$T_D = \frac{26}{B+5}$$

$$D_U = R_U T_U$$

$$D_U = (B - W) T_U$$

$$(6) = (B - (5))(T_U) \Rightarrow \begin{cases} D_U = 6 \\ W = 5 \end{cases}$$

$$T_U = \frac{6}{B-5}$$

$$T_D = T_U \Rightarrow \frac{26}{B+5} = \frac{6}{B-5}$$
$$26(B-5) = 6(B+5)$$
$$26B - 130 = 6B + 30$$
$$20B = 160$$
$$B = 8 \text{ mph}$$