Name Solutions to Pre-AP Algebra II Summer Reading

Solutions to Quiz #1 - Summer Reading Packet

Upcoming MTA2W/T classes

1. Find the slope of the line which goes through the points $(2,-6)$ and $(-7,-12)$.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{(-12) - (-6)}{(-7) - (2)} = \frac{-6}{-9} = \boxed{\frac{2}{3}}$$

2. What is the equation of a line, in point-slope form, that goes through the point $(3,-12)$ and has the slope $-\frac{2}{3}$.

$$y - y_1 = m(x - x_1) \quad \therefore \quad y - (-12) = -\frac{2}{3}(x - 3)$$

$$\boxed{y + 12 = -\frac{2}{3}(x - 3)}$$

3. Simplify:

$x^4 \cdot x^7 = x^{4+7} = \boxed{x^{11}}$

$(3xy)^4 = 3^4 x^4 y^4 = \boxed{81x^4y^4}$

$(2x^3)^4 = 2^4 \cdot x^{12} = \boxed{16x^{12}}$

4. Simplify:

$\frac{7x^6}{14x^9} = \frac{1}{2x^3} = \boxed{\frac{1}{2x^3}}$

$\left(\frac{x^3}{2y}\right)^5 = \boxed{\frac{x^{15}}{32y^5}}$

5. Simplify

$(4x^0y^3)^2 = \boxed{16y^6}$

$\frac{x^{-4}}{x^5} = \frac{1}{x^5 \cdot x^4} = \boxed{\frac{1}{x^9}}$

$\frac{x^{12}}{x^{-4}} = x^{12} \cdot x^4 = \boxed{x^{16}}$

6. Factor

$64x^2 - 9y^2$

$(8x + 3y)(8x - 3y)$

$x^2 - 6x - 7$

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

$49x^2 + 28x + 4$

$(7x + 2)^2$

7. Solve using the Quadratic Formula.

$5x^2 - 4x - 3 = 0$

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(5)(-3)}}{2(5)}$$

$$= \frac{4 \pm \sqrt{16 + 60}}{10} = \frac{4 \pm \sqrt{76}}{10}$$

$$= \frac{4 \pm 2\sqrt{19}}{10} = \boxed{\frac{2 \pm \sqrt{19}}{5}}$$

8. Find the distance between the following points:

$(2,-6)$ and $(-7,-12)$

$$D = \sqrt{(2 - (-7))^2 + (-6 - (-12))^2}$$

$$= \sqrt{9^2 + 6^2}$$

$$= \sqrt{81 + 36}$$

$$= \sqrt{117} = \boxed{3\sqrt{13}}$$

9. Find the Midpoint of the following points:

$(2,-6)$ and $(-7,-12)$

$\left(\frac{2+(-7)}{2}, \frac{(-6)+(-12)}{2}\right) = \left(-\frac{5}{2}, -9\right)$

10. What is the discriminant of the following equation?

$5x^2 - 4x - 3 = 0$

$b^2 - 4ac$

$= (-4)^2 - 4(5)(-3) = 16 + 60 = 76$

11. Determine the harmonic mean of 12 and 15.

$\frac{2(12)(15)}{12+15} = \frac{2 \cdot 12 \cdot 15}{27} = \frac{40}{3}$

12. Using the formula from the packet, find the sum of the first 100 numbers $(1+2+3+\ldots+100)$.

$\frac{100(100+1)}{2} = 5050$

13. Using the formula from the packet, find the sum of the first 20 squares $(1^2+2^2+3^2+\ldots+20^2)$.

$\frac{20(20+1)(2\cdot 20+1)}{6} = \frac{10 \cdot 7 \cdot 41}{1} = 2870$

14. Using the formula from the packet, find the sum of the first 15 cubes $(1^3+2^3+3^3+\ldots+15^3)$.

$\frac{15^2(15+1)^2}{4} = \frac{225(256)}{4} = 14400$

15. What is the law of sines you would use if you knew $\angle A, \angle C$, and side c?

$\frac{\sin A}{a} = \frac{\sin C}{c}$

16. What is the law of cosines you would use if you wanted to solve for $\angle B$?

$b^2 = a^2 + c^2 - 2ac \cdot \cos B$

17. Simplify:

$\frac{x}{r} = \cos\theta$ $\quad \frac{1}{\csc\theta} = \sin\theta$ $\quad \frac{\sin\theta}{\cos\theta} = \tan\theta$

$\frac{y}{x} = \tan\theta$ $\quad \frac{1}{\cos\theta} = \sec\theta$

$\frac{r}{y} = \csc\theta$ $\quad \frac{1}{\sin\theta} = \csc\theta$ $\quad \frac{\cos\theta}{\sin\theta} = \cot\theta$

18. Given the following polynomial, $f(x) = 5x^5 - 3x^4 + 2x^3 + 4x^2 - 7x + 12$, find the . . .

(first = a, b, c; last = 12; odd power)

Sum of the roots:

$-\frac{b}{a} = -\frac{(-3)}{5}$

$= \boxed{\frac{3}{5}}$

Product of the roots:

$-\frac{\text{last}}{\text{first}} = \boxed{-\frac{12}{5}}$

Sum of the squares of the roots:

$\frac{b^2-2ac}{a^2} = \frac{(-3)^2-2(5)(2)}{5^2}$

$= \frac{9-20}{25} = \boxed{\frac{-11}{25}}$

19. Given the following polynomial, $f(x) = 2x^8 - 5x^7 + 3x^3 + 7x^2 - 6x + 13$, find the . . .

(a, b; NO "c" term; even power)

Sum of the roots:

$-\frac{b}{a} = \frac{-(-5)}{2}$

$= \boxed{\frac{5}{2}}$

Product of the roots:

$+\frac{\text{last}}{\text{first}} = \boxed{\frac{13}{2}}$

Sum of the squares of the roots:

Since there is no "x^6" term there is NO "c" coefficient.

$\therefore \frac{b^2-2ac}{a^2} = \frac{(-5)^2-2(2)(0)}{2^2}$

$= \boxed{\frac{25}{4}}$

20. Find the sum of the measures of interior angles of a polygon with 12 sides:

($n = 12$)

$(n-2)(180^\circ) = (12-2)180$

$= \boxed{1800^\circ}$

21. From the number 2520, find the ...

…number of positive integral factors.

$2^3 \cdot 3^2 \cdot 5^1 \cdot 7^1$ $\therefore$ $4 \cdot 3 \cdot 2 \cdot 2$

$= \boxed{48}$

… number of integral factors. $\therefore$ positive & negative

$\therefore 48 \times 2$

$= \boxed{96}$

…sum of the positive integral factors.

$(2^3+2^2+2^1+2^0)(3^2+3^1+3^0)(5^1+5^0)(7^1+7^0)$

$(2^3+2^2+2+1)(3^2+3+1)(5+1)(7+1)$

$15 \cdot 13 \cdot 6 \cdot 8 = \boxed{9360}$

…sum of the integral factors.

positives + negatives = 0

$\therefore 9360 + (-9360) = \boxed{0}$

22. Determine the number of diagonals of a convex polygon with 20 sides.

$\frac{n}{2}(n-3)$ $\therefore$ $\frac{20}{2}(20-3) = 10 \cdot 17 = \boxed{170}$

23. Determine the sum of the terms in the 12 row of Pascal's triangle.

1
1 1
1 2 1
1 3 3 1
1 12 ..... 12 1 ← "12 row"

$\therefore 2^{12} = \boxed{4096}$

24. Find the sum of the coefficients (and constants) in the expansion of $(3x^3 - 4y^2 + 5z - 2)^8$

$(3-4+5-2)^8 = 2^8 = \boxed{256}$

25. What are the first 4 perfect numbers?

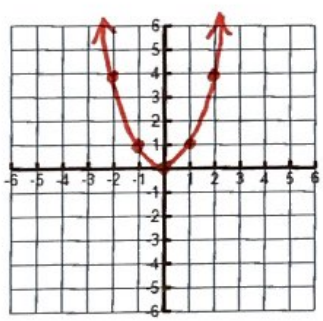
6, 28, 496, 8128

26. Write the following repeating decimal as a fraction in simplest terms.

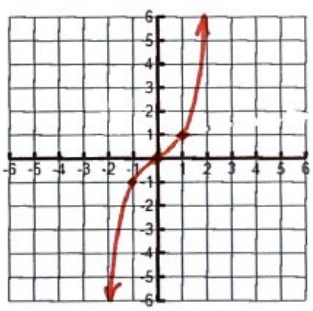
$5.12\overline{34}$ $\frac{51234 - 512}{9900} = \frac{50722}{9900} = \boxed{\frac{25361}{4950}}$

Graph the following:

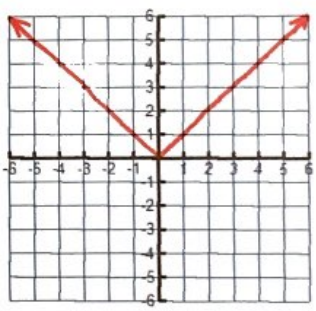
27. $y = x^2$



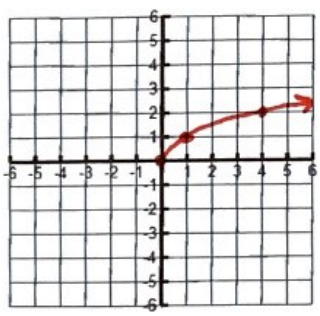
28. $y = x^3$



29. $y = |x|$



30. $y = \sqrt{x}$



31. $y = 2^x$