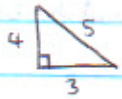
2010 Chiles Mini Mu, Pre-Algebra: Cars, SOLUTIONS

1. $3^2 + 4^2 = y^2$

$25 = y^2$ OR 

$\sqrt{25} = \sqrt{y^2}$ notice 3,4,5 is a Pythagorean Triple

$y = \pm\sqrt{25}$

$y = \pm 5$

A) 5 is a value of y.

2. 57 95

1, 57 1, 95

3, 19 5, 19

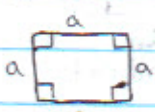
C) 2 numbers are both factors of 57 and 95

3. $\frac{\frac{2}{10}}{\frac{2}{3}} = \frac{2}{10} \cdot \frac{3}{2} = \frac{3}{10}$

$\frac{3}{10}$ (track) = 20

track = $20 \cdot \frac{10}{3} = \frac{200}{3}$

D) $\frac{200}{3}$

4. 

perimeter maximizes the area when the sides are equal

$a + a + a + a = 64$

$4a = 64$

$a = 16$ ← length of each side

Area = (a)(a) = (16)(16) = 256

C) 256

5. total = last season + this season

$= 3d^3 + 2d^2$ ← cannot be simplified further since value of "d" is not given

B) $3d^3 + 2d^2$

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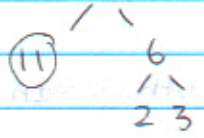
6. 66 prime factorization

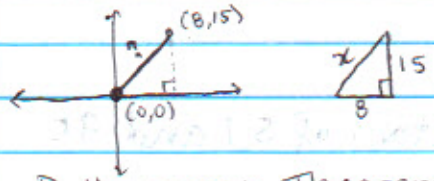


E) NOTA; answer is 11.

7. Integers are $\{\ldots -4, -3, -2, -1, 0, 1, 2, 3, 4 \ldots\}$

E) NOTA; all choices were integers

8.



Pythagorean Theorem

$x^2 = 8^2 + 15^2$

$\sqrt{x^2} = \sqrt{289}$

$x = 17$

A) 17

9. prime numbers: ... 109, 113, 127, 131, 137, 139, 149, 151

four primes between 114 and 141

D) 4

10. 60

1, 60 — 4, 15

2, 30 — 5, 12

3, 20 — 6, 10

these are composite

B) 8

11. $A = \pi r^2 = \sqrt{16}\,\pi = 4\pi$

$r^2 = 4$

$r = 2$

$d = 2r = 2(2) = 4$

B) 4

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12. Area of a sphere's surface $= 4\pi r^2$

$4\pi r^2$, where $r = \pi$

$= 4\pi(\pi)^2$

$= 4\pi^3$

c) $4\pi^3$

13. $\frac{3}{7} \approx .42857\ldots$ ← we must round up

↑ hundredths decimal place

$\approx .43$

B) 0.43

14. $\frac{1951 + (-1)^3(1957)}{3.00}$

$= \frac{1951 + (-1)(-1)(-1)(1957)}{3}$

$= \frac{1951 + (-1)(1957)}{3}$

$= \frac{1951 - 1957}{3}$

$= \frac{-6}{3}$

$= -2$

A) -2

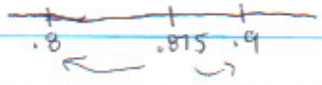
15. 0.1~~8~~ ~~9~~ ~~2~~ ~~8~~0

$-\ 0.13998$

0.03032

A) 0.03032 ← the sides differ by this much

16. $\frac{7}{8} = .875 = 87.5\%$



D) 90% is closer to 87.5% than the other choices

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17. $\tau = \frac{(2^6)(6^2)}{4!}$

$= \frac{(2)(2)(2)(2)(2)(2)(6)(6)}{(4)(3)(2)(1)}$

$= \frac{(8)(36)12}{3}$ because $\frac{36}{3} = \frac{12 \cdot 3}{3} = 12$

$= 8(12)$

$= 96$

D) 96

18. $t^3 + 105{,}000t^2 - 13{,}000$

- these are each terms
- the expression cannot be simplified further

c) 3 terms in the expression

19. $\frac{-(-11(3)) - 3^3}{-(-3+2)}$ ← $(-1)(-1) = 1$ ← distribute (-) ... notice this is $(-1)(-3+2)$

$= \frac{11(3) - 27}{3 - 2}$

$= \frac{33 - 27}{1}$

$= \frac{6}{1}$

$= 6$

6th letter is 1 T 2 H 3 E 4 W 5 I 6 N S...

c) N

20. Square numbers: ... 16, 25, 36, 49, 64, 81 ...

$t = 49$ (between 40 and 60)

$s = t + 25 = 49 + 25 = 74$

c) 74

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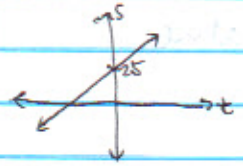
21. $s = t + 25$



A) a line

22. $t = 3$

$r = t^3 - 5 = (3)^3 - 5 = 27 - 5 = 22$ $\quad 28 > 22$

$s = t + 25 = 3 + 25 = 28$

flip $\begin{cases} s > r \\ r < s \end{cases}$

A) $r < s$

23. $\left(3 + \left((7-4) - \frac{6}{3}\right)^{20} + 4\right)(3000)$

$= \left(3 + (3-2)^{20} + 4\right)(3000)$

$= \left(3 + 1^{20} + 4\right)(3000)$

$= (3 + 1 + 4)(3000)$

$= (8)(3000)$

B) 24,000

24. $y = \frac{6}{x-3}$ when $x = 1$

$y = \frac{6}{1-3}$

$y = \frac{6}{-2}$

$y = -3$

E) NOTA

25. $\frac{3}{7} + \frac{8}{49} + x = 1$ ← total

$\frac{3(7)}{7(7)} + \frac{8}{49} + x = \frac{49}{49}$

$\frac{21}{49} + \frac{8}{49} + x = \frac{49}{49}$

$x = \frac{49}{49} - \frac{21}{49} - \frac{8}{49}$

$x = \frac{20}{49}$

B) $\frac{20}{49}$

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26. $|-2006+7|$

$=|-1999|$ take positive of enclosed value

$=1999$

c) 1999

27. anthropomorphic

5 vowels

$\underline{+3}$ ← told to add 3

8

cube root of 8 is 2

A) 2

28. LIGHT $5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 120$

29. 1 billion = $1,000,000,000 = 1 \times 10^9 = 10^9$

1 2 3 4 5 6 7 8 9

c) 10^9

30. $C = 4I$ $I = 1{,}000T$

$C = 4I$ $4I = 4{,}000T$

$C = 4{,}000T$

D) 4,000

C = Cars
I = The Incredibles
T = Toy Story