**Solutions**

1.Prime factors (numbers with exactly 2 factors) of 165 include 3, 5, and 11. The largest of these factors is 11, which is answer choice **C**.

2. 2/5 of 20 (2/5 x 20) is 8 rabbits. Subtract 8 from 20 to find how many are left after Ben captures rabbits to get 12. ¾ of 12 (3/4 x 12) is 9, leaving 12-9 =3 rabbits. **E**

3. The perimeter of the triangle is 6+6+3=15, so half of that is 7.5. **B**

4. The number of arrangements (permutations) of the letters in the word Cenozoic can be taken by computing 8! (the product of numbers between 1 and 8 inclusive), which is 40320. We account for the repeated c and o by dividing the result by 2! \*2!, which gives us 10080. **B**

5. From the point (0,0) Vera goes 5 to the left to the point (-5,0) then walks three units down to (-5,-3) and finally 8 to the right to the light source at (3,-3). **C**

6. Since t is represented in terms of thousands of years, t=3. Plugging in 3 for t into the equation results in p = **=** 1000 + 2300 = 3300. **C**

7.  First notice that the years of each evolution is a hundred time later (1000 x 100 = 100,00 and 100,000 x 100 = 10, 000,00 and so on). The Mass of the rodents double in size during these time periods ( 600 grams is 0.600 kg, 0.600 x 3 = 1.8…). Since the time frame is multiplied by a constant, as does the mass, we can multiple 5.4 by 3 to get the mass in 1 billion years = 16.2 **D**

8.  Simply compute using long division to get 14,593. **B**

9. The time in hours and minuets from 6:34 am to 8:27 pm is 13 hours and 53 minutes. **B**

10. Jim loses and replaces 1 tooth every 14 +5 =19 days. Because only one tooth is being replaced and regrown at one time, it will take Jim 19 \* 73 days to regrow all of his teeth. Converting this to years by dividing by 365, we get 19/5 = 3.8. Rounded up, this is approximately 4 years. **C**

11.There are 60 flightless bird species, 10000 – 60 = 9940 bird species that contain birds that can fly, and (25/100) \* 60 = 15 bird species that contain flightless large birds. Thus, the ratio of flightless large birds to the birds that can fly is 15: 9940, or 3:1988. **B**

12. Because the answer is wanted in feet, we convert all measurements to feet. 42 inches is 3.5 ft (12 inches in a foot), 3 yards is 9 ft (3 feet per yard), 30 inches is 2.5 ft, 96 inches is 8 ft, and 2 yards is 6ft. Averaging these together (taking the sum of all the values and dividing it by the number of values) gives us 56ft/7 or 8ft. **A**

13. Surabhi has 8 \*100 = 800 worldsies. When she spends 52 of them, she is left with 800-52 = 748 worldsies. Shen spends 8 \* 4= 32 worldsies on skull island and is left with 748 – 32 = 716 worldsies. This is equivalent to 716/8 = 89.5 US Dollars. **B**

14. This question uses PEMDAS. In the first set of parentheses, 10 x 15 = 150 and = -2, From left to right 150 + 40 -2 = 188 in the second parentheses, first evaluate the brackets from left to right 23 - 45 + 4 = -18 then divide by two to get -9. Finally 188 – (-9) = 197 **C**

15. The height of the hemispherical part of the footprint is 9ft because we not that the radius of the semicircle is 9ft. The area of the rectangle is 54ft and the base length equals (9-6)\* 2 = 6ft. We assume that the rectangle’s base is centered at the center of the hemisphere because the footprint is vertically symmetrical. The height of the rectangle is equivalent to 54/ 6 = 9ft. The height of the triangle on top of the rectangle is 2\*15/6 = 5ft (using A = ½ bh -> h = 2Ab, where A is the area, b is the base length, and h is the height). Thus the length of the footprint is 5+ 9 + 9 = 23ft. The height of the dinosaur is 23 \* 4 = 92ft. **D**

16. Try drawing it out! If Alex throws the egg 8 ft in front of him and Jason throws the egg 12ft in front of him, the distance between where the balls land is 4ft. Lets assume that both balls land on the farthest edge of the basket, with Jason’s egg landing at the farthest back point, and Alex’s landing at the closest front point. In this case the diameter of the basket would be the difference between where the two balls were thrown and the radius would be half of that (2 ft). **A**

4ft

Alex/Jason

Alex’s egg

Jason’s egg

Basket

17. Let Cyrus’s current age be x. The guardian’s current age would then be 3x. In 30 years, Cyrus’s age will be x + 30 and the Guardian’s age will be 3x + 30. Using information from the second part of the riddle we get 0.6 \* (3x+30) = x +30 -> 1.8x + 18 = x +30 -> 0.8x = 12 -> x=15. **A**

18.  He catches the following butterflies: 1 + 2 + 4 + 8 + 16 + 32 + 64 = 127. **C**

19. We first calculate the number of berries of each color the tree has. 1/4 \* 112 = 28 of the berries are red, 1/7 \* 112 = 16 of the berries are black, 1/14 \* 112 = 8 of the berries are blue and 112 - 28- 16 – 8 = 60 of the berries are green. In order to be guaranteed 1 berry of each color, we think of the longest possible scenario where Wesley chooses all of the red, black, and green berries before he chooses a blue berry ( He collects all of the red, black, and green berries and then has to choose one more blue berry). Thus Wesley will need to select 104 +1 = 105 berries. **E**

20. Solving for °F, we get °F = °C+ 32. If °C = -10, we get °F = -18 + 32 = 14 °F. **D**

21.  The top of the glacier will have a surface area of 6\*7 = 42 m2. Because only 2/3 of the glacier is above water, we don not include the second base of the prism in our calculations. The surface area of the sides will simply be 2/3 of the original sides surface area, which is 2/3 \* 2 ( 6\*9 + 9\*7 ) = 156 m2. Adding the top base we get 156 + 42 = 198 m2. **A**

22. If the glacier is melting at a rate of 45 m3/min, and reforming at a rate of 24 m3/min, its true melting rate is 21 m3/min. The volume of the glacier is 6m \* 7m \* 9m = 378 m3. Thus, the entire glacier will melt in 378/ 21 = 18 minutes.**B**

23. If Brighten can find 1 fossil in 5 minutes, and Rahul can find 1 fossil in 3 minutes, together they can find 1/5 + 1/3 = 8/15 of a fossil in one minute. Thus, it will take them 16 / (8/15) = 2\*15 = 30 minutes to find 16 fossils. **B**

24. M stands for 1000 in roman numerals, X stands for 10 , and I stands for 1. Adding these up we get 2 \* 1000 + 2\* 10 + 1 = 20201. **D**

25. This is an alternating pattern where every odd digit stone is increasing in height by 2ft and every even digit stone is decreasing in height by 2ft. Thus the fifth stone will have a height of 32+2 = 34, the sixth stone will have a height of 24-2 = 22, and the seventh stone will have a height of 34 +2 = 36. Adding these together we get 34 + 22 + 36 = 92 ft. **D**

26.  Going in order starting at Clue 1, the statement is false so the name doesn’t have a “d” in it, eliminating Podocarpus and Pandnus. Clue 2 is also false, so the plant name does have a “u” in it. This eliminates Aralia. The third clue is true so the plant name starts with “A”. This eliminates Palmus. The final clue is true so the name has an s in it. This eliminates Araucarioxylon. The only name left is Alnus. **A**

27. The sum of the angles is 180° and the sum of the angels in a trapezoid is equal to 360°. The sum of the remaining two angels would be 360-180 = 180°. The area of the trapezoid is found by plugging the values to the formula given: ½ x (16 + 40) x 12 = 336. The question asks for the product of the area of the trapezoid and the sum of the missing angels which is 336 x 180 =60,480. **C**

28. Jack’s work for this problem is exactly right, and the answer is three. Jack implements the inverse property of multiplication which state that multiplying a number by its inverse (1 over the number or its reciprocal) equals one. Jill could have also implemented this property however she made a mistake by adding 100 to 115 rather than subtracting it. Thus the answer is **C.**

29. 113.50 x 3 = 340.5 and 75.75 x 4 = 303. Adding these together 340.5 + 303 = 643.5. The question asks for the value to be rounded to the nearest hundred so the answer is 600. **B**

30. The answer choices all refer to place values after the decimal (indicated by the -ths), the correct answer is Ten Millions. **E**