

1. The expression $5^{\frac{1}{2}} \cdot 27^{\frac{1}{2}}$ is equal to

- $3 \cdot \sqrt{15}$
- $135^{\frac{1}{4}}$
- $\frac{1}{135}$
- $(\sqrt{135})^{-1}$

2. There may be more correct answers. The expression $\frac{1}{\sqrt{20} - 4}$ is equal to

- $\frac{1}{2\sqrt{5} + 4}$
- $\frac{\sqrt{5} + 2}{2}$
- $\frac{\sqrt{20}}{16}$
- $\frac{1}{2\sqrt{5} - 4}$

3. Which smallest possible natural number x should the number 120 be multiplied by in order to get a complete square?

Answer:

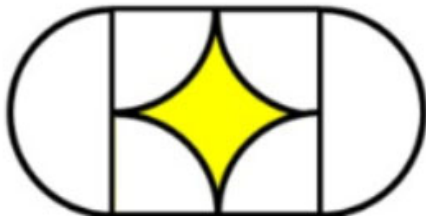
4. The expression $\frac{x^{3k+2} + x^{6k+3}}{x^{3k} + x^{6k}}$ is equal to

- x^5
- $\frac{x^2 + x^5}{1 + x^2}$
- $\frac{x^2 + x^{3k+3}}{1 + x^{3k}}$
- $\frac{x^2 + x^3}{2}$

5. When the wood was cut, 40% of its mass was solid matter and 60% of its mass was water. After drying, only 50% of its mass was water. What was the weight of the wood after drying if it weighed 2250 kg before drying?

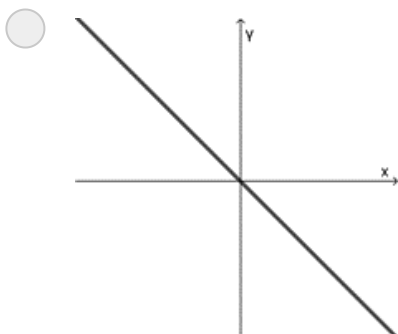
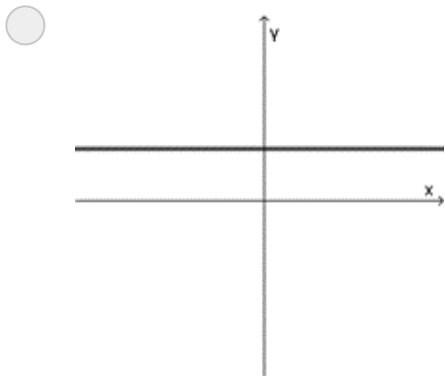
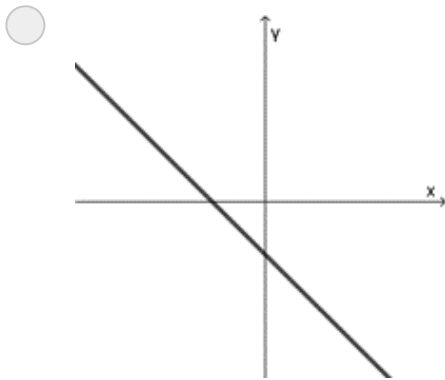
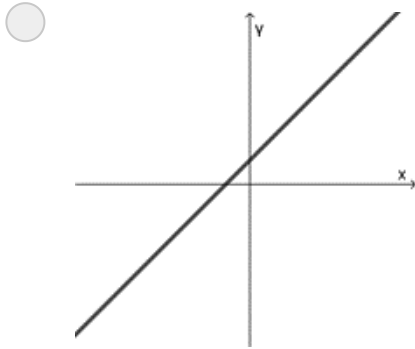
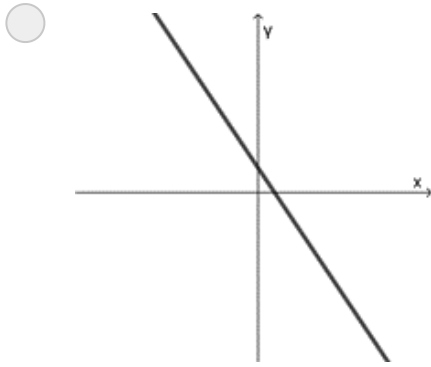
- 1750 kg
- 900 kg
- 1900 kg
- 2200 kg
- 1800 kg

6. Find the area of the yellow figure if the area of the square is 16. Round your result to 1 decimal place.



Answer:

7. Which graph can be described by $-x - y - 1 = 0$?



8. Which capital is moving with the fastest orbital velocity due to Earth's rotation?

- Paris
- Cairo
- Helsinki
- Athens

9. A pen has an ink cartridge with 1000 mm^3 of ink in it. The pen makes a 1.0-millimeter-wide line with a thickness of 1.0 micrometer. What is the longest line we can draw with that pen?

- 100 m
- 1000 m
- 10 m
- 10000 m

10. If the frequency of a heart is 75 beats per minute, how many seconds does it take the heart to beat hundred times?

Answer:

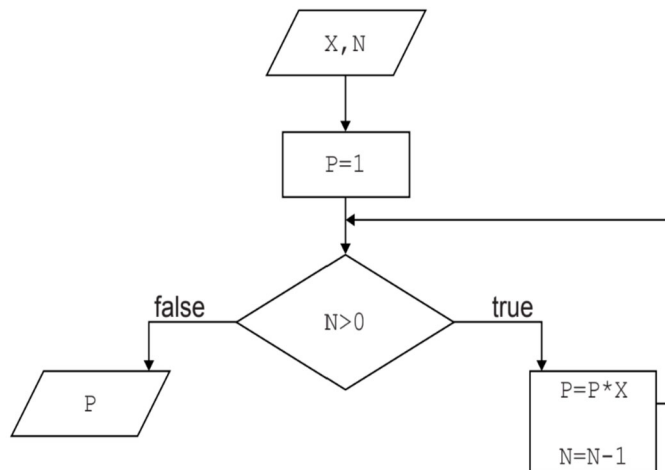
11. Peanuts have a caloric value of approximately 600 kcal per 100 g. 1 kcal is the thermal energy needed to heat up a kilogram of water by $1 \text{ }^\circ\text{C}$. Using the information available, estimate the minimum mass of peanuts we must burn to heat up a kilogram of water from the melting point to the boiling point.

- 17 g
- 60 g
- 600 g
- 10 g

12. Colours are represented by a computer as a combination of the three primary colours: red, green and blue. Numerical values are used to represent the different shades of each primary colour. These values range from 0 to 255. What is the maximum number of colours that can be represented in a computer pixel.

- 16777216
- 65536
- 16581375
- 256
- 768

13. Consider the following algorithm that inputs X and N, and outputs P.



What result will the algorithm output for the inputs X=3 and N=2?

Answer:

14. The direct role of chlorophyll during photosynthesis is to

- produce oxygen.
- absorb chemical energy.
- produce glucose.
- absorb light energy.

- 15. A research team measures the pH of a liquid sample from a freshwater lake and finds it to be 5.9. Based on this pH level, which of the following statements is true?**
- The water is strongly acidic, similar to stomach acid, and unsafe for most aquatic life.**
 - The water is neutral, indicating it is pure without any dissolved minerals or gasses.**
 - The water is mildly acidic and could be influenced by acid rain or natural acidic sources.**
 - The water is strongly basic and likely contains high concentrations of hydroxide ions.**
- 16. Loftus and Palmer (1974) conducted an experiment in which they showed the participants films of car accidents and asked them how fast the car was going when it HIT/SMASHED the other car. After a week they were brought back and asked if they remembered any broken glass (there was none). Although most participants accurately reported no broken glass, more participants in the ‘smashed’ (than ‘hit’) condition said they saw broken glass.**
- What does this tell us about the reliability of memory?**
- Memory is not reliable because the participants were tricked into thinking there was broken glass.**
 - Memory is reconstructive - we remake/rebuild it as we try to remember the event.**
 - Memory is reliable, the participants were tricked into thinking there was broken glass.**
 - Memory is a reliable process. Information stored in memory is hard to alter.**
- 17. Bach's 'Brandenburg Concertos' were composed during what era?**
- Baroque**
 - Medieval**
 - Early Romantic**
 - Classical**

18. For the sentences below think of ONE (1) word only which can be used appropriately in all three sentences. Write your solution.

1. Managing a large company is hard
_____.
2. All _____ and no play makes Jack a dull boy.
3. I won't help you, you are old enough to _____ it out on your own.

Answer:

19. For the sentences below think of ONE (1) word only which can be used appropriately in all three sentences. Write your solution.

1. I could hardly _____ her hat in the crowd.
2. You'll need to have that _____ checked.
3. Yes, you're _____ on. I couldn't have put it better myself.

Answer:

20. For the sentences below think of ONE (1) word only which can be used appropriately in all three sentences. Write your solution.

1. A useful _____ of thumb is that 10 hours are needed to analyse the material.
2. The labourers work to _____, not a minute more than is needed.
3. If there's any justice left in this world, the judge will _____ against his imprisonment.

Answer:

21. Complete the sentence by choosing the correct answer.

If water _____, life on Earth would probably never have begun.

- didn't exist**
- hadn't existed**
- would not exist**
- will not exist**

22. Which of the following is not a feature of democracy?

- Existence of the rule of law**
- Separation of powers**
- Minority rule**
- Respect of human rights**

23. Read the text below and find the answer that fits best.



I can't wait for the thought tube

- The text shows eagerness for a conceptual art piece named the "thought tube", symbolizing the flow and exchange of ideas.
- The text conveys excitement for an upcoming technological invention that enhances personal thought processing and sharing one's consciousness with others.
- The text expresses anticipation for a new, innovative method of communication that revolutionizes how thoughts are shared.
- The text highlights the powerlessness of humanity against the progression of communication technology, resulting in dehumanization and complete integration of mind and matter.

24. Which of the literary characters does not die at the end?

- Macbeth
- Odysseus
- Don Quixote
- Faust (Goethe)

25. Which animal is associated with Europe in Greek mythology?
- Bull
 - Lion
 - Dog
 - Donkey
26. Which leader was associated with the "Long March" during the Chinese Civil War in 1934 through 1936?
- Mao Zedong
 - Hirohito
 - Jiang Jieshi
 - Sun Yat Sen
27. Which battle is often considered the turning point in World War II, marking a significant defeat for Nazi Germany?
- Battle of Midway
 - Battle of the Bulge
 - Battle of Britain
 - Battle of Stalingrad
28. Which novel is not the work of a Russian writer?
- Crime and Punishment
 - The Red and Black
 - War and Peace
 - The Master and Margarita
29. The six-pointed star is a symbol of
- Buddhism
 - Freemasonry
 - Judaism
 - Communism

30. Which of the following countries does Poland not border?

- Russia**
- Hungary**
- Belarus**
- Czech Republic**

31. What does the word minaret mean?

- An explosive**
- A ceramic decoration**
- A tower adjacent to a mosque**
- A type of mineral**

32. What does the word etymology mean?

- The study of the forms of Earth's surface**
- A rhetorical figure**
- The study of the origin of words**
- A state of emotional exaltation**

