1. The height of Adam is measured as 1.8 m with a percentage error of 3%. Which of the following CANNOT be the actual height of Adam?

   A. 1.746 m

   B. 1.800 m

   C. 1.830 m

   D. 1.854 m

2. $(2m-n+3)(2m+n+3)=$

   A. $(2m)^2-(n+3)^2$.

   B. $(2m-n)^2-3^2$.

   C. $(2m)^2-(n-3)^2$.

   D. $(2m+3)^2-n^2$.

3. If $a+5b=8$ and $(a+2b)^2-9b^2=56$, then $a-b=$

   A. 8.

   B. 7.

   C. –7.

   D. –8.

4. $\frac{p}{8q}-\frac{p}{q}=$

   A. $\frac{p}{8}$.

   B. $\frac{p}{7q}$.

   C. $-\frac{7p}{8q}$.

   D. $-\frac{p^2}{8q^2}$.

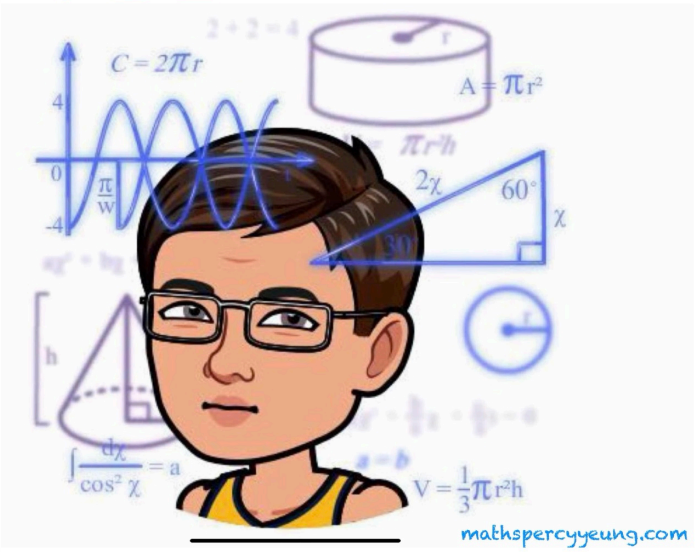
5. If $3x-7y=5$, then $y=$

   A. $\frac{7}{3x-5}$.

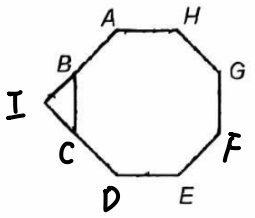
   B. $\frac{7}{3x+5}$.

   C. $\frac{3x-5}{7}$.

   D. $\frac{3x+5}{7}$.



6. In the figure, $ABCDEFGH$ is a regular octagon. AB and DC are produced to meet at I. Which of the following are true?



I. Each interior angle of $ABCDEFGH$ is $45°$

II. $\triangle BIC$ is an isosceles triangle.

III. $\angle BIC = 90°$

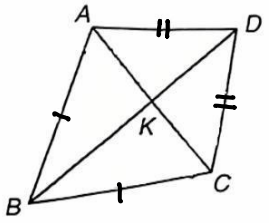
A. II only

B. I and II only

C. II and III only

D. I, II and III

7. In the figure, AC and BD intersect at K. $BA = BC$ and $DA = DC$. Which of the following must be true?



I. $AC \perp BD$

II. BD bisects $\angle ADC$.

III. $\triangle ABC \cong \triangle ADC$

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

8. The owner of a bakery wants to draw a statistical chart to show the changes in sales of cake A from 2016 to 2020. Which statistical chart should the owner draw?

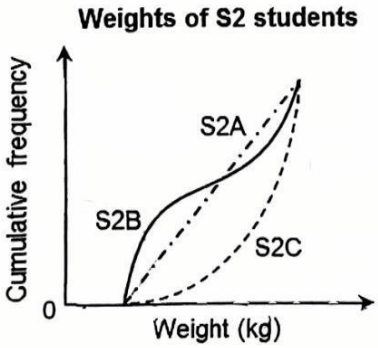
A. Broken line graph

B. Frequency curve

C. Histogram

D. Bar chart

9. The cumulative frequency curves below show the weights (in kg) of S2A, S2B and S2C students.



If the lower quartiles of the weights of S2A students, S2B students and S2C students are a kg, b kg and c kg respectively, then

A. $c > b > a$.

B. $c > a > b$.

C. $a > b > c$.

D. $b > a > c$.

10. Let a, b and c be non-zero numbers. If $5a = 4b = 3c$, then $(3a+b):(b+3c) =$

A. 17 : 25.

B. 25 : 17.

C. 13 : 23.

D. 23 : 13.

11. Let a, b, p and q be non-zero numbers. If $a : b = \frac{1}{p} : \frac{1}{q}$, then

A. $ap = bq$

B. $aq = bp$.

C. $ab = pq$.

D. $a = p$ and $b = q$.

12. In the figure, E is the mid-point of AB. D is a point on AC such that $DE \perp AB$. Which of the following must be correct?

I. $\triangle ADE \cong \triangle BDE$

II. $\triangle ABC \sim \triangle BDC$

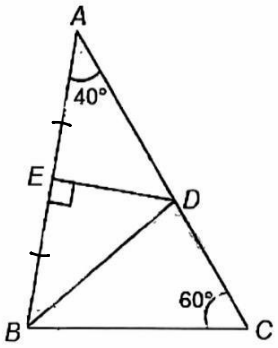
III $\triangle BCD$ is an isosceles triangle.

A. I and II only

B. I and III only

C. II and III only

D. I, II and III



13. It is given that $\triangle ABC \cong \triangle FGH$ and $\triangle PQR \sim \triangle GHF$. Which of the following must be correct?

I. $\triangle ABC \sim \triangle RPQ$

II. $\angle BCA = \angle PQR$

III. $PQ \times GF = PR \times GH$

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

14. Which of the following is/are true?

I. Any two rectangles with the same width must be similar.

II. Any two regular hexagons must be similar.

III. Any two polygons with the same perimeter must be similar.

A. I only

B. II only

C. I and III only

D. II and III only

15. Which of the following points lie on the graph of $x-3y+12=0$?

$P(3, 3)$, $Q(-6, 2)$, $R(-3, -5)$, $S(6, 6)$

A. P and R

B. P and S

C. Q and R

D. Q and S

16. If $(a+1, a-1)$ is a solution of the equation $3x-2y=6a$, then $a=$

A. 1.

B. -1.

C. $\frac{1}{5}$.

D. $-\frac{1}{5}$.

17. Which of the graphs of the simultaneous equations below have no intersection points?

A. $\begin{cases} 2y=3x+5 \\ 6x-4y=-10 \end{cases}$

B. $\begin{cases} y=\frac{1}{2}x+4 \\ x-2y-8=0 \end{cases}$

C. $\begin{cases} 2x+3y=6 \\ 3x-2y=15 \end{cases}$

D $\begin{cases} -2x+3y=6 \\ 2x-3y=-6 \end{cases}$

18. Given that the simultaneous equations $\begin{cases} x-7y=16 \\ Ax+By=0 \end{cases}$ have no solution, where A and B are non-zero constants. Which of the following must be true?

I. $B=-7A$

II. B is a negative number.

III. AB is a positive number.

A. I only

B. II only

C. III only

D. I, II and III

19. Brand A juice and brand B juice contain 60% apple juice and 80% apple juice respectively. If Nancy wants to use brand A juice and brand B juice to produce a mixture of 3600 mL juice with 72% apple juice by volume, find the required volume of brand B juice.

A. 1440 mL

B. 1800 mL

C. 2160 mL

D. 2700 mL

20. Which of the following is true?

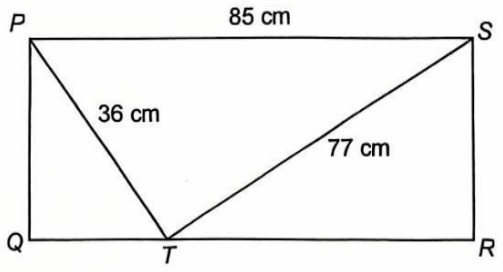
A. $\sqrt{225} > 15$

B. $\sqrt[3]{65} > 4$

C. $\sqrt[4]{79} > 3$

D. $\sqrt[5]{3100} > 5$

21. In the figure, $PQRS$ is a rectangle. T is a point lying on QR such that $PT = 36$ cm and $ST = 77$ cm. If $PS = 85$ cm, find the area of rectangle $PQRS$.



A. 1386 cm^2

B. 1530 cm^2

C. 2772 cm^2

D. 3060 cm^2

22. Which of the following numbers is/are rational number(s)?

I. $\frac{\sqrt{12}}{\sqrt{27}}$

II. $-0.\dot{3}$

III. $\frac{1.7}{83}$

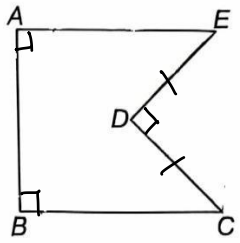
A. I and II only

B. I and III only

C. II and III only

D I, II and III

23. In the figure, $CD = DE$ and $\angle ABC = \angle BAE = \angle CDE = 90°$.



If $AE = BC = 30$ cm and $AB = 20$ cm, then the area of pentagon $ABCDE$ is

A. 550 cm^2.

B. 500 cm^2.

C. 450 cm^2.

D. 400 cm^2.

24. The radius of a circle is measured as 7 cm, correct to the nearest cm. Express the upper limit of the actual area of the circle in terms of π.

A. 36π cm^2

B. 42.25π cm^2

C. 56.25π cm^2

D. 64π cm^2

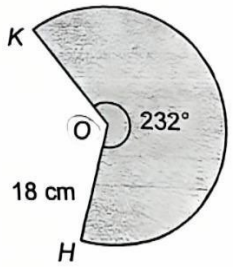
25. In the figure, the radius of sector OHK is 18 cm. Find the area of the sector.

A. 11.6π cm^2

B. 23.2π cm^2

C. 208.8π cm^2

D. 835.2π cm^2



26. In the figure, a circle is divided into 5 equal parts and the area of each part is 45π cm^2. Find the diameter of the circle.

A. 15 cm

B. 30 cm

C. 45 cm

D. 112.5 cm

27. Consider two right circular cylinders A and B with the same curved surface area. If the ratio of the height of cylinder A to that of cylinder B is 5 : 8, find the ratio of the volume of cylinder A to that of cylinder B.

A. 25 : 64

B. 64 : 25

C. 5 : 8

D. 8 : 5

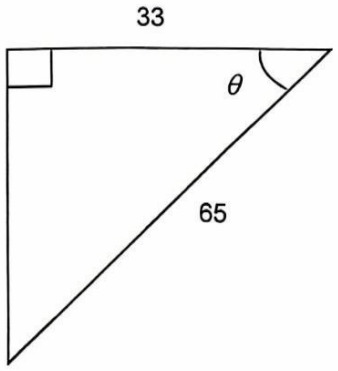
28. Refer to the figure. Find the value of $\tan\theta$.

A. $\frac{56}{65}$

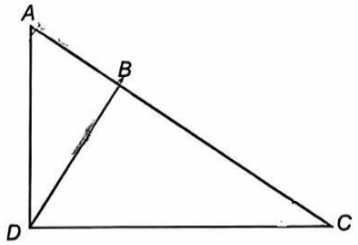
B. $\frac{33}{65}$

C. $\frac{33}{56}$

D. $\frac{56}{33}$



29. In the figure, ABC is a straight line. $AB = 20$ cm, $AD = 52$ cm, $BD = 48$ cm and $CD = 60$ cm. Find $\angle ACD$ correct to the nearest 0.1°.



A. 36.9°

B. 40.9°

C. 49.1°

D. 53.1°

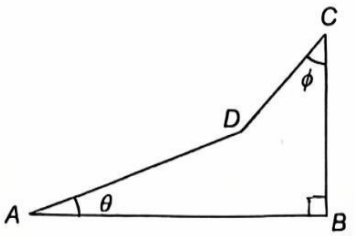
30. In the figure, BC =

A. $AD\sin\theta + CD\sin\phi$.

B. $AD\sin\theta + CD\cos\phi$.

C. $AD\cos\theta + CD\cos\phi$.

D. $AD\cos\theta + CD\sin\phi$.



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