

Section A - Selected Response

Directions: Place the letter corresponding to the correct answer to each of the following on the provided answer sheet.

1. Which referent could be used for 1 metre?

- (A) The length of a dinner fork.
- (B) The length of your stride.
- (C) The width of a classroom in your school.
- (D) The width of a computer keyboard.

2. A stack of 100 pieces of sheet music is 0.5 inches tall. How many pieces can fit in a storage box that is 1 foot high?

- (A) 200 pieces
- (B) 400 pieces
- (C) 1200 pieces
- (D) 2400 pieces

3. What is 100 inches converted to yards, feet and inches?

- (A) 1 yd. 1 ft. 4 in.
- (B) 2 yds. 2 ft. 2 in.
- (C) 2 yds. 2 ft. 4 in.
- (D) 4 yds. 0 ft. 4 in.

4. A movie poster indicates that King Kong is 1500 cm tall. How tall is King Kong to the nearest foot?

- (A) 17 ft.
- (B) 29 ft.
- (C) 50 ft
- (D) 76 ft.

5. A car is travelling at 90 kilometres per hour. If the speed limit is 30 miles per hour, how many miles per hour is the car over the speed limit?

- (A) 26
- (B) 38
- (C) 56
- (D) 60

6. Sam measured out four pieces of wood to build a bookcase. The measurements were:

Measurement I	500 mm
Measurement II	6.2 cm
Measurement III	16 inches
Measurement IV	2 feet

Which sequence places the measurements in order from *smallest to largest* ?

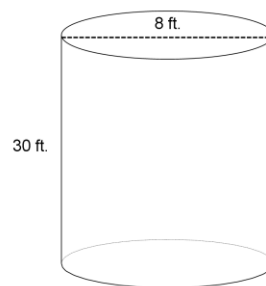
- (A) II, I, III, IV
- (B) II, III, I, IV
- (C) IV, II, III, I
- (D) IV, III, I, II

7. A picture measures 17 in. wide and 20 in. long. What is the approximate dimension of the picture in SI units?

- (A) 6.7 cm wide and 7.9 cm long
- (B) 7.9 cm wide and 6.7 cm long
- (C) 43 cm wide and 51 cm long
- (D) 51 cm wide and 43 cm wide

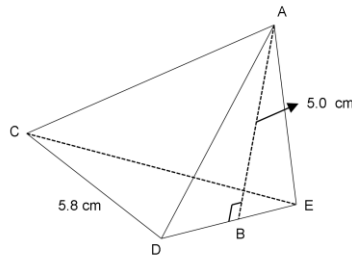
8. A water tank is in the shape of a right cylinder 30 ft. high and 8 ft. diameter. How much sheet metal was used in its construction?

- (A) 804.2 ft^2
- (B) 854.5 ft^2
- (C) 1608.5 ft^2
- (D) 1910.1 ft^2



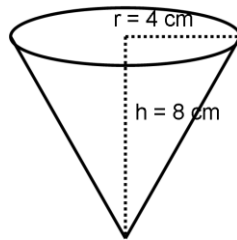
9. What is the surface area of the regular tetrahedron to the nearest square centimetre if $AB = 5.0$ cm and $CD = 5.8$ cm?

- (A) 15 cm^2
- (B) 44 cm^2
- (C) 58 cm^2
- (D) 116 cm^2



10. What is the lateral area of the cone to the nearest tenth?

- (A) 100.5 cm^2
- (B) 112.4 cm^2
- (C) 150.8 cm^2
- (D) 162.7 cm^2

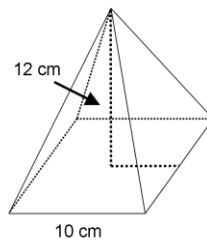


11. An advertising model of an MP3 player has a height of 5 in. a width of 5 in. and a depth of 2 in. What is the volume of the model MP3 player to the **nearest tenth of a cm^3** ?

- (A) 20.0 cm^3
- (B) 50.0 cm^3
- (C) 262.5 cm^3
- (D) 781.3 cm^3

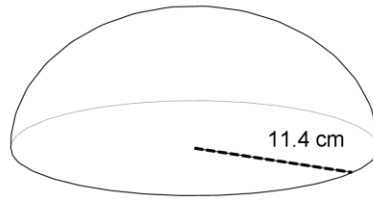
12. What is the volume of a square based pyramid with side length of 10 cm and height of 12 cm?

- (A) 120 cm^3
- (B) 360 cm^3
- (C) 400 cm^3
- (D) 1200 cm^3



13. A hemisphere has a radius of 11.4 cm. What is the volume of the hemisphere to the nearest tenth of a cubic centimetre ?

- (A) 1224.2
- (B) 1550.7
- (C) 3101.4
- (D) 6202.7



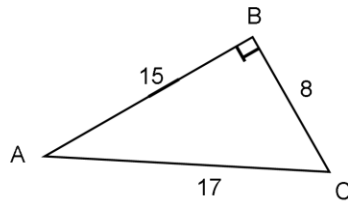
14. An orange is peeled and the surface area is found to be 339.8 cm^2 . What is its radius?

- (A) 5.2 cm
- (B) 7.4 cm
- (C) 13.5 cm
- (D) 16.3 cm



15. In $\triangle ABC$ which side is opposite $\angle C$?

- (A) AB
- (B) AC
- (C) BC
- (D) $\angle A$

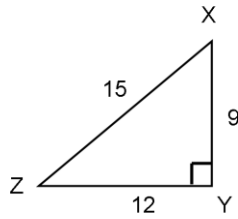


16. What is the value of $\tan 40^\circ$, to four decimal places?

- (A) -1.1172
- (B) 0.6427
- (C) 0.8391
- (D) 1.1918

17. In $\triangle XYZ$ which trigonometric ratio is equal to $\frac{4}{5}$?

I	$\sin \angle X$
II	$\cos \angle Z$
III	$\cos \angle X$



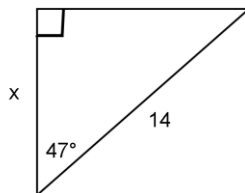
- (A) I
- (B) II
- (C) I and II
- (D) I and III

18. Which is the correct ratio for tangent?

- (A) $\tan \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$
- (B) $\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$
- (C) $\tan \theta = \frac{\text{opposite}}{\text{hypotenuse}}$
- (D) $\tan \theta = \frac{\text{adjacent}}{\text{opposite}}$

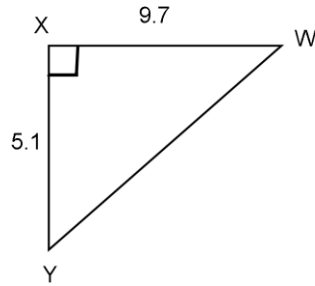
19. Which equation should be used to solve for x in the triangle below?

- (A) $\cos 47^\circ = \frac{14}{x}$
- (B) $\cos 47^\circ = \frac{x}{14}$
- (C) $\sin 47^\circ = \frac{14}{x}$
- (D) $\sin 47^\circ = \frac{x}{14}$



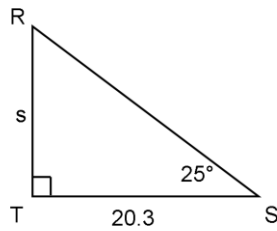
20. What is the measure of $\angle Y$ to the nearest tenth of a degree?

- (A) 27.7°
- (B) 31.7°
- (C) 58.3°
- (D) 62.3°



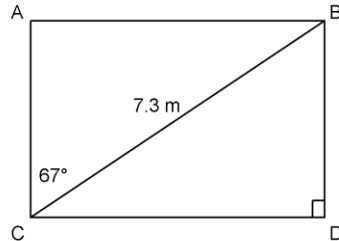
21. What is the length of side s to the nearest tenth of a millimeter?

- (A) 8.6 mm
- (B) 9.5 mm
- (C) 18.4 mm
- (D) 43.5 mm



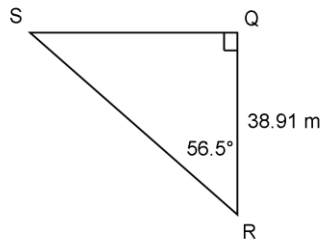
22. What is the length of side AB in rectangle ABCD, to the nearest tenth of a metre?

- (A) 2.9 m
- (B) 3.1 m
- (C) 6.7 m
- (D) 7.9 m



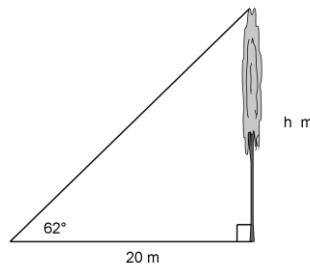
23. A surveyor made the measurements shown in the diagram. What is the distance from R to S, to the nearest hundredth of a metre?

- (A) 25.75 m
- (B) 46.66 m
- (C) 58.79 m
- (D) 70.50 m



24. Mikhall walks 20 m away from the base of a tree. He turns around and measures the angle of elevation to the top of the tree as 62° . How tall is the tree to the nearest tenth of a metre?

- (A) 9.4 m
- (B) 10.6 m
- (C) 17.7 m
- (D) 37.6 m



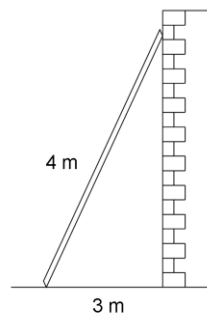
25. A tree breaks off 3m from its base such that the top of the tree just touch the ground. If the top of the tree forms an angle of 26° with the ground, how long was the tree before it broke?

- (A) 3.3 m
- (B) 6.3 m
- (C) 6.8 m
- (D) 9.8 m



26. A 4 m ladder leans against a building. If the base of the ladder is 3 m from the wall, what is the angle of inclination?

- (A) 36.9°
- (B) 41.4°
- (C) 48.6°
- (D) 53.1°



27. If $\cos x = 0.5534$, what is the value of x to the nearest tenth of a degree ?

- (A) 1.0°
- (B) 29.0°
- (C) 33.6°
- (D) 56.4°

28. Which of the following is a prime number?

- (A) 1
- (B) 4
- (C) 11
- (D) 27

29. What is the prime factorization of 180 in compact form?

- (A) 1×180
- (B) 10×18
- (C) $2 \times 3 \times 5$
- (D) $2^2 \times 3^2 \times 5$

30. What is the Greatest Common Factor for 28 and 98?

- (A) 7
- (B) 14
- (C) 98
- (D) 2744

31. What is the Least Common Multiple for 36 and 96?

- (A) 12
- (B) 36
- (C) 96
- (D) 288

32. Which of the following statements are true?

I	A whole number is an integer.
II	A rational number is a real number.
III	A repeating decimal is an irrational number.
IV	A rational number can be expressed as a fraction.

- (A) I, II and III
- (B) I, II and IV
- (C) II, III and IV
- (D) I, II, III, IV

33. Which number system does $\sqrt[3]{8}$ belong to ?

- (A) Q and R
- (B) I, Q and R
- (C) W, I, Q and R
- (D) N, W, I, Q and R

34. Which of the following is the best approximation of $\sqrt[3]{-35}$?

- (A) Between -4 and -5
- (B) Between -3 and -4
- (C) Between 3 and 4
- (D) Between 4 and 5

35. Which of the following is an irrational number?

- (A) $\sqrt[3]{-8}$
- (B) $-\sqrt{\frac{4}{9}}$
- (C) $\sqrt{2.25}$
- (D) $\sqrt{14}$

36. What is the index of $\sqrt[3]{2^7}$?

- (A) 2
- (B) 3
- (C) 7
- (D) 2^7

37. What is $\sqrt{98}$ as a mixed radical?

- (A) $2\sqrt{7}$
- (B) $7\sqrt{2}$
- (C) $2\sqrt{49}$
- (D) $49\sqrt{2}$

38. What is $4\sqrt[3]{3}$ as an entire radical?

- (A) $\sqrt[3]{12}$
- (B) $\sqrt[3]{48}$
- (C) $\sqrt[3]{108}$
- (D) $\sqrt[3]{192}$

39. What is $5^{\frac{2}{3}}$ in radical form?

- (A) $(\sqrt{5})^3$
- (B) $(\sqrt[3]{5})^2$
- (C) $(\sqrt[3]{3})^2$
- (D) $(\sqrt[3]{2})^3$

40. Which of the following is equivalent to $2\sqrt{5}$?

(A) $5^{\frac{1}{2}}$

(B) $10^{\frac{1}{2}}$

(C) $20^{\frac{1}{2}}$

(D) $50^{\frac{1}{2}}$

41. Which of the following is equivalent to $\left(\frac{1}{8}\right)^{-3}$?

(A) $(-8)^3$

(B) $\left(-\frac{1}{8}\right)^3$

(C) $\left(\frac{1}{8}\right)^3$

(D) $(8)^3$

42. Evaluate : $\sqrt[3]{\frac{8}{27}}$

(A) $-\frac{3}{2}$

(B) $-\frac{2}{3}$

(C) $\frac{2}{3}$

(D) $\frac{3}{2}$

43. A square has an area of 64 cm^2 . What is the length of each side?

- (A) 4 cm
- (B) 8 cm
- (C) 16 cm
- (D) 32 cm

44. Evaluate: $\left(\frac{16}{81}\right)^{\frac{1}{4}}$

- (A) $\frac{4}{20.25}$
- (B) $\frac{2}{3}$
- (C) $\frac{12}{77}$
- (D) $\frac{65536}{43046727}$

45. The volume of a cube is $91\,125 \text{ cm}^3$. What is the measure of each edge of the cube?

- (A) 6.71 cm
- (B) 45 cm
- (C) 301.87 cm
- (D) 3375 cm

46. Evaluate: $16^{\frac{3}{4}}$

- (A) 2
- (B) 8
- (C) 12
- (D) $\frac{56}{3}$

47. Which expression is the largest?

(A) 4^{-1}

(B) 3^{-3}

(C) $\left(\frac{3}{4}\right)^{-3}$

(D) $\left(\frac{1}{4}\right)^{-3}$

Section B - Constructed Response

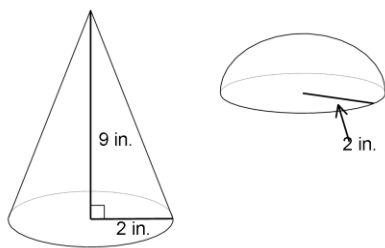
Directions : Answer all of the following questions showing all work.

1. Jack is installing trim around a window that measures 52 in. by 48 in.

A) How much trim will Jack need? (2%)

B) If trim costs \$1.89 per foot, how much will it cost? (2%)

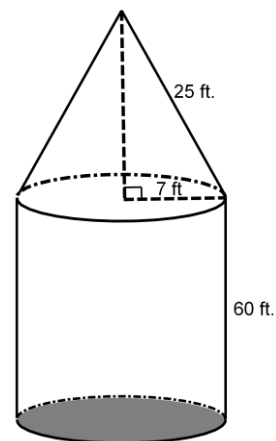
2. The base of a cone is glued to the circular face of a hemisphere. Calculate the volume of the composite object formed, to the nearest square inch. (4%)



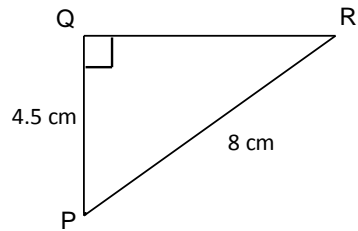
3. Spalding packages tennis balls in a box measuring 8 cm wide, 12 cm long and 4 cm high. If each box contains 6 balls with a radius of 2 cm, how much air space is there in the box? (4%)



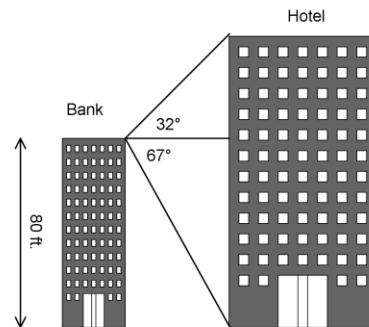
4. A farmer wishes to paint the exterior of his grain storage facility with dimensions as shown. If a can of paint covers 460 ft^2 , how many cans of paint will the farmer need to purchase? (Note: the bottom of the storage facility is **NOT** to be painted.) (4%)



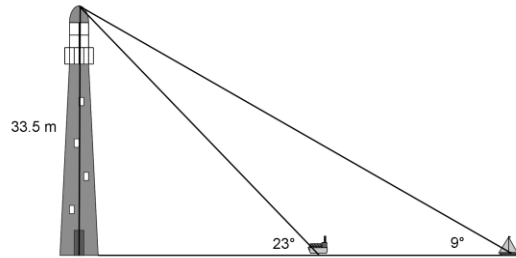
5. Solve $\triangle PQR$. Give the measures to the nearest tenth. (4%)



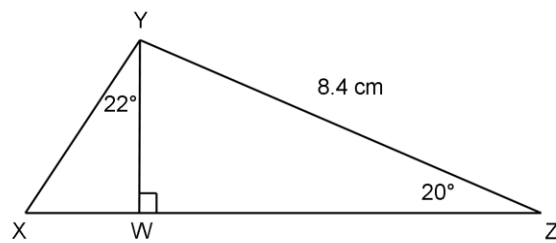
6. From the top of a bank, the angle of inclination to the top of a hotel is 32° . The angle of depression to the base of the hotel is 67° . If the height of the bank is 80 feet, how tall is the hotel to the nearest tenth of a foot? (4%)



7. A lighthouse keeper is spotted from a fishing boat at an angle of elevation of 23° . At the same time a person on a sailboat spots the lighthouse keeper at an angle of elevation of 9° . If the lighthouse keeper is 33.5 m above the water, how far apart are the two vessels? (4%)



8. What is the length of side XY in the diagram below? (4%)



9. Three different construction companies are building a house. The painters show up every 6th day, the dry wallers show up every 4th day and the plasterers show up every 10th day. After how many days will all three companies be working on the house together? (4%)

10. Bob simplified $\sqrt[3]{810}$ as shown: (3%)

$$\begin{aligned}\sqrt[3]{810} &= \sqrt[3]{27} \times \sqrt[3]{30} \\ &= \sqrt[3]{27} \times \sqrt[3]{3} \times \sqrt[3]{10} \\ &= 3 \times 1 \times \sqrt[3]{10} \\ &= 3\sqrt[3]{10}\end{aligned}$$

Identify the error Bob made and write the correct solution.

11. Arrange $\{5\sqrt{2}, 4\sqrt{3}, 3\sqrt{6}, 2\sqrt[3]{4}, 4\sqrt[3]{2}, 3\sqrt[4]{2}\}$ from **least to the greatest**. (4%)

12. In $\triangle ABC$ find BC and write your answer as a mixed radical. (4%)

