**Grade 10 Final Exam Review**

**Multiple Choice**

*Identify the choice that best completes the statement or answers the question.*

\_\_\_\_ 1. A model of the Calgary Tower has a scale of 1:300. The height of the model is  in. What is the height of the Calgary Tower to the nearest foot?

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| a. | 2506 ft. | b. | 209 ft. | c. | 644 ft. | d. | 627 ft. |

\_\_\_\_ 2. Paul plans to replace 487 in. of wood railing along the top of his patio fence. The wood is sold in 8-ft. lengths. How many 8-ft. lengths does Paul need to purchase?

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| a. | 61 | b. | 7 | c. | 5 | d. | 6 |

\_\_\_\_ 3. Baseboards are sold in 8-ft. lengths. Nelia requires 73 yd. of baseboard. How many 8-ft. lengths does Nelia need to purchase?

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| a. | 29 | b. | 28 | c. | 26 | d. | 27 |

\_\_\_\_ 4. Mike ran 1 mi. in 4 min. On average, how far did he run every 10 s? Give your answer in yards and feet.

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| a. | 73 yd. 1 ft. | c. | 220 yd. 0 ft. |
| b. | 7 yd. 1 ft. | d. | 293 yd. 1 ft. |

\_\_\_\_ 5. Which SI unit is most appropriate for measuring the diameter of a marble?

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| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | Metres | b. | Kilometres | c. | Millimetres | d. | Centimetres |

\_\_\_\_ 6. Which imperial unit is most appropriate for measuring the length of a hockey rink?

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| a. | Miles | b. | Feet | c. | Yards | d. | Inches |

\_\_\_\_ 7. On a road map of British Columbia, the distance between Vancouver and Fort St. John is 1237 km. What is this distance to the nearest mile?

|  |  |  |  |  |  |  |  |
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| a. | 742 mi. | b. | 673 mi. | c. | 1979 mi. | d. | 2061 mi. |

\_\_\_\_ 8. Convert 3180 m to yards and the nearest foot.

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| a. | 1060 yd. 0 ft. | b. | 2935 yd. 1 ft. | c. | 3445 yd. 0 ft. | d. | 815 yd. 1 ft. |

\_\_\_\_ 9. The Queen’s Plate is a thoroughbred horse race for 3-year-old Canadian-bred horses. The race is  mi. in length. What is this distance in kilometres?

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| a. | 2 km | b. | 1.7 km | c. | 0.78 km | d. | 1.28 km |

\_\_\_\_ 10. The bobsled track at the Canada Olympic Park in Calgary is 1475 m long. What is this length to the nearest yard?

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| a. | 1598 yd. | b. | 1659 yd. | c. | 1328 yd. | d. | 1362 yd. |

\_\_\_\_ 11. The cliff at Head-Smashed-In Buffalo Jump in southwestern Alberta is about 10 m high. What is this height to the nearest foot?

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| a. | 36 ft. | b. | 35 ft. | c. | 33 ft. | d. | 30 ft. |

\_\_\_\_ 12. The lateral area of a cone is 198.6 cm2. The diameter of the cone is 10.2 cm. Determine the height of the cone to the nearest tenth of a centimetre.

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| a. | 8.8 cm | b. | 11.3 cm | c. | 8.0 cm | d. | 12.4 cm |

\_\_\_\_ 13. A regular tetrahedron has edge length 20.0 m and a slant height of 17.3 m. Calculate the surface area of the tetrahedron to the nearest square metre.

|  |  |  |  |  |  |  |  |
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| a. | 1384 m2 | b. | 173 m2 | c. | 519 m2 | d. | 692 m2 |

\_\_\_\_ 14. In 2008, the Queen Sesheshet Pyramid was discovered in Egypt. Archeologists determined that the original height of this right square pyramid was about 14 m and the original base side length was about 22 m. Determine its original lateral area to the nearest square metre.

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| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 1267 m2 | b. | 783 m2 | c. | 196 m2 | d. | 616 m2 |

\_\_\_\_ 15. A right rectangular pyramid has base dimensions 8 ft. by 6 ft. and a height of 12 ft. Calculate the surface area of the pyramid to the nearest square foot.

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| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 223 square feet | b. | 159 square feet | c. | 271 square feet | d. | 216 square feet |

\_\_\_\_ 16. A right pyramid has a square base with side length 12 m and a height of 7 m. Calculate the surface area of the pyramid to the nearest square metre.

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| a. | 312 m2 | b. | 443 m2 | c. | 664 m2 | d. | 365 m2 |

\_\_\_\_ 17. Calculate the slant height, *s,* of this right square pyramid to the nearest tenth of a centimetre.



|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 11.9 cm | b. | 6.1 cm | c. | 12.1 cm | d. | 16.6 cm |

\_\_\_\_ 18. Calculate the edge length, *l,*of this regular tetrahedron to the nearest tenth of a metre.



|  |  |  |  |  |  |  |  |
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| a. | 10.6 m | b. | 7.1 m | c. | 6.5 m | d. | 5.3 m |

\_\_\_\_ 19. Calculate the volume of this right cone to the nearest tenth of a cubic metre.



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| a. | 141.4 m3 | b. | 47.1 m3 | c. | 49.3 m3 | d. | 55.0 m3 |

\_\_\_\_ 20. A right cone has slant height 15 in. and base diameter 12 in. Determine its volume to the nearest cubic inch.

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| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 1555 cubic inches | b. | 396 cubic inches | c. | 518 cubic inches | d. | 543 cubic inches |

\_\_\_\_ 21. This regular tetrahedron has a height of 4.7 cm. Calculate its volume to the nearest cubic centimetre.



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| a. | 58 cm3 | b. | 45 cm3 | c. | 68 cm3 | d. | 23 cm3 |

\_\_\_\_ 22. The surface area of a tennis ball is approximately 23 square inches. What is the diameter of the tennis ball to the nearest inch?

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| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 3 in. | b. | 1 in. | c. | 4 in. | d. | 6 in. |

\_\_\_\_ 23. Mars approximates a sphere with radius 2100 mi. What is the approximate volume of Mars?

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| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | mi.3 | b. | mi.3 | c. | mi.3 | d. | mi.3 |

\_\_\_\_ 24. A china bowl approximates a hemisphere with diameter 27.0 cm. What is the capacity of the bowl to the nearest tenth of a litre? (1000 cm3 = 1L)

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| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 5.2 L | b. | 10.3 L | c. | 0.4 L | d. | 2.6 L |

\_\_\_\_ 25. A china bowl approximates a hemisphere with diameter 30 cm. One cup is 250 mL. How many cups are required to completely fill the bowl?

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| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 30 cups | b. | 28 cups | c. | 29 cups | d. | 9 cups |

\_\_\_\_ 26. Determine the volume of this composite object, which is a right cylinder and a hemisphere, to the nearest tenth of a cubic metre.



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| a. | 139.5 m3 | b. | 131.7 m3 | c. | 154.0 m3 | d. | 128.5 m3 |

\_\_\_\_ 27. A barn is a composite object formed by a right rectangular prism with a right triangular prism as its roof. The square window on the barn has side length 2 ft. Farmer Fred wants to paint the entire surface of his barn, including the door, but not the window. Determine the surface area to be painted to the nearest square foot.



|  |  |  |  |  |  |  |  |
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| a. | 666 square feet | b. | 460 square feet | c. | 662 square feet | d. | 614 square feet |

\_\_\_\_ 28. Determine tan A and tan C.



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| --- | --- | --- | --- |
| a. | tan A = 1.25; tan C = 0.8 | c. | tan A = 0.8; tan C = 1.25 |
| b. | tan A = 0.8; tan C = 0.7809... | d. | tan A = 0.6247...; tan C = 1.25 |

\_\_\_\_ 29. Determine the angle of inclination of the line to the nearest tenth of a degree.



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| a. | 63.3° | b. | 24.2° | c. | 65.8° | d. | 26.7° |

\_\_\_\_ 30. Determine the length of side *l* to the nearest tenth of a metre.



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| a. | 5.4 m | b. | 27.4 m | c. | 11.1 m | d. | 5.0 m |

\_\_\_\_ 31. A guy wire is attached to a tower at a point that is 5.5 m above the ground. The angle between the wire and the level ground is 56. How far from the base of the tower is the wire anchored to the ground, to the nearest tenth of a metre?

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| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 3.1 m | b. | 6.6 m | c. | 3.7 m | d. | 8.2 m |

\_\_\_\_ 32. A ladder leans against a wall. The base of the ladder is on level ground 1.2 m from the wall. The angle between the ladder and the ground is 70. How far up the wall does the ladder reach, to the nearest tenth of a metre?

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| a. | 0.4 m | b. | 1.3 m | c. | 3.5 m | d. | 3.3 m |

\_\_\_\_ 33. The height of the Telus Plaza South in Edmonton is about 134 m. Stacy is lying on the ground near the building. The angle between the ground and her line of sight to the top of the building is 75. About how far is Stacy from the base of the building, to the nearest metre?

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| a. | 139 m | b. | 500 m | c. | 129 m | d. | 36 m |

\_\_\_\_ 34. An airplane is flying at an altitude of 7000 m. At a certain time, the angle between the ground and a person’s line of sight to the airplane is 22. About how far away is the person from a point on the ground vertically below the airplane, to the nearest hundred metres?

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| a. | 17 300 m | b. | 7500 m | c. | 2800 m | d. | 18 700 m |

\_\_\_\_ 35. The angle between one shorter side of a rectangle and a diagonal is 64. One longer side of the rectangle is 9.2 cm. What is the width of the rectangle, to the nearest tenth of a centimetre?

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| a. | 4.0 cm | b. | 18.9 cm | c. | 8.3 cm | d. | 4.5 cm |

\_\_\_\_ 36. A student stood 8.0 m from the base of a tree. She used a clinometer to sight the top of the tree. The angle shown on the protractor scale was 65. The student held the clinometer 1.6 m above the ground. Determine the height of the tree to the nearest tenth of a metre.

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| a. | 10.4 m | b. | 5.3 m | c. | 3.7 m | d. | 18.8 m |

\_\_\_\_ 37. A helicopter is hovering 200 m above a road. A car stopped on the side of the road is 300 m from the helicopter. What is the angle of elevation of the helicopter measured from the car, to the nearest degree?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 56° | b. | 48° | c. | 42° | d. | 34° |

\_\_\_\_ 38. A rope that anchors a hot air balloon to the ground is 136 m long. The balloon is 72 m above the ground. What is the angle of inclination of the rope to the nearest tenth of a degree?

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| a. | 58.0 | b. | 62.1 | c. | 32.0 | d. | 27.9 |

\_\_\_\_ 39. Determine the length of RS to the nearest tenth of a metre.



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| a. | 19.7 m | b. | 5.7 m | c. | 18.0 m | d. | 64.3 m |

\_\_\_\_ 40. Determine the length of DE to the nearest tenth of a centimetre.



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| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 8.8 cm | b. | 15.9 cm | c. | 3.7 cm | d. | 13.9 cm |

\_\_\_\_ 41. From the start of a runway, the angle of elevation of an approaching airplane is 17.5. At this time, the plane is flying at an altitude of 7.7 km. How far is the plane from the start of the runway to the nearest tenth of a kilometre?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 8.1 km | b. | 2.3 km | c. | 25.6 km | d. | 24.4 km |

\_\_\_\_ 42. A guy wire is attached to a tower at a point that is 7.5 m above the ground. The angle of inclination of the wire is 67. Determine the length of the wire to the nearest tenth of a metre.

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| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 18.7 m | b. | 20.2 m | c. | 8.1 m | d. | 7.9 m |

\_\_\_\_ 43. A balloon is flying at the end of a 170-m length of string, which is anchored to the ground. The angle of inclination of the string is 50. Calculate the height of the balloon to the nearest metre.

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| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 130 m | b. | 143 m | c. | 109 m | d. | 222 m |

\_\_\_\_ 44. Solve this right triangle. Give the measures to the nearest tenth.



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| a. | cm | c. | cm |
| b. | cm | d. | cm |

\_\_\_\_ 45. An architect draws this diagram of a wheelchair entrance ramp for a building. Determine the angle of inclination of the ramp to the nearest tenth of a degree.



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| a. | 86.7 | b. | 29.7 | c. | 3.3 | d. | 5.1 |

\_\_\_\_ 46. Determine the perimeter of this rhombus to the nearest tenth of a centimetre.



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| a. | 16.5 cm | b. | 33.8 cm | c. | 25.1 cm | d. | 7.2 cm |

\_\_\_\_ 47. Determine the perimeter of an equilateral triangle with height 11.9 cm. Give the measure to the nearest tenth of a centimetre.

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| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 81.8 cm | b. | 41.2 cm | c. | 30.9 cm | d. | 71.4 cm |

\_\_\_\_ 48. Determine the length of MN to the nearest tenth of a centimetre.



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| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | cm | b. | cm | c. | cm | d. | cm |

\_\_\_\_ 49. Determine the length of QR to the nearest metre.



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| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 85 m | b. | 170 m | c. | 127 m | d. | 118 m |

\_\_\_\_ 50. Calculate the measure of GHJ to the nearest tenth of a degree.



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| a. |  | b. | 29.3 | c. |  | d. | 68.0 |

\_\_\_\_ 51. Willow stood due south of a totem pole, 21.0 m from its base, and measured the angle of elevation of the top of the pole as 58 Winston stood due east of the totem pole and measured the angle of elevation of the top of the pole as 49How far is Winston from the base of the totem pole to the nearest tenth of a metre?

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| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 4.9 m | b. | 20.7 m | c. | 29.2 m | d. | 11.2 m |

\_\_\_\_ 52. From the top of a 25-m lookout tower, a fire ranger observes one fire due east of the tower at an angle of depression of 7. She sees another fire due north of the tower at an angle of depression of 3. How far apart are the fires to the nearest metre?

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| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 205 m | b. | 681 m | c. | 477 m | d. | 519 m |

\_\_\_\_ 53. Calculate the measure of ABC to the nearest tenth of a degree.



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| --- | --- | --- | --- | --- | --- | --- | --- |
| a. |  | b. | 102.5 | c. | 77.5 | d. |  |

\_\_\_\_ 54. Write the prime factorization of 4116.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. |  | b. |  | c. |  | d. |  |

\_\_\_\_ 55. Determine the edge length of this cube.



|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 301.87 cm | b. | 45 cm | c. | 6.71 cm | d. | 3375 cm |

\_\_\_\_ 56. How many perfect square whole numbers are between 5000 and 6000?

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| a. | 6 | b. | 8 | c. | 1 | d. | 7 |

\_\_\_\_ 57. Factor the binomial .

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| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 58. Factor: 

|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 59. Factor: 

|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 60. Factor: 

|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 61. Factor: 

|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 62. Which set of algebra tiles represents ?

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| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 63. Expand and simplify: 

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| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 64. Factor: 

|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 65. Expand and simplify: 

|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 66. Expand and simplify: 

|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 67. Expand and simplify: 

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| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 68. Expand and simplify: 

|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 69. Expand and simplify: 

|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 70. Each shape is a rectangle. Write a polynomial, in simplified form, to represent the area of the shaded region.



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| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 71. Factor: 

|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 72. Find an integer to replace  so that this trinomial is a perfect square: 

|  |  |  |  |
| --- | --- | --- | --- |
| a. | 7 | c. | 49 |
| b. | 14 | d. | 196 |

\_\_\_\_ 73. Identify this polynomial as a perfect square trinomial, a difference of squares, or neither: 

|  |  |  |  |
| --- | --- | --- | --- |
| a. | Difference of squares | c. | Neither |
| b. | Perfect square trinomial |

\_\_\_\_ 74. Factor: 

|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 75. Factor: 

|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 76. Factor: 

|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 77. Factor: 

|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 78. Estimate the value of  to one decimal place.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | –0.3 | b. | 3.4 | c. | 0.9 | d. | 5.7 |

\_\_\_\_ 79. For which number will the fourth root be rational?

256, 27, –81, 40 000

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 40 000 | b. | –81 | c. | 27 | d. | 256 |

\_\_\_\_ 80. Which of these numbers is an integer, but not a whole number?

–9, 0, 1, 

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 0 | b. | –9 | c. |  | d. | 1 |

\_\_\_\_ 81. Write  in simplest form.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. |  | b. |  | c. |  | d. |  |

\_\_\_\_ 82. Write  as an entire radical.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. |  | b. |  | c. |  | d. |  |

\_\_\_\_ 83. Evaluate  without using a calculator.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | –3 | b. | 3 | c. |  | d. | does not exist |

\_\_\_\_ 84. Evaluate 

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 0.4804 | b. | 0.1012 | c. | 0.0256 | d. | 0.010 24 |

\_\_\_\_ 85. Evaluate 

|  |  |  |  |
| --- | --- | --- | --- |
| a. | 18 | c. | 1.741 101... |
| b. | 32 | d. | 40 |

\_\_\_\_ 86. Evaluate 

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. |  | b. | does not exist | c. |  | d. |  |

\_\_\_\_ 87. Evaluate  without using a calculator.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. |  | b. |  | c. | – | d. | – |

\_\_\_\_ 88. Evaluate  without using a calculator.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. |  | b. |  | c. |  | d. |  |

\_\_\_\_ 89. Evaluate  without using a calculator.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. |  | b. |  | c. |  | d. |  |

\_\_\_\_ 90. Which power with a negative exponent is equivalent to ?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. |  | b. |  | c. |  | d. |  |

\_\_\_\_ 91. Simplify . Write using powers with positive exponents.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. |  | b. |  | c. |  | d. |  |

\_\_\_\_ 92. Simplify .

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. |  | b. |  | c. |  | d. |  |

\_\_\_\_ 93. Simplify 

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. |  | b. |  | c. |  | d. |  |

\_\_\_\_ 94. Evaluate 

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. |  | b. |  | c. |  | d. |  |

\_\_\_\_ 95. Evaluate 

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. |  | b. |  | c. |  | d. |  |

\_\_\_\_ 96. Simplify 

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. |  | b. |  | c. |  | d. |  |

\_\_\_\_ 97. Evaluate  for  and .

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. |  | b. |  | c. | 531 441 | d. |  |

\_\_\_\_ 98. Evaluate  for  and .

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. |  | b. | 72 | c. |  | d. |  |

\_\_\_\_ 99. Consider the relation represented by this arrow diagram. Represent the relation as a set of ordered pairs.



|  |  |
| --- | --- |
| a. | {(House P, 1), (House Q, 3), (House R, 4), (House S, 5)} |
| b. | {(3, House P), (4, House Q), (1, House R), (5, House S)} |
| c. | {(1, House P), (3, House Q), (4, House R), (5, House S)} |
| d. | {(House P, 3), (House Q, 4), (House R, 1), (House S, 5)} |

\_\_\_\_ 100. This set of ordered pairs shows the years of some Winter Olympics and the host city in each year. Represent the relation as a table.

{(1988, Calgary), (1992, Albertville), (1994, Lillehammer), (1998, Nagano),

(2002, Salt Lake City), (2006, Turin), (2010, Vancouver)}

|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 101. Different colours of marbles can be associated with the number of marbles in a bag. Consider the relation represented by this arrow diagram. Represent the relation as a graph.



|  |  |
| --- | --- |
| a. |  |
| b. |  |
| c. |  |
| d. |  |

\_\_\_\_ 102. The members of the Salvatore family can be associated with their masses, in kilograms. Consider the relation represented by this set of ordered pairs. Describe the relation in words.



|  |  |
| --- | --- |
| a. | The relation shows the association “has a mass, in kilograms, of” from a set of masses to a set of members of the Salvatore family. |
| b. | The relation shows the association “has a mass, in grams, of” from a set of members of the Salvatore family to a set of masses. |
| c. | The relation shows the association “has a mass, in kilograms, of” from a set of members of the Salvatore family to a set of masses. |
| d. | The relation shows the association “has a height, in kilograms, of” from a set of members of the Salvatore family to a set of masses. |

\_\_\_\_ 103. This table shows the masses, *m* grams, of different numbers of identical beads, *n*. Identify the domain.

|  |  |
| --- | --- |
| **Number of Beads,**  ***n*** | **Mass of Beads, *m***  **(g)** |
| 1 | 1.56 |
| 2 | 3.12 |
| 3 | 4.68 |
| 4 | 6.24 |
| 5 | 7.80 |

|  |  |
| --- | --- |
| a. |  |
| b. |  |
| c. |  |
| d. |  |

\_\_\_\_ 104. For the function , determine *x* when .

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 83 | b. | –67 | c. | 11 | d. | –11 |

\_\_\_\_ 105. For the function , determine *x* when .

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | –3 | b. | 12 | c. | –39 | d. | –12 |

\_\_\_\_ 106. Write  as an equation in two variables.

|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 107. The function  converts a temperature, *f* degrees Fahrenheit, to *C* degrees Celsius. Determine the value of *f* when . Give the answer to the nearest degree.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 70C | b. | –70C | c. | –29C | d. | –6C |

\_\_\_\_ 108. Each point on this graph represents an animal. Which animal has the least mass?



|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | C | b. | A | c. | D | d. | E |

\_\_\_\_ 109. Joshua went on a bike ride. For part of the ride, Joshua stopped to play in a park with a friend. Which segment of the graph best describes this part of his bike ride?



|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | CD | b. | AB | c. | OA | d. | BC |

\_\_\_\_ 110. Joshua went on a bike ride. Which statement best describes what is happening for line segment DE in this graph?



|  |  |
| --- | --- |
| a. | Joshua spends time at the park. |
| b. | Joshua leaves home. |
| c. | Joshua cycles to the park. |
| d. | Joshua returns home. |

\_\_\_\_ 111. Joshua went on a bike ride. During the ride, he stopped to play at a park, as shown by line segment CD. How much time did Joshua spend at the park?



|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 65 min. | b. | 75 min. | c. | 70 min. | d. | 80 min. |

\_\_\_\_ 112. Which of these graphs represents a function?

i) ii)

 

iii) iv)

 

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | ii | b. | i | c. | iii | d. | iv |

\_\_\_\_ 113. Determine the domain and range of this graph.



|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 114. Determine the domain and range of the graph of this function.



|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 115. The relation between *x* and *y* is linear. Which ordered pair completes this table of values?

|  |  |
| --- | --- |
| ***x*** | ***y*** |
| 7 | –4 |
| 4 | –7 |
| 1 | –10 |
| –2 | –13 |
|  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| a. | (–5, –16) | c. | (–13, –5) |
| b. | (–16, –5) | d. | (–5, –13) |

\_\_\_\_ 116. For a service call, an electrician charges a $65 flat fee, plus $45 for every 30 min worked. Determine the rate of change of this linear relation.

|  |  |  |  |
| --- | --- | --- | --- |
| a. | $45/h | c. | $65/h |
| b. | $110/h | d. | $90/h |

\_\_\_\_ 117. This graph shows the cost of a taxi ride. The cost, *C* dollars, is a function of the duration of the ride, *t* min. What is the duration of the ride when the cost is $35?



|  |  |  |  |
| --- | --- | --- | --- |
| a. | 45 min | c. | 50 min |
| b. | 58 min | d. | 53 min |

\_\_\_\_ 118. Determine the slope of this line segment.



|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 119. Is the slope of this line segment positive, negative, zero, or not defined?



|  |  |  |  |
| --- | --- | --- | --- |
| a. | zero | c. | not defined |
| b. | positive | d. | negative |

\_\_\_\_ 120. Is the slope of this line segment positive, negative, zero, or not defined?



|  |  |  |  |
| --- | --- | --- | --- |
| a. | positive | c. | not defined |
| b. | negative | d. | zero |

\_\_\_\_ 121. Determine the slope of the line that is parallel to this line segment.



|  |  |  |  |
| --- | --- | --- | --- |
| a. | – | c. |  |
| b. |  | d. | – |

\_\_\_\_ 122. The slope of a line is . What is the slope of a line that is parallel to this line?

|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. | – |

\_\_\_\_ 123. The slope of a line is . What is the slope of a line that is perpendicular to this line?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | – | c. |  |
| b. | – | d. |  |

\_\_\_\_ 124. A line has *x*-intercept –5 and *y*-intercept 1. Determine the slope of a line parallel to this line.

|  |  |  |  |
| --- | --- | --- | --- |
| a. | – | c. |  |
| b. | – | d. |  |

\_\_\_\_ 125. Write an equation to describe this graph.

**

|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 126. Write an equation for the graph of a linear function that has slope 1 and *y*-intercept 8.

|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 127. Which equations represent parallel lines?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | , | c. | , |
| b. | , | d. | , |

\_\_\_\_ 128. Which equations represent perpendicular lines?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | , | c. | , |
| b. | , | d. | , |

\_\_\_\_ 129. Write an equation for the line that passes through U(3, –7) and is perpendicular to the line: **.

|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 130. In which form is the equation ** written?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | Standard form | c. | General form |
| b. | Slope-intercept form | d. | Slope-point form |

\_\_\_\_ 131. Determine the slope of the line with this equation: 

|  |  |  |  |
| --- | --- | --- | --- |
| a. | – | c. |  |
| b. |  | d. | – |

\_\_\_\_ 132. Merny needs a 132-ft. string of outdoor lights. She has *m* 12-ft. strings and *n* 16-ft. strings. Write an equation for the relation.

|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 133. Create a linear system to model this situation:

The perimeter of an isosceles triangle is 36 cm. The base of the triangle is 9 cm longer than each equal side.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | *s* + *b* = 36  *b* – 9 = *s* | b. | 2*s* + *b* = 36  *b* + 9 = *s* | c. | 2*b* + *s* = 36  *s* + 9 = *b* | d. | 2*s* + *b* = 36  *s* + 9 = *b* |

\_\_\_\_ 134. Create a linear system to model this situation:

A collection of nickels and dimes contains four times as many dimes as nickels. The total value of the collection is $20.25.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | *d* = 4*n*  5*n* + 10*d* = 2025 | b. | *d* = 4*n*  5*d* + 10*n* = 2025 | c. | *n* = 4*d*  5*n* + 10*d* = 2025 | d. | *d* + *n* = 15  5*n* + 10*d* = 2025 |

\_\_\_\_ 135. Create a linear system to model this situation:

In a board game, Judy scored 3 points more than twice the number of points Ann scored.

There was a total of 39 points scored.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | *j* = 3 + 2*a*  *j* + *a* = 39 | b. | *j* – 3 = 2*a*  *j* + 2*a* = 39 | c. | *j* + 3 = 2*a*  *j* + *a* = 39 | d. | *a* = 3 + 2*j*  *j* + *a* = 39 |

\_\_\_\_ 136. Create a linear system to model this situation:

Cheri operates a grass-cutting business. She charges $19 for a small lawn and $29 for a large lawn. One weekend, Cheri made $287 by cutting 13 lawns.

|  |  |  |  |
| --- | --- | --- | --- |
| a. | *s* + *l* = 13  19*s +* 29*l =* 287 | c. | *s* + *l* = 13  29*s +* 19*l =* 287 |
| b. | *s* + *l* = 287  19*s +* 29*l =* 13 | d. | *s* + *l* = 287  29*s +* 19*l =* 13 |

\_\_\_\_ 137. Create a linear system to model this situation:

A length of outdoor lights is formed from strings that are 5 ft. long and 11 ft. long. Fourteen strings of lights are 106 ft. long.

|  |  |  |  |
| --- | --- | --- | --- |
| a. | 5*x* + 11*y* = 14  *x* + *y* = 106 | c. | *x* + *y* = 14  5*x* + 11*y* = 106(14) |
| b. | *x* + *y* = 14  5*x* + 11*y* = 106 | d. | *x* + *y* = 14  *x* + 2*y* = 106 |

\_\_\_\_ 138. Create a linear system to model this situation:

A rectangular field is 35 m longer than it is wide. The length of the fence around

the perimeter of the field is 290 m.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | *l* + 35 = *w*  2*l* + 2*w* = 290 | b. | *l* = *w* + 35  2*l* + 2*w* = 290 | c. | *l* = *w* + 35  *l* + *w* = 290 | d. | *l* = *w* + 35  *lw* = 290 |

\_\_\_\_ 139. Yoshiko used this linear system to represent a situation involving the costs of shirts and pants.

3*s* + *p* = 144

4*s* + 3*p* = 122

What problem might Yoshiko have solved?

**A.** Three shirts and one pair of pants cost $144. Four shirts and three pairs of pants cost $122.

Determine the costs of one shirt and one pair of pants.

**B.** Three shirts and one pair of pants cost $144. Two shirts and three pairs of pants cost $122.

Determine the costs of one shirt and one pair of pants.

**C.** Three shirts cost $144. Four shirts and three pairs of pants cost $122.

Determine the costs of one shirt and one pair of pants.

**D.** Three shirts and 4 pairs of pants cost $144. Four shirts and three pairs of pants cost $122.

Determine the costs of one shirt and one pair of pants.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | Problem D | b. | Problem A | c. | Problem C | d. | Problem B |

\_\_\_\_ 140. Use the graph to solve the linear system:

*y* = –5*x* 

*y + * = 2*x*



|  |  |  |  |
| --- | --- | --- | --- |
| a. | (2, 0) | c. | (0, 0) |
| b. | (2, –2) | d. | (0, –2) |

\_\_\_\_ 141. Which linear system is represented by this graph?

|  |  |
| --- | --- |
| **A)** *x* – *y* = 5  5*x +* 6*y =* 18  **B)** *x* – *y* = 7  5*x* +6*y =* 18  **C)** *x* – *y* = 9  6*x* +6*y =* 18  **D)** *x* – *y* = 11  6*x* +5*y =* 18 |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | System D | b. | System B | c. | System A | d. | System C |

\_\_\_\_ 142. The solution of this linear system is (–3, *y*). Determine the value of *y*.

*x –* *y =* 

*x – y =* 

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 20 | b. | 30 | c. | 10 | d. | 40 |

\_\_\_\_ 143. Use an elimination strategy to solve this linear system.





|  |  |  |  |
| --- | --- | --- | --- |
| a. | and | c. | and |
| b. | and | d. | and |

\_\_\_\_ 144. Use an elimination strategy to solve this linear system.





|  |  |  |  |
| --- | --- | --- | --- |
| a. | and | c. | and |
| b. | and | d. | and |

\_\_\_\_ 145. Use an elimination strategy to solve this linear system.





|  |  |  |  |
| --- | --- | --- | --- |
| a. | and | c. | and |
| b. | and | d. | and |

\_\_\_\_ 146. Without graphing, determine the slope of the graph of the equation: 3*x +* 4*y =* 11

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. |  | b. | – | c. | 4 | d. | 3 |

\_\_\_\_ 147. Determine the number of solutions of the linear system:

14*x* + 7*y* = 315

16*x –* 2*y* = 610

|  |  |  |  |
| --- | --- | --- | --- |
| a. | no solution | c. | two solutions |
| b. | one solution | d. | infinite solutions |

\_\_\_\_ 148. Determine the number of solutions of the linear system:

5*x* + 7*y* = 76

–25*x –* 35*y* = –380

|  |  |  |  |
| --- | --- | --- | --- |
| a. | 2 solutions | c. | infinite solutions |
| b. | one solution | d. | no solution |

\_\_\_\_ 149. Two lines in a linear system have the same slope, but different *y*-intercepts.

How many solutions does the linear system have?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | two solutions | c. | infinite solutions |
| b. | no solution | d. | one solution |

\_\_\_\_ 150. For what value of *k* does the linear system below have infinite solutions?

*x + y =* 14

*kx* + 2*y =* 28

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 28 | b. |  | c. |  | d. | 0 |

**Short Answer**

151. A cruise ship is 790 ft. long. Convert this length to the nearest metre.

152. A window is 35 in. high. Convert this height to the nearest centimetre.

153. Determine the surface area of this sphere to the nearest square inch. Determine its volume to the nearest cubic inch.



154. A spherical balloon has a surface area of 88 cm2. What is the diameter of the balloon to the nearest tenth of a centimetre?

155. A pencil has a cylindrical body with a cone-shaped end. The cylinder is 5 cm long with a radius of

0.29 cm. The cone has a slant height of 1 cm and has the same radius as the cylinder. Determine the surface area of the pencil to the nearest tenth of a square centimetre.

156. A road increases 8 m in altitude for every 100 m of horizontal distance. Calculate the angle of inclination of the road, to the nearest tenth of a degree.

157. A tree is supported by a guy wire. The guy wire is anchored to the ground 7.0 m from the base of the tree. The angle between the wire and the level ground is 60°. How far up the tree does the wire reach, to the nearest tenth of a metre?

158. A communications tower is 300 m high. Rebecca is driving toward the tower. The angle between the ground and Rebecca’s line of sight to the top of the tower is 5°. About how far is Rebecca from a point on the ground vertically below the top of the tower, to the nearest hundred metres?

159. A rectangle has length 19.0 cm. The angle between one shorter side of the rectangle and a diagonal is 56°. Calculate the width of the rectangle, to the nearest tenth of a centimetre.

160. A flagpole is 14.0 m high. At a certain point, the angle between the ground and Jon’s line of sight to the top of the flagpole is 63°. About how far is Jon from the flagpole, to the nearest tenth of a metre?

161. A ski jump is 116 m long. It has a vertical rise of 54 m. What is the angle of inclination of the jump to the nearest tenth of a degree?

162. Determine the height of this isosceles triangle to the nearest tenth of a centimetre.



163. A roof has the shape of an isosceles triangle with equal sides 8 m long and base 12 m long. What is the measure of the angle of inclination of the roof to the nearest degree?



164. Determine the cube root of 551 368.

165. A cube has surface area 6900.0 cm2. What is the volume of the cube to the nearest tenth of a cubic centimetre?

166. Write an expression for the width of this rectangle.



167. Simplify , then factor.

168. Suppose you must use 1 *x*-tile and 10 *x*-tiles. Which numbers of 1-tiles could you use to form a rectangle?

169. Copy and complete this statement.



170. Evaluate .

171. Estimate the value of  to one decimal place.

172. Write  in simplest form.

173. Which of these numbers is the greatest?

, , , , 

174. Simplify  Write using powers with positive exponents.

175. Evaluate 

176. A sphere has volume 1417 cm. What is the radius of the sphere to the nearest tenth of a centimetre?

177. Consider the relation represented by this arrow diagram. Represent the relation as a set of ordered pairs.



178. Use the numbers below.

a) Write a set of ordered pairs that represents a function.

b) Write a set of ordered pairs that does not represent a function.



179. Identify the domain and range of this relation.



180. This table shows the refund, *r* dollars, for different numbers of pop cans, *n*. Write the domain and range.

|  |  |
| --- | --- |
| **Number of Pop Cans, *n*** | **Refund, *r* ($)** |
| 9 | 0.45 |
| 13 | 0.65 |
| 16 | 0.80 |
| 24 | 1.20 |
| 33 | 1.65 |

181. This is a graph of the function .



a) Determine the range value when the domain value is –2.

b) Determine the domain value when the range value is –1.

182. Determine the domain and range of the graph of this function.



183. Which graphs have:

i) a negative rate of change?

ii) a positive rate of change?

iii) neither a negative nor a positive rate of change?

a) b)

 

c) d)

 

e) f)

 

184. This graph shows the volume of gasoline left in a car’s tank, *v* litres, as a function of the distance travelled, *d* in hundreds of kilometres. Determine the domain and range of the graph.



185. Determine the vertical and horizontal intercepts of this graph.



186. Determine the slope of the line that passes through (–11, –8) and (6, 16).

187. Graph the line with *y*-intercept 3 and slope –2*.*

**

188. From January 2010 to August 2010, the amount of money in Shannon’s savings account increased by $75 per month. In May 2010, there was approximately $534 in her savings account. Write an equation in slope-point form to represent the amount of money in her savings account, *s,* as a function of the number of months, *n,* since December 2009.

189. Desmond works as a babysitter for two families. Family A pays $5.75 per hour. Family B pays $7.5 per hour. Last weekend, Desmond earned $75. Write an equation in general form for the relation.

190. Create a linear system to model this situation:

The cost of admission to the museum is $5.50 for adults and $3.50 for students.

Yesterday, 100 admissions were sold, and the receipts were $424.00.

191. Use graphing technology to solve this linear system.

Where necessary, write the coordinates to the nearest tenth.

–3*x* – 5*y* = 12

–*x* + *y* = –10

192. Use graphing technology to solve this linear system.

Where necessary, write the coordinates to the nearest tenth.

*x* + *y* = –3

*x* + 7*y* = –8

193. Fill in the each blank below with the correct integer.

|  |  |
| --- | --- |
| **System A**  \_\_\_\_:  \_\_\_\_: | **System B**  7*x* + 6*y* = –376  –4*x* – 6*y* = 256 |

194. Use substitution to solve this linear system:

*x +* *y =* –34

–3*x +* 4*y =* –4

195. Create a linear system to model this situation. Then use substitution to solve the linear system to solve the problem.

At the local fair, the admission fee is $8.00 for an adult and $4.50 for a youth. One Saturday, 209 admissions were purchased, with total receipts of $1304.50. How many adult admissions and how many youth admissions were purchased?

196. Use an elimination strategy to solve this linear system.



**

197. Use an elimination strategy to solve this linear system.



**

198. Determine the number of solutions of this linear system.

15*x* + 30*y* = –240

17*x +* 21*y* = 53

199. For what values of *k* does the linear system below have:

**a)** infinite solutions?

**b)** one solution?

**c)** no solution?

*x* + *y =* 16

*kx* + 3*y =* 48

200. Determine the number of solutions for the linear system that models this problem:

Erica paid $6.00 for a bottle of water and 3 granola bars. Her friend paid $12.00 for 2 bottles of water and 6 granola bars. How much does a bottle of water cost?

**Problem**

201. Explain how to convert a measurement of 20 000 ft. to miles, yards, and feet.

202. A map of B.C. has a scale of 1:2 500 000. The actual distance between Nanaimo and Campbell River is approximately 96 mi. What is this distance on the map? Answer to the nearest sixteenth of an inch.

203. A nautical mile is approximately 6080 ft. Convert 6 nautical miles to the nearest tenth of a kilometre.

204. In track and field, the 440-yd. race was replaced with the 400-m race when Canada changed from the imperial system to the SI system. Which race is longer and by how much? Use the exact conversion: 1 yd. = 91.44 cm

205. A right pyramid with a base that is a regular hexagon has a slant height of 5.0 m. The base area is 10.4 m2 and the side length of the base is 2.0 m. Calculate the surface area of the pyramid to the nearest tenth of a square metre.

206. A right rectangular pyramid has base dimensions 23.2 cm by 17.0 cm and volume 1552.4 cm3. Calculate the height of the pyramid to the nearest tenth of a centimetre.

207. Francis has three empty containers: a right rectangular prism, a right square pyramid, and a right cone. Each container has height 2.0 cm. The prism has base dimensions 1.5 cm by 2.5 cm. The pyramid has base side length 3.4 cm. The cone has base diameter 3.8 cm. Determine the volume of each container to the nearest tenth of a cubic centimetre. Which container has the least volume? Which container has the greatest volume? Explain your answer.

208. A right cone has a base diameter of 8 in. and a volume of 259 cubic inches. Determine the slant height of the cone to the nearest inch.

209. A baby’s rattle contains a plastic ball inside a spherical case. The diameter of the plastic ball is 2 cm and the diameter of the case is 7 cm.



a) Calculate the volume of the spherical case, to the nearest cubic centimetre.

b) Calculate the volume of the plastic ball, to the nearest cubic centimetre.

c) Calculate the volume of air in the rattle, to the nearest cubic centimetre.

210. A solid sphere just fits inside a cube that has an edge length equal to the diameter of the sphere. The edge length of the cube is 4.9 cm. What is the volume of air in the cube to the nearest cubic centimetre?

211. This cone was cut from a right rectangular prism with dimensions 19 cm by 21 cm by 65 cm. What volume of the right rectangular prism, in cubic centimetres, remains?



212. A guy wire is connected from a tower to the ground. Determine the height of the tower, to the nearest tenth of a metre. What assumptions about the ground are you making?



213. Sue used a clinometer to sight the top of a tall building from a point 160.0 m from the base of the building. The angle shown on the protractor was 46°. Sue held the clinometer 1.8 m above the ground. Determine the height of the building to the nearest tenth of a metre.

214. a) In BCD, identify the side opposite D and the side adjacent to D.

b) Determine sin D to the nearest tenth. Describe what the value of sin D indicates.

c) Determine the measure of D to the nearest tenth of a degree.



215. Determine the perimeter of this triangle to the nearest tenth of a centimetre.



216. A rectangular lawn has the dimensions shown. A gardener wants to use an electric lawnmower to mow the lawn. The electrical outlet is located at O.



a) Determine the length of cord needed to reach corner C, to the nearest tenth of a metre.

b) Determine the distance between the electrical outlet and corner N, to the nearest tenth of a metre.

217. A Girl Guide measured the angle of elevation of the top of a monument as 59 The height of the monument is 38.5 m. She then walked 31.0 m due west from the point where she measured the angle of elevation. Determine the angle of elevation of the monument from her new location to the nearest tenth of a degree.



218. A cube has surface area 2646 m2. What is its volume?

219. Calculate the volume of the largest possible sphere that can fit in a cube with volume 2197.0 cm3. Give the volume to the nearest tenth of a cubic centimetre. Explain your steps.

220. A square is drawn inside a circle with radius .

a) Write an expression for the area of the shaded region.

b) Factor the expression.



221. Use decomposition to factor . Explain your steps.

222. A rectangle has length 14*x* and width *y*. Strips of width  are cut from the rectangle as shown. Write an expression that represents the area of the rectangle that remains.



223. Factor. Explain your steps.



224. Use mental math to determine . Explain your strategy.

225. A square has an area of 1134 m. Determine the perimeter of the square. Write the answer as a radical in simplest form.

226. The Greek mathematician Heron is credited with this formula for the area of a triangle:

, where *a*, *b*, and *c* are the side lengths of the triangle, and *s* is one-half the perimeter of the triangle, .

Use Heron’s formula to calculate the area of this triangle as an entire radical and as a radical in simplest form, if possible.



227. In isosceles ABC, what is the length of BC? Write your answer as a mixed radical.



228. Harish simplified  as shown:









Identify the error Harish made, then write a correct solution.

229. The height, *h* metres, of a Douglas fir tree can be estimated from the formula , where *d* metres is the diameter at the base. Use this formula to determine the approximate height of a Douglas fir tree with base diameter 4.1 m. Write the answer to the nearest metre.

230. Another formula for the approximate surface area, *SA* square metres, of a person’s body is , where *h* is the person’s height in centimetres, and *m* is the person’s mass in kilograms.

a) Calculate the surface area of a newborn with height  cm and mass 7.3 kg. Write the answer as a decimal to the nearest hundredth of a square centimetre.

b) Calculate the surface area of a person with height 170 cm and mass 66 kg. Write the answer as a decimal to the nearest hundredth of a square centimetre.

231. At a distance of 1 m from a light source, the intensity of the light is 2 mW/m2 (milliwatts per square metre). The intensity, *I*, at a distance *d* metres from the source is given by the formula: *I* = 2*d*–2 .

Determine the intensity of the light 2.5 m from the source.

232. Koli wants to invest enough money on January 1st to pay his daughter $900 at the end of each year for the next 6 years.

The investment savings account pays 3.3% compounded annually.

The amount, *A* dollars, that Koli must invest on January 1st is given by the formula:

,

where *P* is the annual payment in dollars, *r* is the annual interest rate expressed as a decimal, and *t* is the time in years that the money will be invested.

How much must Koli invest on January 1st?

233. A tree farmer used the formula  to estimate the volume, *V*  cubic metres, of a tree with height *h* metres and mean trunk diameter *d* metres. The height of a tree is 20 times its mean trunk diameter, and its volume is 230 m. What is the mean trunk diameter of this tree to the nearest metre?

234. A relation contains 5 elements in the domain and 6 elements in the range. Can this relation be a function? Justify your answer.

235. This graph represents a day trip from Vancouver to Hope, B.C. The distance between Vancouver and Hope is approximately 150 km.

a) Describe the journey for each segment of the graph.

b) How long did the day trip take?

c) What are the dependent and independent variables?



236. A company rents paddle boats by the day. This table shows the total cost of renting a paddle boat for different numbers of days.

|  |  |
| --- | --- |
| **Number of**  **Days (n)** | **Total Cost ($)** |
| 1 | $54.00 |
| 3 | $112.00 |
| 5 | $170.00 |
| 7 | $228.00 |

a) Graph the relation between the total cost of the rental and the number of days.



b) Does the graph represent a linear relation? How do you know?

c) Determine the rate of change, then describe what it represents.

237. This graph represents the relation between the distance a vehicle travels and the number of revolutions of a tire. An equation for the distance travelled, *d* metres, after *r* revolutions of the tire is .





a) Identify the dependent and independent variables.

b) Does the graph represent a linear relation? How do you know?

c) Describe another strategy you could use to determine whether this relation is linear.

238. a) Determine the rise, run, and slope of this line segment.



b) Draw a line segment whose slope is:

i) zero

ii) not defined

iii) the same as the slope of the line segment in part a



239. Construction workers are paving a road. The road must drop 4 cm for every 650 cm measured horizontally.

a) What is the slope of the road?

b) Suppose a section of the road drops 24.5 cm. How long is this section of the road measured horizontally?

240. Sketch graphs to help explain what happens to the graph of ** when:

a) the coefficient of *x* increases by 1 each time until it is 6

b) the constant term decreases by 1 each time until it is 

241. For the equation **:

a) Explain how to change the equation so the line has a greater slope, then a lesser slope.

b) Explain how to change the equation so the line has a greater *y*-intercept, then a lesser *y*-intercept.

c) Rewrite the equation so the new line has a *y*-intercept that is one less than the given *y*-intercept, and a slope that is one more than the given slope.

242. Identify the graph below that corresponds to each given slope and *y*-intercept.

a) slope ; *y*-intercept 0

b) slope ; *y*-intercept 

c) slope 4; *y*-intercept 0

d) slope ; *y*-intercept 0

|  |  |
| --- | --- |
| Graph A | Graph B |
| Graph C | Graph D |

243. In Jay’s business, the annual cost of operating a car, *c*, is a linear function of the number of kilometres the car is driven, *k*. The annual cost of operating a car that has been driven 19 375 km is approximately $3875. The annual cost of operating a car that has been driven 20 000 km is approximately $3900.

a) Write an equation in slope-point form to represent this function.

b) Use the equation in part a to determine how many kilometres a car has been driven when the annual operating cost is approximately $4350.

244. Write an equation in general form for the line that passes through A(3, –4) and B(11, 8).

245. Charles’s Gas Law states that the volume, *v*, of a fixed mass of gas at a constant pressure varies directly with its absolute temperature, *t*. At 27°C, the volume of a certain amount of air is 500 mL. When the air is heated to 90°C, the volume increases to 605 mL.

a) Write an equation in general form for this relation.

b) Determine the volume of the air when its temperature is 60°C.

c) Determine the temperature of the air when its volume is 1010 mL.

246. **a)** Write a linear system whose solution is: *x* = 5, *y* = –5.

**b)** Is there more than one linear system with this solution? Explain.

247. Gino’s class was assigned the following two-part question for homework.

**a)** Write a linear system to model this situation:

Save-Way-More food store received a delivery of 86 boxes of apples and bananas. Each box of apples had a mass of 32 lb., and each box of bananas had a mass of 16 lb. The total mass of the delivery was 1968 lb.

**b)** Use a graph to solve this problem:

How many boxes of each fruit were there?

Gino answered part a correctly, but could not understand why his solution of 49 boxes of apples and 37 boxes of bananas was incorrect for part b. Explain what he likely did wrong.

248. **a)** Use graphing technology to determine the solution of this linear system.

17*x* + 10*y* = 9

7*x* – 6*y* = 29

**b)** Verify the solution.

249. **a)** Write a linear system to model this situation:

A large tree removes 1.5 kg of pollution from the air each year. A small tree removes 0.04 kg each year. An urban forest has 1650 large and small trees. Together, these trees remove 1818 kg of pollution each year.

**b)** Use graphing technology to solve this problem:

How many of each size of tree are in the forest?

**c)**  Verify the solution.

250. a) Model this situation with a linear system:

To rent a car, a person is charged a daily rate and a fee for each kilometre driven. When Chena rented a car for 15 days and drove 800 km, the charge was $715.00. When she rented the same car for 25 days and drove 2250 km, the charge was $1512.50.

b) Determine the daily rate and the fee for each kilometre driven. Verify the solution