**1.** The basic unit of length in the SI system is the

**A)**centimetre **B)**kilometre **C)**metre **D)**millimetre

 **2.** Which of the four imperial length units listed below is the smallest?

**A)**foot **B)**inch **C)**mile **D)**yard

 **3.** A tire has a diameter of 3 ft. How many times will it rotate in order to roll across a field that is 297 yd long? Round your answer to the nearest tenth, if necessary.

**A)**297 **B)**99 **C)**94.5 **D)**31.5

 **4.** If the total surface area of a cube is 1417 cm2, what is the surface area of each face of the cube, to the nearest tenth of a square inch?

**A)**236.2 in.2 **B)**36.6 in.2 **C)**15.4 in.2 **D)**6.1 in.2

 **5.** How long is 5 ft 9 in. in metres? Round your answer to the nearest hundredth.

**A)**18.86 m **B)**9.26 m **C)**1.75 m **D)**1.80 m

 **6.** It is 851 km from Whitehorse to Inuvik. How long would it take to fly from Whitehorse to Inuvik in a de Havilland Beaver at a speed of 143 mph, if you did not have to stop to refuel?

**A)**3.7 h **B)**6.0 h **C)**16.8 h **D)**27.0 h

 **7.** Jean is travelling in the United States. A road sign indicates she is 319 mi from her destination. To the nearest kilometre, how far is Jean from her destination?

**A)**126 km **B)**198 km **C)**514 km **D)**810 km

 **8.** The carpet Caleigh has chosen for her new recreation room costs $8.50 per square metre. The room measures 20 ft by 18 ft. To the nearest dollar, how much will it cost Caleigh to carpet this room?

**A)**$284 **B)**$933 **C)**$3060 **D)**$32 938

 **9.** A rectangle measures 12 cm by 15 cm. What is the area of the rectangle in square metres?

**A)**0.0018 m2 **B)**0.018 m2 **C)**0.18 m2 **D)**1.8 m2

 **10.** Determine the volume of the right pyramid.

****

**A)**3 yd3 **B)**6 yd3 **C)**12 yd3 **D)**18 yd3

 **11.** Calculate the surface area of the right prism.

****

**A)**6 cm2 **B)**22 cm2 **C)**28 cm2 **D)**36 cm2

 **12.** Calculate the surface area of the right pyramid, to the nearest tenth of a square foot.

****

**A)**27.6 ft2 **B)**34.7 ft2 **C)**53.4 ft2 **D)**54.7 ft2

 **13.** What is the volume of a right cylinder with radius 1 m and height 3 m, to the nearest tenth of a cubic metre?

**A)**3.0 m3 **B)**9.4 m3 **C)**25.1 m3 **D)**28.3 m3

 **14.** Determine the surface area of the right cone, to the nearest square centimetre.



**A)**120 cm2 **B)**189 cm2 **C)**217 cm2 **D)**245 cm2

 **15.** The surface area of a bowling ball is 500 cm2. What is its radius, to the nearest tenth of a centimetre?

**A)**4.9 cm **B)**6.3 cm **C)**9.8 cm **D)**12.6 cm

 **16.** Determine the volume of a right cone with radius 4.2 in. and height 1.4 ft. Express the answer to the nearest cubic inch.

**A)**26 in.3 **B)**310 in.3 **C)**931 in.3 **D)**1241 in.3

 **17.** Mandy is pouring water into cylindrical glasses that have a diameter of 5 cm and a height of 16 cm. If she fills the glasses three-quarters full, how much water will be in each glass, to the nearest cubic centimetre?

**A)**236 cm3 **B)**314 cm3 **C)**942 cm3 **D)**1256 cm3

 **18.** What is ?

**A)** **B)** **C)** **D)**

 **19.** Simplify .

**A)** **B)** **C)**16 **D)**144

 **20.** Which expression represents a negative number?

**A)**2–3 **B)**(–3)2 **C)**–30 **D)**(–3)–1

 **21.** Which value of *x* satisfies the equation *x*–2 = ?

**A)**18 **B)**9 **C)**4.5 **D)**3

 **22.** Which power is equivalent to ?

**A)**2643 **B)** **C)** **D)**

 **23.** Simplify .

**A)**25 **B)** **C)** **D)**

 **24.** Determine the value of *y* in the equation *y* =  when *x* = 10. Leave your answer in simplest radical form if necessary.

**A)**– **B)**7 **C)** **D)**

 **25.** Which of the following is equivalent to ?

**A)** **B)** **C)** **D)**

 **26.** What is  as an equivalent radical?

**A)** **B)** **C)** **D)**

 **27.** Determine the product (*x* + 2)(*x* – 6).

**A)***x*2 – 12*x* – 12 **B)***x*2 + 2*x* – 12 **C)***x*2 – 4*x* – 12 **D)***x*2 – 12*x* – 4

 **28.** Multiply and simplify (5*x* + 2)2.

**A)**25*x*2 + 20*x* + 10 **B)**25*x*2 + 20*x* + 4

**C)**25*x*2 + 10*x* + 4 **D)**25*x*2 + 4

 **29.** Which of the following binomial multiplication expressions does the diagram represent?



**A)**(2*x* + 3)(*x* + 3) **B)**(2*x* + 3)(*x* + 9)

**C)**(3*x* + 3)(*x* + 3) **D)**(3*x* + 3)(*x* + 9)

 **30.** Which of the following expressions is the factored form of 3*x*(*y* + 1) + 4*z*(*y* + 1)?

**A)**(3*x* + 4*z*)(*y* + 1) **B)**(3*x* + *y*)(4*z* + 1)

**C)**(3*x* + 1)(4*z* + *y*) **D)**(3*xy* + 1)(4*z* + 1)

 **31.** Which of the following values of *k* makes the trinomial 36*x*2 + *kx* + 81 a perfect square?

**A)**54 **B)**0 **C)**2916 **D)**108

 **32.** Which expression is *not* an example of a difference of squares?

**A)**225 – 100*x*2 **B)**64 – 16*x*2 **C)**36*x*2 – 49 **D)**9*x*2 – 181

 **33.** Which of the following pairs of integers has a product of 63 and a sum of –16?

**A)**7 and 9 **B)**7 and –9

**C)**–7 and –9 **D)**–7 and 9

 **34.** The area, in metres, of a rectangle is *x*2 – 10*x* – 75. When the expression is factored fully, the factors are the dimensions of the rectangle. Determine the actual dimensions, in metres, of the rectangle when *x* = 25.

**A)**10 m by 30 m **B)**20 m by 40 m **C)**25 m by 35 m **D)**30 m by 45 m

 **35.** What is the factored form of 6*x*2 + 17*x* + 5?

**A)**(6*x* + 1)(3*x* + 5) **B)**(3*x* + 5)(2*x* + 1)

**C)**(3*x* + 1)(2*x* + 5) **D)**(2*x* + 5)(3*x* + 1)

**Problem**

 **1.** In the figure below, the hole in the end extends straight through the block. Determine the total surface area of the block.



 **2.** What is the edge length of the cube that has the same volume as this rectangular prism?



 **3.** An observatory is designed in the shape of a right cylinder with a hemispherical dome. What is the volume of air in the observatory, to the nearest thousand cubic yards?

****

 **4.** Greg works as a caretaker at a park. In the fall, he rakes all the leaves in the rectangular park. The length of the park is (3*x* + 1) m. The width of the park is (2*x* + 4) m.

**a)** Develop an expression that represents the area of the park.

**b)** Calculate the actual area that Greg has to rake if *x* = 5 m.

**FPC 10 - Midterm**

**Answer Section**

**MULTIPLE CHOICE**

 **1.** C

 **2.** B

 **3.** C

 **4.** B

 **5.** C

 **6.** A

 **7.** C

 **8.** A

 **9.** B

 **10.** B

 **11.** B

 **12.** D

 **13.** B

 **14.** C

 **15.** B

 **16.** B

 **17.** A

 **18.** D

 **19.** A

 **20.** D

 **21.** D

 **22.** B

 **23.** C

 **24.** D

 **25.** B

 **26.** A

 **27.** C

 **28.** B

 **29.** A

 **30.** A

 **31.** D

 **32.** D

 **33.** C

 **34.** A

 **35.** C

**PROBLEM**

 **1.** Surface area of the four long sides:

*A* = 4  3  8

 = 96

The combined surface area of the four long sides is 96 cm2.

Surface area of the two ends if they were whole:

*A* = 2  3  3

 = 18

The combined surface area of the two ends, if they were whole, would be 18 cm2.

Surface area lost for the hole in each end:

*A* = 2  1  2

 = 4

The surface area lost for the hole in each end is 4 cm2.

Surface area inside the hole:

*A* = (2  1  8) + (2  2  8)

 = 48

The surface area inside the hole is 48 cm2.

Total surface area:

*A* = 96 + 18 – 4 + 48

 = 158

The total surface area of the figure is 158 cm2.

 **2.** • The volume of the rectangular prism is (*x*)(2*x*)(4*x*) = 8*x*3.

• The length, width, and height of a cube are equal.

• Therefore, the edge length of the cube, when cubed, must equal 8*x*3. The edge length of the cube is  or 2*x*.

 **3.** Convert the height from feet to yards. Use 3 ft = 1 yd.

87 ft = 29 yd

Volume of right cylinder = *r*2*h*

Volume of hemisphere 

Volume of air in observatory = volume of cylinder + volume of hemisphere



The volume of air in the observatory is approximately 139 000 yd3.

 **4. a)** *A* = *l*  *w*

 *A* = (3*x* + 1)(2*x* + 4)

 *A* = 6*x*2 + 12*x* + 2*x* + 4

 *A* = 6*x*2 + 14*x* + 4

The area of the park is (6*x*2 + 14*x* + 4) m.

**b)** Substitute *x* = 5 into the equation:

*A* = 6*x*2 + 14*x* + 4

*A* = 6(5)2 + 14(5) + 4

*A* = 150 + 70 + 4

*A* = 224

The area is 224 m2.