College Preparation Test 1

Fundamental Mathematics Skills

Choose the correct answer from the four choices A, B, C, or D.

		A	B	C	D
1.	3.5 m = ■	35 cm	350 cm	0.035 cm	3500 cm
2.	5.51 kg = ■	5510 g	551 000 g	55 100 g	55.1 g
3.	700 mL = ■	0.7 L	7 L	0.07 L	0.007 L
4.	8100 mL = ■	81 000 cm^3	8100 cm^3	8.1 cm^3	2700 cm^3
5.	100 000 cm = ■	100 km	10 km	1 km	0.1 km
6.	$(50\ mm)^3$ = ■	12 500 mm^3	1250 mm^3	125 000 mm^3	2500 mm^3
7.	0.534 $g/cm^3 \times 1\ 000\ 000\ cm^3$ = ■	5.34 kg	0.534 kg	534 kg	5340 kg
8.	The side length of a cube is doubled. What happens to its volume?	stays the same	increases by a factor of 2	increases by a factor of 4	increases by a factor of 8
9.	Find the value of h in the formula S.A. $= 2\pi r^2 + 2\pi rh$ if S.A. = 84.8 cm^2 and r = 3.0 cm.	3.5 cm	1.5 cm	3.0 cm	4.5 cm
10.	A circle has a diameter of 5.0 cm. What is its circumference?	2.5 cm	15.7 cm	19.6 cm	31.4 cm
11.	A square-based prism has a side length of 4.0 m and a height of 6.5 m. What is its volume?	169 m^3	136 m^3	104 m^3	26 m^3
12.	What is the area of a circle with a circumference of 44.0 mm?	380.1 mm^2	308.9 mm^2	308.1 mm^2	154.1 mm^2

Problems

13. Suppose concrete costs \$155/m^3. Calculate the cost of a concrete walkway that is 40 ft long, 3 ft wide, and 2 in. thick.

14. A rectangular piece of wallboard is 250 cm by 140 cm. Two 32 cm diameter holes are cut out of the wallboard for ducts. What is the area of the remaining wallboard to the nearest tenth of a square centimetre?

15. A storage silo is in the shape of a cylinder topped by a hemisphere. Determine the volume of the silo, to the nearest cubic metre, if the height of the cylinder is 20 m and the diameter of the base is 12 m. The volume of a cylinder is calculated using the formula $V = \pi r^2 h$ and the volume of a sphere is calculated using the formula $V = \frac{4}{3}\pi r^3$.

16. A plastic prism has a right triangular base. The sides of the triangular base have lengths 9 cm, 12 cm, and 15 cm. The prism is 20 cm high. Determine the surface area of the prism.

17. A satellite is in orbit at an altitude of 22 000 km above the Earth. How far does the satellite travel in one rotation about the Earth given that the diameter of the Earth is 12 800 km? Round your answer to the nearest kilometre.

College Preparation Test 2

Fundamental Mathematics Skills

Choose the correct answer from the four choices A, B, C, or D.

		A	B	C	D
1.	Solve for c. $c^2 = 5.1^2 + 6.2^2$	7.3	32.2	11.3	8.0
2.	Solve for x. $x^2 + 12.4^2 = 16.8^2$	11.3	20.9	8.8	7.6
3.	A square plot of land has a perimeter of 26.0 km. Find the length of its diagonal.	10.0 km	9.2 km	18.4 km	6.5 km
4.	A hiker walks 17 km north, 6 km east, and then 9 km south. What is the shortest distance between the hiker's start point and end point?	8 km	14 km	10 km	11 km
5.	$\sin 50° =$ ■	0.7660	0.5000	0.262	0.6428
6.	Solve for θ, to the nearest degree. $\cos \theta = 0.9816$	11°	79°	1°	44°
7.	In a right triangle, $\tan \theta = \frac{5}{12}$ and the side opposite to $\angle\theta$ is 15 m. What is the length of the hypotenuse?	36 m	19 m	13 m	39 m
8.	$\frac{9.6 \times \sin 50°}{\sin 30°} =$ ■	20.7°	11.1°	14.7°	16.0°
9.	Solve for c. $c^2 = 11^2 + 13^2 - 2(11)(13)\cos 120°$	20.8	12.1	29.0	15.5
10.	Solve for angle θ, if $0 \leq \theta \leq 90°$. $1 = 2 \cos \theta$	0.5°	60°	30°	50°

Problems

11. In $\triangle$DEF, $\angle$E = 90°, d = 8.52 m, and f = 18.09 m. Determine the values of sin D, cos D, and tan D to three decimal places.

12. The angle of elevation to the top of a building from a point that is 35.6 m from the base of the building is 52.6°. There is an antenna on the edge of the roof and the angle of elevation to the top of the antenna from the same point on the ground is 56.8°. What is the height of the antenna, to the nearest metre?

13. A triangular frame has a base of 8.2 m. The other two sides of the frame meet the base at angles of 35° and 45°. Determine the lengths of the other two sides to the nearest tenth of a metre.

14. A motorboat leaves a dock and travels 800 m due west, then turns 40° to the north and travels another 1000 m to a second dock. What is the distance from the first dock to the second dock to the nearest metre?

15. A circular plate with a diameter of 1.0 m is secured to a wooden counter with 10 bolts equally spaced along the outer edge. Find the distance between two adjacent bolts, to two decimal places.

College Preparation Test 3

Fundamental Mathematics Skills

Choose the correct answer from the four choices A, B, C, or D.

		A	B	C	D
1.	$(+4) - (+3) - (-8) + (-7) =$ ■	−14	0	2	16
2.	$(-4)(-5) + (+3)(-7) =$ ■	1	−1	−41	41
3.	$(+5)(+3)(-4) \div (-10) =$ ■	24	−24	6	−6
4.	$(7 - 3 \times 2)^2 - 6(-1)^3 \div 3 =$ ■	62	3	66	−1
5.	$\frac{4(5-2)^2}{9} \times 2^3 - 5 =$ ■	27	12	16	123
6.	$0.1 + 0.05 + 0.34 =$ ■	0.49	0.40	0.39	0.94
7.	$0.002\ 7 \div 3 =$ ■	0.009	0.000 9	0.008 1	1111
8.	$75 \div 0.25 =$ ■	3000	3	300	1875
9.	Write 115 000 in scientific notation.	115×10^3	1.15×10^3	1.15×10^5	1.15×10^6
10.	$9.002 \times 10^6 =$ ■	90 020 000	9 002 000	9002.000	144.032
11.	The change in 14 students' heights, in centimetres, over a period of time was recorded. 5, 12, 11, 13, 10, 11, 9 6, 10, 15, 11, 12, 6, 9 Find the mean change in height.	5 cm	15 cm	11 cm	10 cm
12.	Refer to question 11. What is the median change in height?	10.5 cm	7.5 cm	6 cm	9 cm
13.	Refer to question 11. What is the mode change in height?	5 cm	15 cm	10 cm	11 cm

Problems

14. The table shows the elevation, in metres above sea level, of 16 of the most prominent mountain peaks in the Canadian Rockies.

3616	3617
3567	3741
3316	2949
3959	3399
3275	2940
3089	3360
3024	3363
3394	3360

a) Calculate the mean, median, and mode elevations.

b) Create a frequency table with six equally spaced intervals that contain all the data.

c) Use your frequency table from part b) to display the data as a histogram.

d) Why is a histogram used to display the data and not a bar graph?

15. A store owner keeps track of a certain brand of jeans sold by size.

Size	4	6	8	10	12	14	16
Number Sold	1	8	13	16	6	2	2

a) Calculate the mean, median, and mode jean size.

b) Which measure of central tendency is most informative to the store owner?

c) What would the mean, median, and mode be if twice as many pairs of jeans for each size were sold?

College Preparation Test 4

Fundamental Mathematics Skills

Choose the correct answer from the four choices A, B, C, or D.

		A	B	C	D
1.	Reduce $\frac{42}{70}$ to lowest terms.	$\frac{21}{35}$	$\frac{3}{5}$	$\frac{4}{7}$	$\frac{6}{7}$
2.	$\frac{5}{6}+\frac{3}{8}-\frac{1}{3}=\blacksquare$	$\frac{7}{8}$	$\frac{7}{17}$	1	$\frac{19}{24}$
3.	$2+\frac{4}{9}=\blacksquare$	$\frac{17}{9}$	$\frac{15}{9}$	$\frac{8}{9}$	$\frac{22}{9}$
4.	$\frac{2}{5}\times\frac{3}{4}=\blacksquare$	$\frac{3}{10}$	$\frac{5}{9}$	$\frac{2}{3}$	$\frac{23}{20}$
5.	$4\div\frac{2}{3}=\blacksquare$	$\frac{7}{2}$	$\frac{8}{3}$	6	5
6.	$\frac{15}{24}=\frac{\blacksquare}{8}$	3	6	7	5
7.	$\frac{28}{\blacksquare}=\frac{4}{9}$	16	7	54	63
8.	$\left(\frac{4}{3}\right)^3=\blacksquare$	$\frac{4}{3}$	$\frac{64}{9}$	$\frac{64}{27}$	$\frac{64}{3}$
9.	Change $3\frac{3}{7}$ to an improper fraction.	$\frac{24}{7}$	$\frac{10}{7}$	$\frac{13}{7}$	$\frac{6}{7}$
10.	A 5-kg bag of peanuts cost \$8.50. How much does 12 kg of peanuts cost?	\$22.70	\$21.75	\$21.25	\$20.40
11.	Write the ratio 2 min:90 s in simplest form.	1:45	4:3	45:1	20:9
12.	Flour and water are in a mixture in the ratio 2:3. If the mass of the mixture is 350 g, determine the amount of water in the mixture.	233 g	210 g	175 g	117 g

Problems

13. Compounds A, B, and C are in a mixture in the ratio 3:2:5. Find the total mass of the mixture if it contains 100 g of compound B.

14. A 360-cm support is to be placed against a wall. It creates a slope of $\frac{4}{3}$ with the wall. How far from the wall should the bottom of the support be placed?

15. Cameron invests \$5000 at 4.0% per year, simple interest and Alicia invests \$5500 at 3.0% per year, simple interest. Determine when the two investments will have the same value.

College Preparation Test 5

Fundamental Mathematics Skills

Choose the correct answer from the four choices A, B, C, or D.

		A	B	C	D
1.	Simplify. $4x - [y + 2x - (-x + 5) - 1]$	$7x + y - 6$	$x - y + 6$	$x - y + 4$	$x - y - 4$
2.	Evaluate $(n^3)(3n^2)(2n^0)$ for $n = 2$.	0	192	96	384
3.	Evaluate $(3x^3)^2 \div x^4$ for $x = 3$.	81	9	1944	27
4.	Evaluate $\frac{2ab}{9} + a(b + 3) - \frac{12 + b}{a}$ for $a = 3$ and $b = 6$.	17	53	25	47
5.	Solve for n. $12n + 8 + 3n = -48 - n + 8$	3	4	-4	-3
6.	Solve for k. $\frac{3}{5}k - \frac{1}{4} = \frac{1}{8}$	$\frac{9}{40}$	$\frac{1}{2}$	$-\frac{5}{24}$	$\frac{5}{8}$
7.	Given $C = 2\pi a + 2\pi b$, solve for a.	$a = \frac{C}{2\pi} - b$	$a = \frac{C + b}{2\pi}$	$a = 2\pi C - b$	$a = \frac{C - 2\pi}{b}$
8.	Given $A = \frac{h(a + b)}{2}$, solve for b.	$b = \frac{2A}{ah}$	$b = 2A - ah$	$b = \frac{ha}{2} - A$	$b = \frac{2A}{h} - a$
9.	Three times a number that is increased by 54 is 321. What is the number?	89	125	161	36
10.	Simplify $\frac{-24b^4c^3}{48bc^4}$.	$\frac{-b^3}{c^3}$	$\frac{-b^4}{2}$	$\frac{-b^3}{2c}$	$\frac{2b^3}{c}$
11.	Simplify $\left(\frac{6y^5}{-2y^3}\right)\left(\frac{6x}{3x^3}\right)$.	$\frac{-3y^2}{2x^2}$	$\frac{-12y^2}{5x^3}$	$\frac{6y^2}{x^3}$	$\frac{-6y^2}{x^2}$

Problems

12. Simplify $\sqrt[3]{-8x^{12}y^9z^3}$.

13. Simplify $\frac{(3a^4b^2)^3}{(a^3b^3)^5}$. Express your answer as a fraction with positive exponents.

14. A contagious disease spreads exponentially through a population at a rate of 3.3% per day. If there are initially 75 known infected cases, how long will it take for the disease to grow to 75 000 cases?

15. In an experiment, the distance a marble travelled horizontally through the air is measured as a function of its initial speed.

Distance (m)	0.85	1.84	2.81	3.82	4.83	5.75
Initial Speed (m/s)	1.5	3.0	4.5	6.0	7.5	9.0

Use technology to graph the data in the table. Then, determine the equation of the line of best fit.

College Preparation Test 6

Fundamental Mathematics Skills

Choose the correct answer from the four choices A, B, C, or D.

		A	B	C	D
1.	Expand and simplify. $(3a + 4)(2a - 3)$	$6a^2 - a + 1$	$6a^2 - a - 12$	$6a^2 + 8a - 12$	$6a^2 - 6a + 8$
2.	Expand and simplify. $(2b + 1)^2 - (b + 2)^2$	$3b^2 - 3$	$3b^2 + 4b + 5$	$3b^2 + 5$	$3b^2 + 4b - 3$
3.	Factor fully $8x^3y - 4xy^2$.	$4xy(x^2 - xy)$	$4xy(2x^2 - y)$	$4x(2x^2y - y^2)$	$4xy(2x^2y - y)$
4.	Factor fully $9t - 9tz + 9tz^2$.	$9t(-z + z^2)$	$9(t + z)^2$	$9t(1 - z + z^2)$	$9t(z^2 + z - 1)$
5.	Simplify $(5x^5)(2x^{-2})(3x^{-3})$.	0	30	1	$30x$
6.	Simplify $(3x^4)^{-2}$.	$-9x^6$	$-9x^8$	$\frac{1}{9x^6}$	$\frac{1}{9x^8}$
7.	Simplify $9^{\frac{3}{2}} - \sqrt[3]{27}$.	0	30	27	24
8.	Simplify $\left(\frac{8x^3}{27}\right)^{\frac{2}{3}}$.	$\frac{4x^2}{9}$	$\frac{21x^3}{243}$	$\frac{21x^{4.5}}{243}$	$\frac{16x^3}{81}$
9.	Evaluate $\frac{3t(t-4)^2}{2}$ for $t = 6$.	180	36	18	72
10.	Evaluate $\left(\frac{9x^4}{16}\right)^{\frac{1}{2}}\left(\frac{x^2}{4}\right)^{\frac{4}{3}}$ for $x = 2$.	6	3	2	1
11.	Solve for w. $3(5w - 2) - 4(3w - 5) = w$	13	-7	2	-2
12.	Solve for x. $-2(x - 3)(x + 3) - 18 = 0$	0	3	-3	4.24
13.	Solve for t. $\frac{5t^3(t^2 + t)}{t^4} - 50 = 0$	9.0	11.0	9.2	10.0
14.	Solve for y. $16(4y - 5) = 8(7y + 5)$	-2	-1	15	-5
15.	Simplify $9^{-\frac{3}{2}} - 27^{-\frac{1}{3}}$.	-4.5	$-\frac{8}{27}$	-24	$-\frac{1}{3}$

Problems

16. When a weather balloon is launched, the air temperature on the surface of the Earth is 9.75°C. For every 500 m that the balloon rises above the surface, the air temperature drops by 3.25°C. If the balloon is rising at 5 m/s, how long will it take it to reach the height where the air temperature is 0°C?

17. Nine workers—electricians, carpenters, and drywallers—were hired to build portable classrooms. The total labour cost was $2760/day. The number of drywallers was double the number of electricians. The number of carpenters was three times the number of drywallers. Electricians earned $600/day, carpenters earned $320/day, and drywallers earned $240/ day. How many of each worker were employed?

College Preparation Test 7

Fundamental Mathematics Skills

Choose the correct answer from the four choices A, B, C, or D.

		A	B	C	D
1.	$8\% = \blacksquare$	0.008	80	$\frac{80}{100}$	$\frac{2}{25}$
2.	$\frac{13}{20} = \blacksquare$	0.65%	65%	53%	26%
3.	$\left(\frac{7}{10} + \frac{45}{50} + \frac{20}{25}\right) \div 3 = \blacksquare$	80%	72%	720%	8%
4.	$0.075 = \blacksquare$	0.75%	7.5%	75%	0.075%
5.	What percent of 32 is 25?	$75\frac{3}{10}\%$	128%	$78\frac{1}{8}\%$	7%
6.	7% of what number is 42?	2.94	600	6	29.4
7.	45 is 60% of what number?	750	133	75	27
8.	8 kg of sand composed of 80% silica is mixed with 12 kg of sand composed of 60% silica. What percent of the mixture is composed of silica?	72%	88%	70%	68%
9.	If the CPI increases from 125.0 to 145.0, what is the percent increase in the CPI?	16%	116%	20%	120%
10.	Sales have increased by 15% over last year. What percent less were last year's sales than this year's sales?	13%	15%	2%	85%
11.	A store purchased winter coats from the manufacturer for $70 each. Each coat was sold at 150% of the purchase price. After the season, the coats were reduced by 40% of their selling price. What was the sale price?	$70	$42	$77	$63

Problems

12. Three students wrote a test. The average of their marks was 78%. The student who received the highest mark scored 1 percentage point greater than one student and 8 percentage points greater than the other student. Find the highest mark.

13. In its first year, a company's fixed expenses were $150 000, its variable expenses were $400 000, and its revenue was $700 000. In its second year, the company's fixed expenses increased by 10% and its revenue decreased by 5%. By what percent would the company have to decrease its variable expenses to have the same profit in the second year as in the first year?

College Preparation Test 8

Fundamental Mathematics Skills

Choose the correct answer from the four choices A, B, C, or D.

		A	B	C	D
1.	Two investments increase by the same factor. The first increases from $750 to $1050. By how much does the second investment of $800 increase?	$1120	$320	$300	$140
2.	A $200 jacket is on sale for 30% off. A tax of 13% is applied to the sale price. What is the final price of the jacket?	$166.00	$158.20	$67.80	$218.20
3.	A pair of running shoes that costs $45 sells for $95. Overhead expenses are 15% of the selling price. What is the gross profit margin on the shoes?	$59.25	$35.75	$43.25	$37.61
4.	A laptop computer purchased in the U.S. costs $760 and has a 19% tax applied. What is the total cost in Canadian dollars if $1 CAN = $0.8164 USD?	$1107.79	$738.35	$782.28	$828.52
5.	How much interest will a $900 investment earn in 2 years at 3.5% per year, simple interest?	$1.10	$630.00	$63.00	$6.30
6.	What amount would have to be invested at 5.25% per year simple interest to grow to $7500 in 5 years?	$7125.89	$5531.25	$1425.18	$5940.59
7.	A $5000 GIC earns interest at a rate of 3% in the first year and 6% in the second year. What is the value of the GIC after 2 years if the interest is compounded after the first year?	$5459.00	$5450.00	$5009.00	$5512.50

Problems

8. Peter invested $2500 at 3.0% per year, compounded monthly. After 2 years, the rate changed to 3.5% compounded quarterly. How much will Peter's investment be worth after 5 years?

9. Rita wants to borrow $25 000 to buy a car. A bank offers personal loans at 7.00% per year, compounded annually. A lender with the car dealership offers personal loans at 6.80% per year, compounded weekly. Which loan will cost Rita less, if she plans to pay back her loan with one lump sum in 10 years?

Chapter 1 College Preparation Test Answers

1. B
2. A
3. A
4. B
5. C
6. C
7. C
8. D
9. B
10. B
11. C
12. D
13. $87.78
14. 33 391.5 cm^2
15. 2714 m^3
16. 828 cm^2
17. 178 442 km

Chapter 2 College Preparation Test Answers

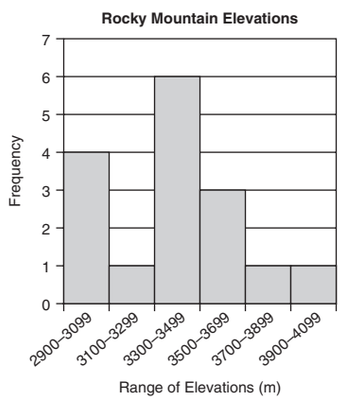
1. D
2. A
3. B
4. C
5. A
6. A
7. D
8. C
9. A
10. B
11. sin D = 0.426, cos D = 0.905, tan D = 0.471
12. 8 m
13. 4.8 m, 5.9 m
14. 1693 m
15. 0.31 m

Chapter 3 College Preparation Test Answers

1. C
2. B
3. C
4. B
5. A
6. A
7. B
8. C
9. C
10. B
11. D
12. A
13. D
14. **a)** mean: 3373 m, median: 3361.5 m, mode: 3360 m
b) Answers may vary. For example:

Range of Elevations (m)	Frequency
2900–3099	4
3100–3299	1
3300–3499	6
3500–3699	3
3700–3899	1
3900–4099	1

c) Graphs may vary. For example:



d) Answers may vary. For example: Histograms are more appropriate than bar graphs to display continuous data that fall into several intervals.

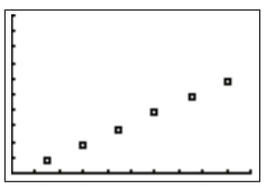
15. **a)** mean: 6.86; mode: 10; median: 10
b) mode
c) mean: 13.71; mode: 10; median: 10

Chapter 4 College Preparation Test Answers

1. B
2. A
3. D
4. A
5. C
6. D
7. D
8. C
9. A
10. D
11. B
12. B
13. 500 g
14. 216 cm
15. after 14.3 years

Chapter 5 College Preparation Test Answers

1. B
2. B
3. A
4. C
5. D
6. D
7. A
8. D
9. A
10. C
11. D
12. $-2x^4y^3z$
13. $\frac{27}{a^3b^9}$
14. 213 days
15.



Xmin = 0, Xmax = 10, Xscl = 1, Ymin = 0, Ymax = 10, Yscl = 1
$y = 0.657x - 0.131$

Chapter 6 College Preparation Test Answers

1. B
2. A
3. B
4. C
5. B
6. D
7. D
8. A
9. B
10. B
11. B
12. A
13. A
14. C
15. B
16. 300 s
17. 1 electrician, 6 carpenters, 2 drywallers

Chapter 7 College Preparation Test Answers

1. D
2. B
3. A
4. B
5. C
6. B
7. C
8. D
9. A
10. A
11. D
12. 81%
13. 12.5%

Chapter 8 College Preparation Test Answers

1. B
2. B
3. B
4. A
5. C
6. D
7. A
8. $2946.92
9. the bank loan