

Numerical Skills

Name: _____

1. Evaluate.

a) $\frac{1}{3} - \frac{5}{6} - 1\frac{1}{3}$

b) $1.5 - \left(\frac{3}{4} + \frac{1}{4}\right)$

c) $\frac{-4}{5} \left(\frac{-3}{4} + \frac{1}{3}\right)$

d) $\left(1\frac{4}{5} + 0.75\right) \left(-\frac{1}{3} + \frac{-1}{4}\right)$

e) $\frac{-5}{7} \times \frac{28}{5} \div \left(-\frac{8}{6}\right)$

f) $3\frac{1}{2} + \frac{8}{15} \div \frac{4}{45}$

g) $\sqrt{3^2} + 4^3 + 12^2$

h) $\frac{5\sqrt{16} - 8}{3}$

2. Which of the following are rational numbers?

a) $0.\dot{7}$

b) 3.14

c) $1\frac{3}{4}$

d) 0.6

e) $\sqrt{5}$

3. Write as a fraction in lowest terms.

a) 0.62

b) 1.4

c) -7.25

4. Write in decimal form.

a) $-\frac{22}{3}$

b) $\frac{13}{7}$

c) $-4\frac{7}{8}$

d) 5.0×10^5

e) 2.85×10^{-4}

5. Write in scientific notation.

a) 37300000

b) 0.0000000000154

c) $200000000000 \times 0.0000000007$

6. Simplify.

a) $a \cdot a^3$

b) $(2a^2)(3a)$

c) $b^7 \div b^3$

d) $10x^{10} \div 20x^5$

e) $3a^0$

7. Evaluate.

a) $2^{-1} + 3^2$

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

c) $\left(\frac{2}{3}\right)^{-3}$

d) $\left(\frac{3}{4}\right)^0$

e) $2^2 \times 3^{-2}$

f) $\frac{5}{2^{-3}}$

g) $\frac{3^6 \times 3^7}{3^{10}}$

8. Simplify, then evaluate for the given values.

a) $(x^{-5})^2(x^7)^3(x^2)^{-6}$ when $x = 2$

b) $\frac{(m^5)^2}{m^{11}} + \frac{(n^2)^3}{n^7}$ when $m = 3$ and $n = 4$

c) $a^2 + 5b$ for $a = -\frac{1}{3}$ and $b = -\frac{2}{15}$

9. On a particular corner kick, the height of the soccer ball in metres is given by the formula $h = -2t^2 + 5t$, where t is the time in seconds. What is the height of the ball at 2 seconds?

Algebra Skills

1. Simplify.

a) $4xy - 12y^2 + 7xy + 9y^2$

b) $2a^2 - 4a - (3a^2 - 7a)$

c) $xy + x^2y - 4xy + 3yx^2$

d) $5y^3(2y^4 + 3y^2 + 1)$

e) $k(5-k) - 3(2k - k^2)$

f) $2t(t+3) + 4t(t-2)$

g) $2x(3x+5y) - 2(x^2 + 3xy) - 5y(3x^2 - 2x)$

h) $3x(2x+y) - 2x[3 - (2x+4)]$

2. Simplify.

a) $(5a^3b^2c)(2ab^3)$

b) $(-30x^{10}y^6z) \div (-15x^2y^{-3})$

c) $\left(\frac{-16x^5y^3}{4x^2y^2}\right)^3$

d) $\frac{4xy-8}{4}$

e) $\frac{15x^2y^3 - 20x^5y^2 + 25x^3y^4}{5xy^2}$

f) $\left(\frac{10a^3b^2 - 8a^2b^3}{2a^2b^2}\right) + \left(\frac{15a - 21b}{-3}\right)$

3. Factor completely.

a) $3a^2 - 9a + 6ab$

b) $3x^2y - 6xy^3$

c) $-x^2 - 10x$

d) $16x^3y^2 - 4x^2y^3$

e) $-10p^2q - 5pq$

f) $3a^2b^3c - 10ab^2c^5 + 7a^3bc^2$

4. Solve the following equations. Do a formal check for a) and b).

a) $2x - 8 = 3x + 2$

b) $6(2-x) = 3(x+2)$

c) $\frac{x+3}{7} = -2$

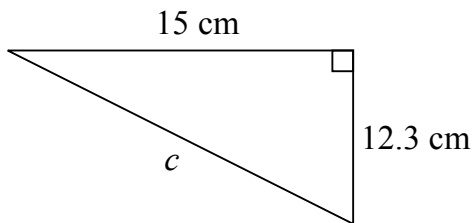
$$d) \frac{3x}{5} = \frac{x}{2} - \frac{3}{5}$$

$$e) \frac{y+4}{3} = \frac{y+1}{2}$$

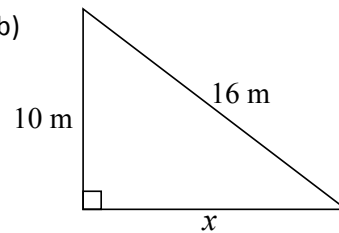
$$f) \frac{x-1}{2} + \frac{3x+2}{2} = \frac{5}{3}$$

5. Solve for the indicated side. Round answers to the nearest unit.

a)



b)



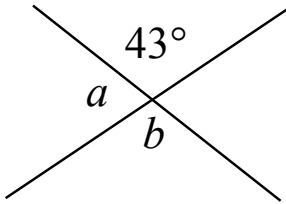
6. Marsha leans a 6.0 m ladder against a wall. The base of the ladder is 1.5 m from the wall. How far up the wall will the ladder reach?

7. On his way to school Abdul cuts across a vacant lot that measures 110 m by 55 m. He walks diagonally from corner to corner. One day, a fence is built around the lot and he has to walk around. How much **farther** does he have to walk?

Angles, Triangles and Parallel Lines

1. Determine the value of each variable. State any angle properties used for each question that has a *. (Drawings are not to scale.)

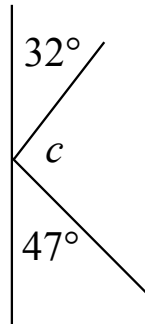
a)



$a =$

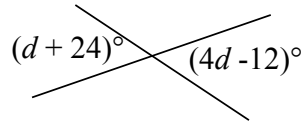
$b =$

*b)



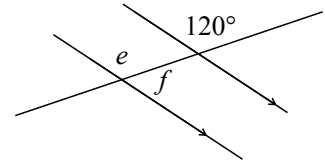
$c =$

*c)



$d =$

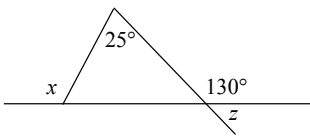
d)



$e =$

$f =$

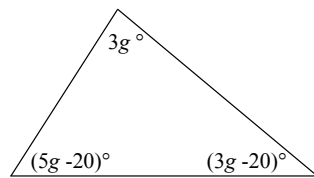
e)



$x =$

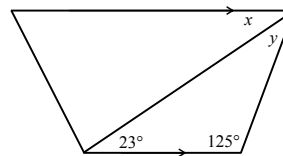
$z =$

*f)



$g =$

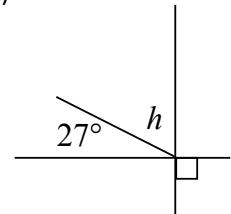
g)



$x =$

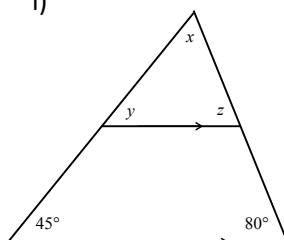
$y =$

*h)



$h =$

i)

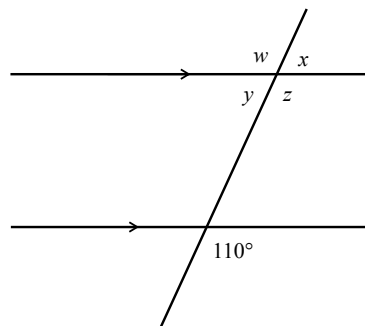


$x =$

$y =$

$z =$

*j)



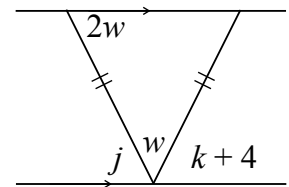
$w =$

$x =$

$y =$

$z =$

k)



$w =$

$j =$

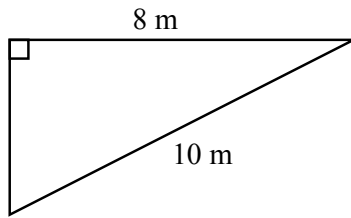
$k =$

Perimeter, Area & Volume

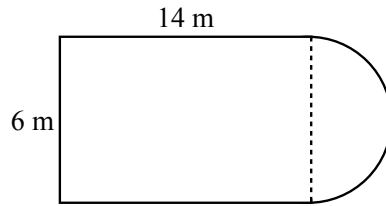
Use your EQAO formula sheet and **calculator** for this part of the review. (Recall: $\pi \approx 3.14159$)

1. For each of the following figures, find the perimeter and area, to one decimal place.

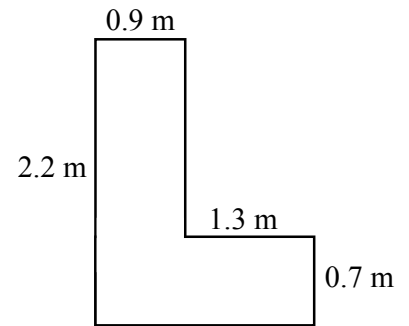
a)



b)

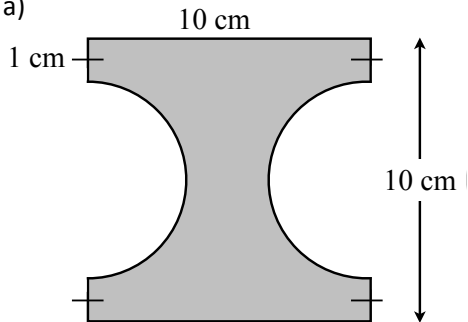


c)

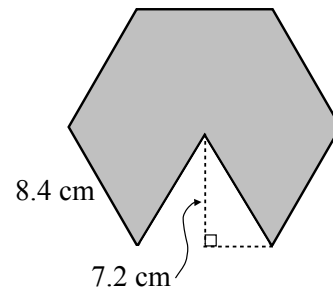


2. Calculate the area of the shaded region, to the nearest tenth.

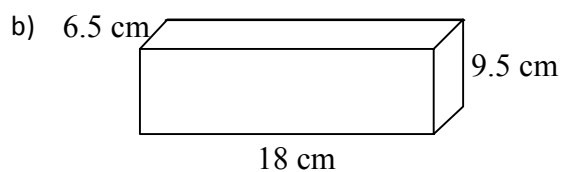
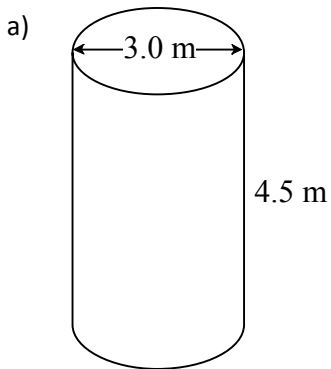
a)



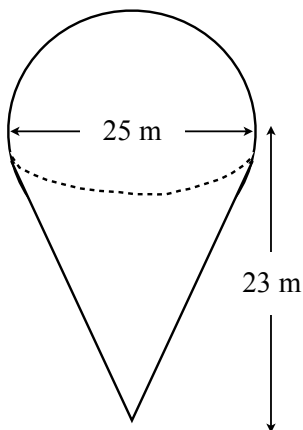
b)



3. For each of the following, calculate the total surface area and volume, to one decimal place.



4. Find the volume of ice cream needed for the cone and scoop shown below, to the nearest whole number.



Analytic Geometry

1. Fill in the blanks.

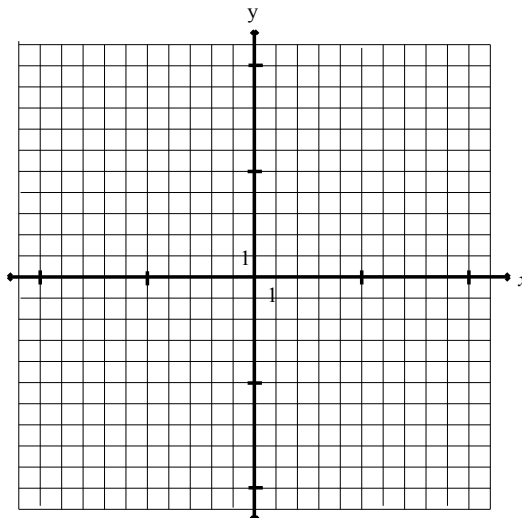
- a) When data plotted on a grid falls to the right, this is described as _____ correlation.
- b) In which quadrant are x -coordinates negative and y -coordinates positive? _____
- c) The point $(8,0)$ is on the _____ -axis. The coordinates of the origin are _____.
- d) The slope of all vertical lines is _____. The slope of all horizontal lines is _____.
- e) Lines that rise to the right have _____ slopes.
- f) In the line $y = -3x + 7$, the slope is _____ and the y -intercept is _____.
- g) The equation of the line with slope $\frac{2}{3}$ and y -intercept 6, in $y = mx + b$ form is _____.
- h) The rise can be found by calculating the difference in the _____-coordinates.
- i) A vertical line has a run of _____.
- j) A relation of the form $y = mx$ shows _____ variation, while a relation of the form $y = mx + b$ shows _____ variation.
- k) For a house call, a plumber charges according to the relation $C = 35t + 40$ where C is the charge in dollars and t is time in hours. The fixed charge is _____ and the hourly rate is _____.
- l) The slope of any line parallel to $y = -7x + 2$ is _____. The slope of any line perpendicular to $y = -7x + 2$ is _____.

2. Graph the following lines on the given grids using the indicated method.

a) $y = 5x - 2$ (table of values)

| x | y |
|-----|-----|
| | |
| | |
| | |
| | |
| | |
| | |

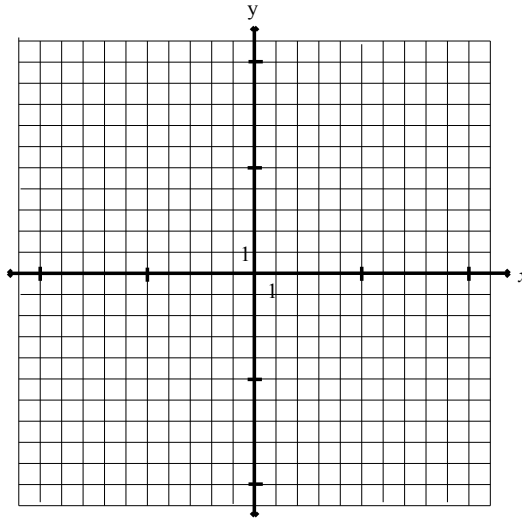
b) $5x - 7y = 0$
(method of your choice)



c) $y = -\frac{5}{4}x + 3$ (slope, y-intercept method)

d) $4x - 3y + 12 = 0$
(x- and y-intercept method – show your work)

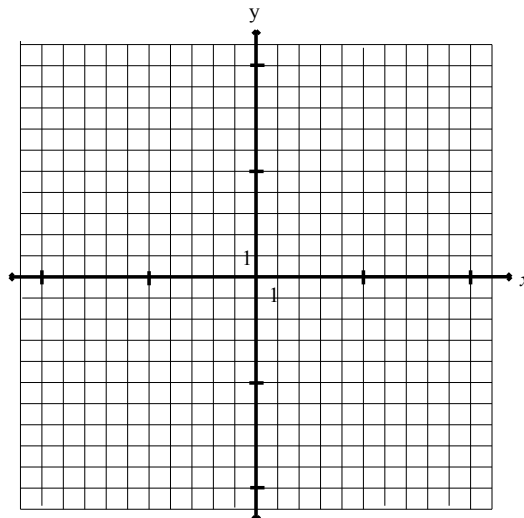
Slope = _____ y-intercept = _____



e) Using the equations from b) and c), solve by comparison to determine the exact point of intersection.

3. Graph on the same set of axes.

- a) $x = 5$
- b) $y = 0$
- c) $y + 8 = 0$
- d) $5x - 30 = 0$



4. State the slope and y-intercept for each of the following.

a) $y = 5x + 2$

b) $y = -\frac{1}{2}x$

c) $y = \frac{3}{5}x - 8$

d) $y = 10$

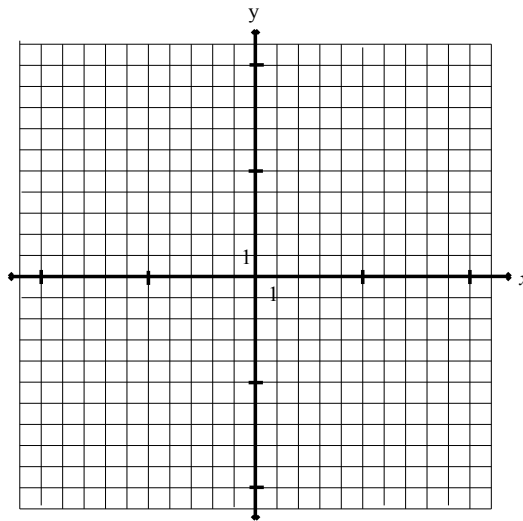
5. Change to slope, y-intercept form. Then, state the slope and y-intercept.

a) $2x - 3y + 15 = 0$

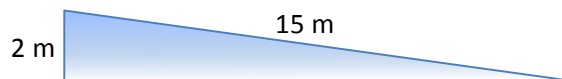
b) $y - 15 = 0$

c) $15x + 25y - 30 = 0$

6. By graphing, determine the point of intersection of the lines $y = 2x - 2$ and $3x + y = 13$.



7. Determine the slope of the wheelchair ramp (assume 90° between the horizontal and the vertical).

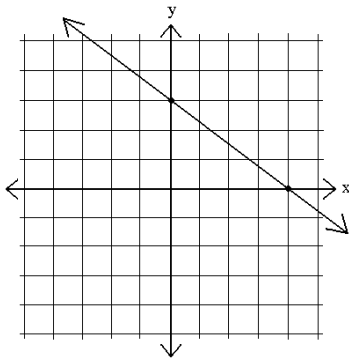


8. Using the slope formula, determine the slope of the line through each set of points.

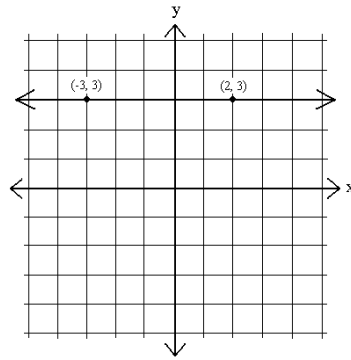
- a) $(1,3)$ and $(5,2)$ b) $(-2,7)$ and $(-5,-1)$ c) $(4,5)$ and $(-6,5)$ d) $(-2,6)$ and $(-2,-6)$

9. State the equation of each line below.

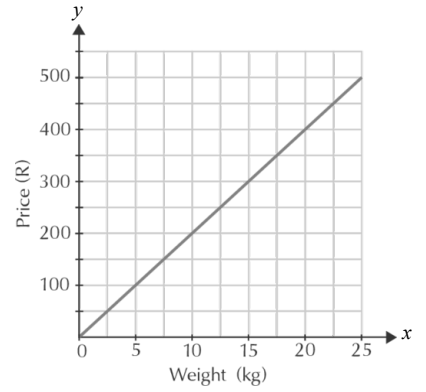
a) _____



b) _____



c) _____



10. Find the equation of each line in the form $y = mx + b$.

a) with slope 5 and y -intercept -10

b) with y -intercept 6 and perpendicular to the line $y = \frac{2}{5}x - 10$

c) through the point $(0, -2)$ and parallel to the line $y = -4x + 7$

d) with slope $\frac{1}{3}$ and passing through $(6, -2)$

e) passing through points $(-2,3)$ and $(5,-3)$

f) perpendicular to $y = -\frac{1}{2}x + 6$ with the same y -intercept as the line $y = 3x - 2$

11. A house is expected to increase in value according to the relation $y = 6500x + 150\,000$ where y is the value of the house, in dollars, after x years.

a) Find the slope of the line and interpret its meaning.

b) Find the y -intercept and interpret its meaning.

c) Find the value of the house after 12 years.

12. Jeff's family is driving home from a camping trip. They are using cruise control so their speed is constant. After 1 hour, they are 250 km away from home. After 3 hours, they are 50 km from home.

a) What is the independent variable?

b) What is the dependent variable?

c) Represent the given information as two ordered pairs.

d) Write an equation for the relation in the form $y = mx + b$.

e) Interpret the meaning of the slope and y-intercept in this situation.

13. Using 1st differences, determine whether the following models represent linear or non-linear relations. Give a reason for your choice.

a)

| x | y | Δy |
|----|-----|------------|
| 0 | -11 | |
| -1 | -6 | |
| -2 | -1 | |
| -3 | 4 | |
| -4 | 9 | |

Type _____

Reason _____

b)

| x | y | Δy |
|----|----|------------|
| 3 | 18 | |
| 2 | 11 | |
| 1 | 6 | |
| 0 | 3 | |
| -1 | 2 | |

Type _____

Reason _____

14. Which of the following relations are linear?

a) $y = 2x - 5$

b) $y = x^2 + 5$

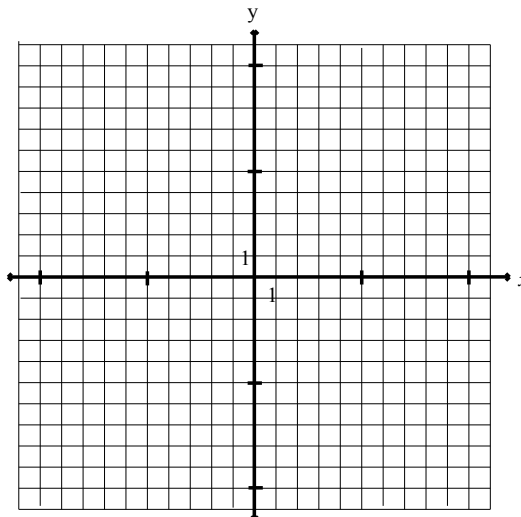
c) $x = 9$

d) $y - 7 = 0$

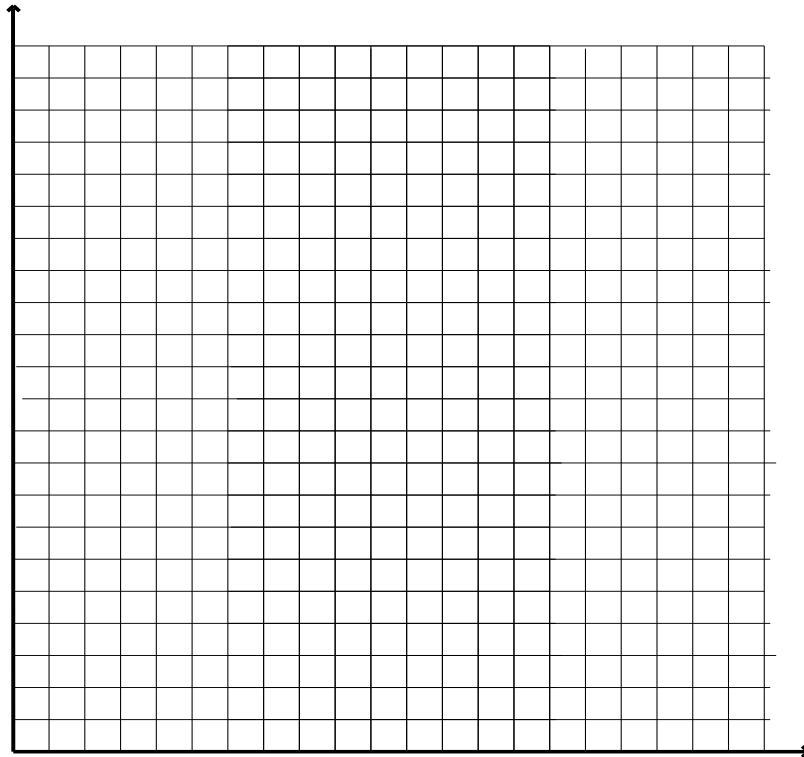
e) $x^2 + y^2 = 25$

15. Graph the relation $y = x^2 - 7$ using a table of values for values of x of -2, -1, 0, 1, 2.

| x | y |
|---|---|
| | |
| | |
| | |
| | |
| | |



16. A plumber charges \$35 for a house call and an hourly rate of \$50/h. Write an equation representing the total charges. Introduce variables using "let statements" then graph the relation for up to 6 hours.



Answers

Review 1: Numerical Skills

1. a) $-\frac{11}{6}$ b) $\frac{1}{2}$ c) $\frac{1}{3}$ d) $-\frac{119}{80}$ e) 3 f) $9\frac{1}{2}$ g) 211 h) 4
2. a) b), c), d)
3. a) $\frac{31}{50}$ b) $\frac{7}{5}$ c) $-\frac{29}{4}$
4. a) $-7.\dot{3}$ b) $1.\overline{857142}$ c) -4.875 d) 500 000 e) 0.000 285
5. a) 3.73×10^7 b) 1.54×10^{-11} c) 1.4×10^2
6. a) a^4 b) $6a^3$ c) b^4 d) $\frac{1}{2}x^5$ d) 3
7. a) $9\frac{1}{2}$ b) $-\frac{3}{4}$ c) $\frac{27}{8}$ d) 1 e) $\frac{4}{9}$ f) 40 g) 27
8. a) $\frac{1}{2}$ b) $\frac{7}{12}$ c) $-\frac{5}{9}$
9. 2 metres

Review 2: Algebraic Skills

1. a) $11xy - 3y^2$ b) $-a^2 + 3a$ c) $-3xy + 4x^2y$ d) $10y^7 + 15y^5 + 5y^3$ e) $2k^2 - k$ f) $6t^2 - 2t$
g) $4x^2 + 14xy - 15x^2y$ h) $10x^2 + 3xy + 2x$
2. a) $10a^4b^5c$ b) $2x^8y^9z$ c) $-64x^9y^3$ d) $xy - 2$ e) $3xy - 4x^4 + 5x^2y^2$ f) $3b$
3. a) $3a(a - 3 + 2b)$ b) $3xy(x - 2y^2)$ c) $-x(x + 10)$ d) $4x^2y^2(4x - y)$ e) $-5pq(2p + 1)$
f) $abc(3ab^2 - 10bc^4 + 7a^2c)$
4. a) -10 b) $\frac{2}{3}$ c) -17 d) -6 e) 5 f) $\frac{7}{12}$
5. a) 19 cm b) 12 m
6. 5.8 m
7. 42 m

Review 3: Angles, Triangles and Parallel Lines

1. a) $a = 137^\circ$, $b = 43^\circ$ b) $c = 101^\circ$ (supplementary angles) c) $d = 12^\circ$ (opposite angles)
d) $e = 120^\circ$, $f = 60^\circ$ e) $x = 75^\circ$, $z = 50^\circ$ f) $g = 20^\circ$ (sum of interior angles of a triangle) g) $x = 23^\circ$, $y = 32^\circ$
h) $h = 63^\circ$ (complementary angles) i) $x = 55^\circ$, $y = 45^\circ$, $z = 80^\circ$ j) $w = 110^\circ$, $x = 70^\circ$, $y = 70^\circ$, $z = 110^\circ$
(corresponding angles, opposite angles, and supplementary angles) k) $j = 72^\circ$, $k = 68^\circ$, $w = 36^\circ$

Review 4: Perimeter, Area, and Volume

1. a) $P = 24.0 \text{ m}$, $A = 24.0 \text{ m}^2$ b) $P = 43.3 \text{ m}$, $A = 98.1 \text{ m}^2$ c) $P = 8.8 \text{ m}$, $A = 2.9 \text{ m}^2$
2. a) $A = 49.8 \text{ cm}^2$ b) $A = 151.2 \text{ cm}^2$
3. a) $SA = 56.5 \text{ m}^2$, $V = 31.8 \text{ m}^3$ b) $SA = 699.5 \text{ cm}^2$, $V = 1111.5 \text{ cm}^3$
4. $V = 7850 \text{ m}^3$

Review 5: Analytic Geometry

1. a) negative b) II c) x , $(0,0)$ d) undefined, 0 e) positive f) -3, 7 g) $y = \frac{2}{3}x + 6$ h) y
i) 0 j) direct, partial k) \$40, \$35 l) -7, $\frac{1}{7}$
2. e) $(\frac{84}{55}, \frac{12}{11})$
4. a) $m = 5$, $b = 2$ b) $m = -\frac{1}{2}$, $b = 0$ c) $m = \frac{3}{5}$, $b = -8$ d) $m = 0$, $b = 10$
5. a) $y = \frac{2}{3}x + 5$, $m = \frac{2}{3}$, $b = 5$ b) $y = 15$, $m = 0$, $b = 15$ c) $y = -\frac{3}{5}x + \frac{6}{5}$, $m = -\frac{3}{5}$, $b = \frac{6}{5}$
6. $(3,4)$
7. $m = 0.13$
8. a) $m = -\frac{1}{4}$ b) $m = \frac{8}{3}$ c) $m = 0$ d) m is undefined
9. a) $y = -\frac{3}{4}x + 3$ b) $y = 3$ c) $y = 20x$
10. a) $y = 5x - 10$ b) $y = -\frac{5}{2}x + 6$ c) $y = -4x - 2$ d) $y = \frac{1}{3}x - 4$ e) $y = -\frac{6}{7}x + \frac{9}{7}$ f) $y = 2x - 2$
11. a) The slope is 6500. This means the value of the house increases by \$6500 every year.
b) The y -intercept is 150 000. This means the house was initially worth \$150 000.
c) \$228 000
12. a) The independent variable is time (h). b) The dependent variable is distance (km).
c) $(1,250)$, $(3,50)$
d) $y = -100x + 350$
e) The slope, -100, means Jeff's family is travelling at 100 km/h, towards home. The y -intercept, 350, means the camping trip was 350 km away from home.
13. a) Since the 1st differences are constant (-5), the relation is linear.
b) Since the 1st differences are not constant, the relation is non-linear.
14. a), c), and d) are linear
16. $y = 50x + 35$