

1. Express as a single power.

a) $x^{12} \div x^5 =$ _____

b) $(-3)^{12} \div (-3)^3 =$ _____

c) $6^{10} \div 6 =$ _____

d) $2^9 \div 2^8 =$ _____

2. Express as a single power.

a) $5^4 \times 5^5 =$ _____

b) $(-7)^4 \times (-7)^8 =$ _____

c) $10^8 \times 10 =$ _____

d) $(x^7)(x^2)(x^8) =$ _____

e) $(-a) \times (-a)^3 =$ _____

f) $\left(\frac{3}{4}\right) \times \left(\frac{3}{4}\right) =$ _____

3. Express as a single power.

a) $(5^{10})^5 =$ _____

b) $[(-4)^2]^8 =$ _____

c) $(y^3)^5 =$ _____

d) $(x^8)^5 =$ _____

e) $(0.7^9)^4 =$ _____

f) $[(-2)^3]^7 =$ _____

4. Evaluate or simplify as required.

a) 10^4

b) -3^4

c) $(-2)^3$

d) $-(-5)^2$

e) $(-6)^4$

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

g) $-\left(\frac{3}{5}\right)^4$

h) $\left(\frac{1}{2}\right)^5$

i) $\left(-\frac{1}{6}\right)^2$

j) $\left(\frac{2}{5}\right)^9 \div \left(\frac{2}{5}\right)^9$

k) $\frac{-24t^4}{-3t^4}$

Answers:

- | | | | | | |
|----------------------|-------------------|-------------------|----------------|-----------------|---------------------------------|
| 1. a) x^7 | b) $(-3)^9$ | c) 6^9 | d) $2^1 (= 2)$ | | |
| 2. a) 5^9 | b) $(-7)^{12}$ | c) 10^9 | d) x^{17} | e) $(-a)^4$ | f) $\left(\frac{3}{4}\right)^2$ |
| 3. a) 5^{50} | b) $(-4)^{16}$ | c) y^{15} | d) x^{40} | e) $(0.7)^{36}$ | f) $(-2)^{21}$ |
| 4. a) 10000 | b) -81 | c) -8 | d) -25 | e) 1296 | f) $\frac{8}{27}$ |
| g) $-\frac{81}{625}$ | h) $\frac{1}{32}$ | i) $\frac{1}{36}$ | j) 1 | k) 8 | |

1. The mass, in kilograms, of ten people randomly chosen from a crowd is listed below.

74, 71, 68, 84, 54, 60, 64, 68, 65, 64

- Determine the mean of the data rounding to 1 decimal place if necessary.
- Determine the median of the data.
- Determine the mode of the data.

2. Students of City High had a Frisbee-throwing contest. These distances, in metres, were recorded for the Frisbee throws.

45, 52, 47, 55, 62, 80, 71, 60, 84, 57, 46, 50, 48, 61, 49, 63, 54, 49, 72

- Calculate the mean, median, and mode for the data, to one decimal place.
- Why is the mode not a good measure of central tendency for the above data?

3. Use the data in the table to answer each question.

Time (s)	0	1	2	3	4	5	6
Distance (m)	0	4	8	12	16	20	24

- Which quantity is the independent variable? The dependent variable?
- Plot the ordered pairs on a graph.
- Is this relationship linear or nonlinear?
- Estimate the distance traveled in 2.5 s, 6.25 s, and 8 s.
- Estimate the time taken to travel 3 m, 21 m, and 36 m.

4. The data for 12 professional basketball players is given in the chart.

Most Points in One Game	Disqualifications in One Season
55	0
33	1
27	0
19	0
19	3
27	1
14	5
16	0
11	0
14	1
14	0
16	0

- Draw a scatter plot.
- If there is a relationship, draw a line of best fit.

Answers:

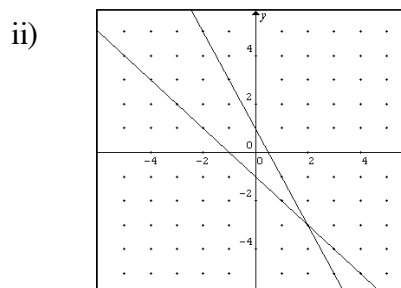
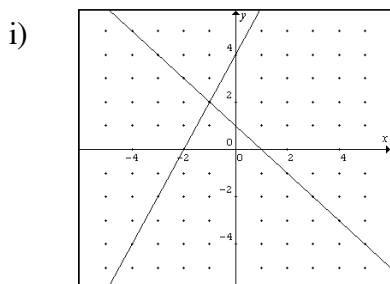
- 67.2
 - 66.5
 - 64,68
- mean 58.2, median 55, mode 49
 - It is not near the middle of the data.
- time is indep.
 - linear
 - 10m, 25m, 32m
 - 0.75s, 5.25s, 9s
- The data shows no correlation, so drawing a line of best fit is not appropriate.

1. Solve each of the following. Do a proper check for parts (c), (d) and (f)
- a) $3x - 8 = 4$ b) $-x + 6 = 2$ c) $2x - 8 = 10 - x$
- d) $6(x - 2) = 3x + 2(x - 1)$ e) $\frac{2x - 1}{5} = 3$ f) $\frac{x}{3} = \frac{x}{2} + 7$
- g) $4(2x + 1) = 9 - 3(1 - 4x)$ h) $\frac{5x}{6} + \frac{1}{8} = \frac{x}{4} - \frac{1}{3}$ i) $\frac{x}{13} = \frac{3}{26}$
- j) $\frac{-5}{x} = -\frac{6}{5}$ k) $\frac{2}{14} = \frac{6}{15x}$ l) $\frac{1}{x} - \frac{3}{x} = \frac{4}{7}$
2. Is $x = 2$ a solution to the equation $(x - 2)^2 + 3(x - 4) = 3x - 12$? Justify your answer.
3. If $x = 5$ is a solution to the equation $2(x - 3) + k(1 + 2x) = k - x - 1$, determine the value of k .
4. Determine the point of intersection for the lines $y = 3x + 1$ and $y = \frac{1}{2}x - 4$ intersect.
5. David earned four times as much as Mitchell. Together they earned a total of \$120. How much did David earn?
6. Three houses are numbered with three consecutive EVEN numbers. If their sum is 186, what are the house numbers?
7. A bag contains 27 coins, all of which are either quarters or dimes. If their total value is \$5.55, how many quarters and how many dimes are there?
8. The ages of Jon and Samantha total 27 years. In 4 years, Samantha's age plus twice Jon's age will be 43. What are Jon and Samantha's ages?

Answers:

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1. a) 4 b) 4 c) 6 d) 10 e) 8 f) -42
- g) $-\frac{1}{2}$ h) $-\frac{11}{14}$ i) $\frac{3}{2}$ j) $\frac{25}{6}$ k) $\frac{14}{5}$ l) $-\frac{7}{2}$
3. -1 4. (-2, -5) 5. Mitchell \$24, David \$96
6. 60, 62, 64 7. 8 dimes, 19 quarters 8. Samantha 23, Jon 4

1. For each of the following graphs:
- determine the equation of each line by finding the slope and intercept.
 - state the co-ordinates of the point of intersection of the two lines.
 - verify that this point satisfies the two equations.



2. Determine the slope of:

- a line with run of 7 and rise of -3 _____
- a line through the points $A(-1,8)$ and $B(3,4)$ _____
- a line with an x -intercept of 5 and a y -intercept of 2 _____
- a ramp with a horizontal span of 5m and a vertical height of 2m _____

3. Determine the first differences for each table of values. State which are linear and which are non-linear relations. For each linear relation, state an equation which represents the relation.

a)

x	y	
1	3	
2	6	
3	9	
4	12	

b)

x	y	
0	0	
1	1	
2	4	
3	9	

c)

x	y	
-1	2	
0	0	
1	-2	
2	-4	

d)

x	y	
1	6	
2	5	
3	4	
4	3	

4. Complete the following table:

<i>equation</i>	<i>slope</i>	<i>y-intercept</i>	<i>slope of a line parallel</i>	<i>slope of a line perpendicular</i>
$y = -\frac{2}{3}x - 4$				
	$\frac{5}{2}$	$\frac{3}{2}$		
		0	-4	
		2		$\frac{2}{3}$
$y = -x + 3$				

Answers:

1. a) i) $y = 2x + 4, y = -x + 1$ ii) $y = -x - 1, y = -2x + 1$ b) i) $(-1, 2)$ ii) $(2, -3)$

2. a) $-\frac{3}{7}$ b) -1 c) $-\frac{2}{5}$ d) $\frac{2}{5}$

3. a) 1st diff's: 3,3,3 ; linear ; $y = 3x$ b) 1st diff's: 1,3,5 ; non-linear

c) 1st diff's: $-2, -2, -2$; linear ; $y = -2x$ d) 1st diff's: $-1, -1, -1$; linear ; $y = -x + 7$

4.

<i>equation</i>	<i>slope</i>	<i>y-intercept</i>	<i>slope of a line parallel</i>	<i>slope of a line perpendicular</i>
$y = -\frac{2}{3}x - 4$	$-\frac{2}{3}$	-4	$-\frac{2}{3}$	$\frac{3}{2}$
$y = \frac{5}{2}x + \frac{3}{2}$	$\frac{5}{2}$	$\frac{3}{2}$	$\frac{5}{2}$	$-\frac{2}{5}$
$y = -4x$	-4	0	-4	$\frac{1}{4}$
$y = -\frac{3}{2}x + 2$	$-\frac{3}{2}$	2	$-\frac{3}{2}$	$\frac{2}{3}$
$y = -x + 3$	-1	3	-1	1

1. Simplify

a) $4x + 9 + 6x + 5$

b) $4x^2 - 7x + 8 + 2x^2 - 3x - 9$

c) $-3a^2 - 7a - 8a - 4a^2$

d) $x^2 + 3x - x^2 - x$

2. Evaluate if $x = -4$ and $y = 6$

a) $2x + y$

b) $4x^2$

c) $\frac{3xy}{x}$

d) $(2x)^2$

3. For the trinomial, $-3x^3 + 2x + 5xy^2$, list the coefficients _____

4. Simplify.

a) $\frac{-45y^5}{-5y^4}$

b) $(5x^3)(-2x^2)$

c) $(-3x^2y)(-4x^5)$

5. Expand and simplify.

a) $5xy(2x - 3y)$

b) $-4x^3(5x + 3)$

c) $7 + 2(x - 1)$

d) $-3(x + 10) - 8$

e) $(8x^2 + 2x - 3) + (-6x^2 + 4x + 7)$

f) $(3x^2 + 5x + 7) - (2x^2 + 4x - 9)$

g) $5x(3x^2 - 2x - 7) + 2x(x + 7)$

h) $3y^2(2 - 3y - y^2) - y(4y - y^2)$

i) $(x - 4)x + 1$

j) $3y + 2(5y + 2)$

k) $3x - 6(x + 2) - (x + 5)$

l) $3x - (x + 7) - x - 2(2x + 8)$

6. Simplify.

a) $\frac{15x - 20}{4}$

b) $\frac{5x^2y - 20xy + 5xy^2}{5xy}$

c) $\frac{36x^3 + 4x}{4x}$

d) $\frac{12x^2 - 8x + 20}{4}$

e) $\frac{-x^2 - x - 42}{-1}$

f) $\frac{3xy^2 - 30xy - 18x}{3x}$

g) $\frac{-25x^2 + 10x + 5}{-5}$

h) $\frac{a^5b^5 + 5a^3b^6 - 14ab^7}{ab^5}$

Answers:

1. a) $10x + 14$

b) $6x^2 - 10x - 1$

c) $-7a^2 - 15a$

d) $2x$

2. a) -2

b) 64

c) 18

d) 64

3. $-3, 2, 5$

4. a) $9y$

b) $-10x^5$

c) $12x^7y$

5. a) $10x^2y - 15xy^2$

b) $-20x^4 - 12x^3$

c) $2x + 5$

d) $-3x - 38$

e) $2x^2 + 6x + 4$

f) $x^2 + x + 16$

g) $15x^3 - 8x^2 - 21x$

h) $-3y^4 - 8y^3 + 2y^2$

i) $x^2 - 3x - 4$

j) $15y^2 + 11y + 2$

k) $4x^2 + 10x + 13$

l) $x^2 + 14x - 5$

6. a) $3x - 4$

b) $x + y - 4$

c) $9x^2 + 1$

d) $3x^2 - 2x + 5$

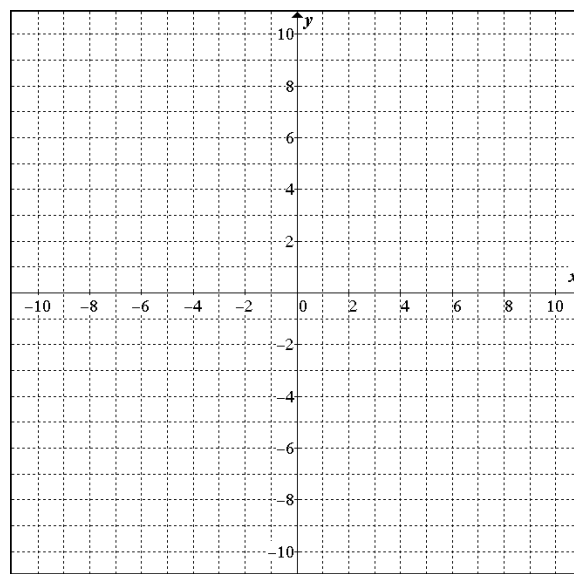
e) $x^2 + x + 42$

f) $y^2 - 10y - 6$

g) $5x^2 - 2x - 1$

h) $a^4 + 5a^2b - 14b^2$

- Determine the slopes of the line segments joining the following pairs of points:
 - A(1,-1) and B(-3,3)
 - C(4,-1) and D(4,-6)
- Calculate the slopes of the line segments joining P(0,0) to Q(5,-6) and R(3,0) to S(-2,5) and determine if they are parallel.
 - Calculate the slopes of the 3 sides of $\triangle ABC$ given the points A(-3,1), B(-1,5), C(5,2) and determine if $\triangle ABC$ is a right triangle.
- Sketch all three lines on the same Cartesian plane, using the method indicated.
 - $y = 3x - 5$ using table of values
 - $y = \frac{2}{3}x + 1$ using slope-intercept
 - $2x + 3y - 6 = 0$ using x and y-intercepts
- Determine the equations of the following lines. Practice proper solutions.
 - through the points A(2, 4) and B(1,5)
 - through the point A(-1, 2) with a slope of $-\frac{1}{3}$
 - through the point A(3, 2) and parallel to the line $y = 2x - 7$
 - through the point A(-1, 5) and perpendicular to the line $y = 4x + 1$
 - with a y-intercept of 5 and passing through P(2, 3)
 - with an x-intercept of 5 and passing through P(2, 3)
- Determine the equation of the line with y-intercept of -2 that is:
 - parallel to $3x - y - 5 = 0$
 - perpendicular to $2x + y + 4 = 0$
- Determine the intersection of the following pair of lines: $2x - 3y = 5$ and $y = 3x + 3$.
- If the point $P(-3,7)$ lies on the line $2x + ky - 8 = 0$, determine the value of 'k'.



Answers:

- 1
 - Does not exist
- they are not parallel
 - it is a right triangle
- $y = -x + 6$
 - $y = -\frac{1}{3}x + \frac{5}{3}$
 - $y = 2x - 4$
 - $y = -\frac{1}{4}x + \frac{19}{4}$
 - $y = -x + 5$
 - $y = -x + 5$
- $y = 3x - 2$
 - $y = \frac{1}{2}x - 2$
- $(-2, -3)$
- 2

1. Jaime has a drinking glass in the shape of a cylinder. The radius of the base of the glass is 5 cm, and the height is 12 cm.
 - a) If the glass were full of water, what would be the volume of water in the glass?
(Note: $V = \text{_____}$)
 - b) If the height of the water in the glass were 7 cm, what would be the volume of water in the glass?
 - c) Complete the following table.

Height of Water (cm)	Volume of Water (cm ³)	First Difference
2		
4		
6		
8		
10		

- d) Based on the chart above, would you say that the data is linear or non-linear? Explain your answer.
 - e) When the graph is drawn, should the points be connected or not? Why is this choice most appropriate for this data?
 - f) Draw a fully labelled graph of the height of water versus the volume of water in Jaime's glass.
2. Calculate the surface area and the volume of the following:
 - a) Rectangular prism of height 3 m, width 12 m and length 10 m.
 - b) Cylinder of height 8 cm, diameter of base 12 cm.
 - c) Cone of height 16 m and radius of the base 5 m.
 3. If the height of a rectangular prism is 10 cm, the width is 22 cm and the volume is 380 cm³, find the length, rounded to one decimal place.
 4. If the height of a cylinder with volume 58 m³ is 8 m, find the radius to one decimal place.

Answers:

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1. a) 942.48 cm³ b) 549.78 cm³
 2. a) 360 m³ b) 904.78 cm³ c) 418.88 cm³ 3. 1.7 cm 4. 1.52 m