

What do you need to know?

Unit 1: Trigonometry

Pythagorean Theorem

Primary Trig. Ratios

Sine Law

Cosine Law

Unit 2: Probability

Experimental Probability

Theoretical Probability

Interpreting Information

Predicting Future Results

Unit 3: Statistics

Sampling Techniques

Collecting Data

Analyzing Data

Graphs - bar, histogram, circle, broken-line

Mean, Median, Mode

Quartiles, Percentiles, Box-Plots

Variance, Standard Deviation

Distribution Types

Normal, Bimodal, Skewed, Uniform

Unit 4: Quadratics I

Parts of a Parabola

Making a Table of Values

How can you tell if it is a parabola?

table of values - 2nd differences

equation - $y=2x^2+5$

graph

Transformations

Vertex Form

Graphing using vertex form

vertex, step pattern

Unit 5: Quadratics II

Changing to Standard Form

expanding binomials

Changing to factored Form

factoring

common, trinomials

Finding the Zeros

Unit 6: Exponential Relations

Exponent Rules

multiply, divide, power of a power

zero and negative exponents

Graphs

equation, shape, ratios in table of values

Exponential Growth

Exponential Decay

Half-Life

Unit 7: Finance

Simple Interest

Compound Interest - Future Value

Compound Interest - Present Value

TVM Solver

Unit 8: Personal Finance

Investments

Credit Cards

Buying a Car

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SOH $\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$
 CAH $\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$
 TOA $\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$

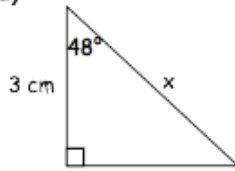
$$\frac{a}{\sin A} = \frac{b}{\sin B}$$

$$a^2 = b^2 + c^2 - 2bc \cos A$$

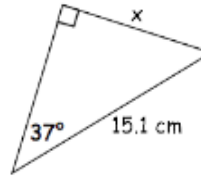
$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

1. Solve for each unknown (to one decimal place).

a)



b)



2. A 10-m ladder is leaning against a wall so that it will reach a window that is located 7 metres above the ground. What angle will the ladder make with the ground?

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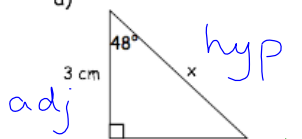
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a)

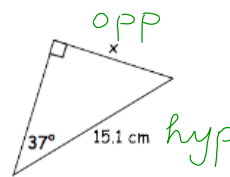


$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$

$$\cos 48^\circ = \frac{3}{x}$$

$$x = 4.48$$

b)

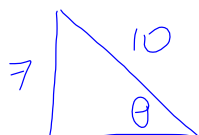


$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

$$\sin 37^\circ = \frac{x}{15.1}$$

$$9.09 = x$$

2. A 10-m ladder is leaning against a wall so that it will reach a window that is located 7 metres above the ground. What angle will the ladder make with the ground?



$$\sin \theta = \frac{7}{10}$$

$$\sin \theta = 0.7$$

$$\theta = 44^\circ$$

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11 C - Exam Review - Probability Name: _____

~~Answer on a separate sheet of paper.~~

- Find the probability of each of the following situations:
 - You toss a coin → what is the probability of seeing tails come up?
 - You toss two coins → what is the probability of seeing both coins show tails?
 - You toss three coins → what is the probability of seeing only one tail on all three coins?
 - You toss three coins → what is the probability of seeing at least one tail on all three coins?
- Find the probability of each situation of rolling a six-sided die:
 - What is the probability of rolling a 5?
 - What is the probability of rolling a 1 or a 2?
 - What is the probability of rolling an odd number?
 - What is the probability of rolling a number greater than 2?
- Using a standard deck of cards, consider the following possibilities:
 - What is the probability of picking a 7, 8, or 9?
 - What is the probability of picking a heart or a face card?

11 C - Exam Review - Probability Name: _____

~~Answer on a separate sheet of paper.~~

- Find the probability of each of the following situations:
 - You toss a coin → what is the probability of seeing tails come up? $\frac{1}{2}$
 - You toss two coins → what is the probability of seeing both coins show tails?

$$\left(\frac{1}{2}\right)\left(\frac{1}{2}\right) = \frac{1}{4}$$
 - You toss three coins → what is the probability of seeing only one tail on all three coins?

$$THH \quad HTH \quad HHT \rightarrow \frac{3}{8}$$
 - You toss three coins → what is the probability of seeing at least one tail on all three coins?

$$1 - P(\text{no tail}) = 1 - \frac{1}{8} = \frac{7}{8}$$
- Find the probability of each situation of rolling a six-sided die:
 - What is the probability of rolling a 5? $\frac{1}{6}$
 - What is the probability of rolling a 1 or a 2?

$$\frac{2}{6} = \frac{1}{3}$$
 - What is the probability of rolling an odd number?

$$\frac{3}{6} = \frac{1}{2}$$
 - What is the probability of rolling a number greater than 2?

$$\frac{4}{6} = \frac{2}{3}$$
- Using a standard deck of cards, consider the following possibilities:
 - What is the probability of picking a 7, 8, or 9?

$$\begin{array}{l} 3 \text{ cards} \\ 4 \text{ suits} \end{array} \rightarrow 3(4) \rightarrow \frac{12}{52} = \frac{3}{13}$$
 - What is the probability of picking a heart or a face card?

$$\begin{array}{l} \heartsuit \rightarrow 13 + 9 \\ \quad \quad \quad \downarrow \text{JQK} \times 3 \text{ suits} \end{array} = \frac{11}{26}$$

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4. Jesse needs to get ready for school. He has two pair of pants to choose from: one black and one brown. He has three shirts to choose from: one red, one green, and one white. Any combination of pants and shirts is equally likely. (hint: use a tree diagram)

(a) What is the probability that he will wear the green shirt and the brown pants?

(b) What is the probability he will wear the black pants with any of the shirts?

8. When rolling two dice 60 times, doubles turned up a total of 15 times.

(a) What is the **experimental probability** of doubles? Answer as a fraction in lowest terms.

(b) What is the **theoretical probability** of rolling doubles?

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(a) What is the probability that he will wear the green shirt and the brown pants?

(b) What is the probability he will wear the black pants with any of the shirts?

$$\frac{3}{6} = \frac{1}{2}$$

8. When rolling two dice 60 times, doubles turned up a total of 15 times.

(a) What is the **experimental probability** of doubles? Answer as a fraction in lowest terms.

$$\frac{15}{60} = \frac{1}{4}$$

(b) What is the **theoretical probability** of rolling doubles?

$$\frac{6}{36} = \frac{1}{6}$$

Statistics

4. Find the mean, median and mode and range for each set of data. Comment on the Variance.
 a) 64, 69, 72, 54, 89, 92, 54, 32

Mean	
Median	
Mode	
Range	
Variance is high or low?	

5. **Packaging Cookies:** Two machines at a Cookie company package cookies in 150 g pouches. If any package is more than 2.3g from the mean, the package is considered defective. At the end of the day, both machines are averaging cookie packages that are 150 g but **one machine** is producing more defects than the other. Which is it?

Recall: Standard deviation is a measure of the **variance** of the data from the mean.

	Mean	Standard deviation
Cookie Machine #1	150 g	± 2.5 g
Cookie Machine #2	150 g	± 1.5 g

Statistics

4. Find the mean, median and mode and range for each set of data. Comment on the Variance.
 a) 64, 69, 72, 54, 89, 92, 54, 32

Mean	$526/8 = 65.75$
Median	66.5
Mode	54
Range	$92 - 32 = 60$
Variance is high or low?	

→ 32 54 54 64 69 72 89 92
 $\frac{64+69}{2} = 66.5$

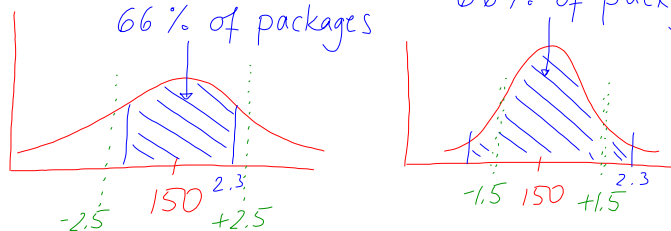
→ high because the data is spread out

5. **Packaging Cookies:** Two machines at a Cookie company package cookies in 150 g pouches. If any package is more than 2.3g from the mean, the package is considered defective. At the end of the day, both machines are averaging cookie packages that are 150 g but **one machine** is producing more defects than the other. Which is it?

Recall: Standard deviation is a measure of the **variance** of the data from the mean.

	Mean	Standard deviation
Cookie Machine #1	150 g	± 2.5 g *
Cookie Machine #2	150 g	± 1.5 g

When SD is high the data is more spread out.
 less than 66% of packages
 more than 66% of packages



Quadratics

1. Fill in the chart (some boxes have been filled in for you...)

Parabola	Direction of Opening	Maximum or Minimum	Vertex	Step Pattern	Optimum value	Axis of symmetry
$y = (x - 2)^2 + 6$				1, 3, 5	6	$X = 2$
$y = -2(x + 3)^2$	Down	Max				
$y = -x^2 + 5$						
$y = \frac{1}{2}(x - 5)^2 - 4$						
$y = 3(x - 4)^2 - 1$						

3. Describe the shape relative to $y = x^2$, the orientation, and coordinates of the vertex of each quadratic relation. Graph each relation on the grid provided.

a) $y = 2(x + 2)^2$

b) $y = -0.5x^2 - 3$

Quadratics

1. Fill in the chart (some boxes have been filled in for you...)

Parabola	Direction of Opening	Maximum or Minimum	Vertex	Step Pattern	Optimum value	Axis of symmetry
$y = (x - 2)^2 + 6$	up	min	(2, 6)	1, 3, 5	6	$X = 2$
$y = -2(x + 3)^2$	Down	Max	(-3, 0)	-2, -6, -10	0	$X = -3$
$y = -x^2 + 5$	down	max	(0, 5)	-1, -3, -5	5	$X = 0$
$y = \frac{1}{2}(x - 5)^2 - 4$	up	min	(5, -4)	$\frac{1}{2}, \frac{3}{2}, \frac{5}{2}$	-4	$X = 5$
$y = 3(x - 4)^2 - 1$	up	min	(4, -1)	3, 9, 15	-1	$X = 4$

3. Describe the shape relative to $y = x^2$, the orientation, and coordinates of the vertex of each quadratic relation. Graph each relation on the grid provided.

a) $y = 2(x + 2)^2$

b) $y = -0.5x^2 - 3$


narrow
(-2, 0)

wide
(0, -3)

10. An arch at the entrance to a tunnel is in the shape of a parabola. The shape of the arch can be modelled by the relation $h = -0.5x^2 + 8$, where h is the height above the road and x is the horizontal distance, both in metres.

- a) What is the vertex of the arch? _____
- b) What is the meaning of the coordinates of the vertex in this context?
- c) What is the height of the opening at a distance 2 m from the max height? (Hint $x=2$)
- d) A truck is carrying a large crate 4 m wide by 8 m high. Can the truck pass through the tunnel? Explain.

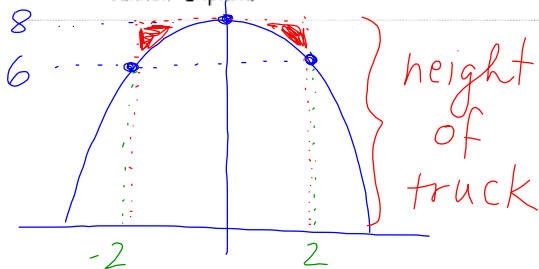
10. An arch at the entrance to a tunnel is in the shape of a parabola. The shape of the arch can be modelled by the relation $h = -0.5x^2 + 8$, where h is the height above the road and x is the horizontal distance, both in metres.

- a) What is the vertex of the arch? (0, 8)
- b) What is the meaning of the coordinates of the vertex in this context?
highest part → middle 
- c) What is the height of the opening at a distance 2 m from the max height? (Hint $x=2$)

$$h = -0.5(2)^2 + 8$$

$$= 6$$

- d) A truck is carrying a large crate 4 m wide by 8 m high. Can the truck pass through the tunnel? Explain.



width of truck

∴ truck can't pass through

Exponentials

1. Evaluate. Express as integers or fractions. (NO decimal answers!)

a) 3^3 b) $(-5)^3$ c) 8^0 d) $(-7)^{-3}$ e) 6^{-4}

2. Write as a single, positive power using exponent rules.

a) 9×9^3 b) $(3^2)^3$ c) $\frac{7^{35}}{7^{29}}$ d) $2^{-8} \times (2^6)^2$

e) $\frac{6^{54} \times (6^{33})^0}{6^{25} \times 6^{22}}$

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

Exponentials

1. Evaluate. Express as integers or fractions. (NO decimal answers!)

a) 3^3 b) $(-5)^3$ c) 8^0 d) $(-7)^{-3}$ e) 6^{-4}

27 -125 1 $= \frac{1}{(-7)^3} = -\frac{1}{343}$ $\frac{1}{6^4} = \frac{1}{1296}$

2. Write as a single, positive power using exponent rules.

a) 9×9^3 b) $(3^2)^3$ c) $\frac{7^{35}}{7^{29}}$ d) $2^{-8} \times (2^6)^2$

9^4

3^6

7^6

$2^{-8} (2^{12})$

e) $\frac{6^{54} \times (6^{33})^0}{6^{25} \times 6^{22}}$

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

$= 2^4$

$$\frac{6^{54} \times 1}{6^{51}}$$

$= 6^3$

$$\begin{aligned} & 3^2 \div 3^{-2} \\ & = 3^{2 - (-2)} \\ & = 3^4 \end{aligned}$$

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5. Pembroke's population has been growing exponentially since the year 2000! The expected population can be estimated using the relation $P = 14\,250(1.013)^n$, where "P" is the population and "n" is the number of years since the year 2000.

- How fast is Pembroke's population growing?
- What is Pembroke's expected population this year (2015)?

5. Pembroke's population has been growing exponentially since the year 2000! The expected population can be estimated using the relation $P = 14\,250(1.013)^n$, where "P" is the population and "n" is the number of years since the year 2000.

- How fast is Pembroke's population growing? $0.013 = 1.3\%$
- What is Pembroke's expected population this year (2015)?

$$14\,250(1.013)^{15}$$
$$= 17\,296.4$$

$\therefore 17\,296$ people

Finance

$$I=PRT$$

$$A=P(1+i)^n$$

$$PV=A(1+i)^{-n}$$

1. Jack borrowed \$5000 at an annual simple interest rate of 6% for 3 years.
 - a. How much interest will he pay?
 - b. How much does he need to pay back all together?

3. How much must Reena invest at an annual **simple interest** rate of 8% in order to earn \$200 in interest over 260 days?

Finance

$$I=PRT$$

$$A=P(1+i)^n$$

$$PV=A(1+i)^{-n}$$

1. Jack borrowed \$5000 at an annual simple interest rate of 6% for 3 years.

- a. How much interest will he pay?

$$I = 5000(0.06)(3)$$

$$= 900$$

- b. How much does he need to pay back all together?

$$5000 + 900$$

$$= 5900$$

3. How much must Reena invest at an annual **simple interest** rate of 8% in order to earn \$200 in interest over 260 days?

$$I = Prt$$

$$200 = P(0.08)\left(\frac{260}{365}\right)$$

$$200 = P(0.0569)$$

$$3509.62 = P$$

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4. Dara invested \$6000 at 10% compounded semi-annually. How much money will she have after 15 years?

5. Mia just bought a new vehicle for \$32900 (including extras and other costs). The dealer gave her a 3% discount, and then charged 14% tax. Mia put down a \$5000 down payment and plans on financing the rest.

a) How much will she have to finance?

b) If the interest rate is 7.5%, compounded biweekly for 4 years, how much will she have to pay in total?

4. Dara invested \$6000 at 10% compounded semi-annually. How much money will she have after 15 years?

$$\begin{aligned}
 A &= P(1+i)^n \\
 &= 6000\left(1 + \frac{0.10}{2}\right)^{15(2)} \\
 &= 25931.65
 \end{aligned}$$

5. Mia just bought a new vehicle for \$32900 (including extras and other costs). The dealer gave her a 3% discount, and then charged 14% tax. Mia put down a \$5000 down payment and plans on financing the rest.

a) How much will she have to finance?

$$\begin{array}{r}
 32900 \\
 3\% \quad - \quad 987 \\
 \hline
 14\% \quad + \quad 4606 \\
 \hline
 36519
 \end{array}$$

36519 - 5000 = 31519
∴ \$31519.00

b) If the interest rate is 7.5%, compounded biweekly for 4 years, how much will she have to pay in total?

$$\begin{aligned}
 A &= P(1+i)^n \\
 &= 31519\left(1 + \frac{0.075}{26}\right)^{4(26)} \\
 &= 42527.83
 \end{aligned}$$

∴ \$42527.83

