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UNIT 1: Absolute Value and Radicals (CH. 1)

1) Arrange from least to Greatest

a) $-|4-7|$, $|-(4-7)|$, $-|5-(-3)|$, $-|4|-|-7|$

2) Evaluate each expression without a calculator

(a) $\sqrt[3]{\frac{27}{8}}$

(b) $36^{3/2}$

(c) $\sqrt[4]{(x-4)^4}$

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3) Simplify each radical expression

a) $-3\sqrt{48x^2} + 7\sqrt{75x^2}$

b) $\frac{1}{\sqrt{3}}$

c) $\frac{1}{\sqrt{14}-2}$

d) $\sqrt{x^2 + 4x + 4} - \sqrt{x^2 + 12x - 36}$

e) $\frac{2}{3}\sqrt[3]{54x} + \frac{1}{4}\sqrt[3]{128x}$

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4) Find the Product and Simplify:

(a) $(\sqrt{x+2} + 3)^2$

(b) $\left(\frac{4-\sqrt{32}}{4}\right)^2$

5) Determine the restriction(s), solve, and check solutions for extraneous roots.

a. $\sqrt{10-3x} = \sqrt{2x+20}$

b. $-\sqrt{x+2} = 2$

c. $\sqrt{x+9} = \sqrt{1-x}$

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UNIT 2: Rational Expressions (CH. 2)

1) Simplify the below rational expressions and state any restrictions

a. $\frac{2x^2+x-6}{x^2+4x-5} \cdot \frac{x^3-3x^2+2x}{4x^2-6x}$

b. $\frac{x^2-14x+49}{x^2-49} \div \frac{3x-21}{x+7}$

c. $\frac{\left(\frac{x^2-1}{x}\right)}{\frac{(x-1)^2}{x}}$

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2) Simplify and solve for x in the following equations.

a) $\frac{1}{x-2} + \frac{3}{x+3} = \frac{4}{x^2+x-6}$

b) $\frac{6}{x+2} - \frac{3}{x^2+x-2} = \frac{x}{x^2+3x+2}$

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3. Solve the following word problems:

a) **DISTANCE Problem:** Ed is a runner and he runs a 8 km loop every day. The first 4 km, he runs at 12km/hr. He runs much slower on the way home. If it takes him 1 hour in total to run the loop, how fast is he running for the last 4 km?

b) **WORK Problem:** It takes Louise 2 hours to paint a room and it takes Pete 8 hours to paint the same room. How long does it take them if they paint the room together?

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- c) The sum of a number and its reciprocal is $\frac{10}{3}$, what is the number?

UNIT 3: Trigonometry (CH 3)

1. Given the following trigonometric ratios, draw a triangle, find the missing side and use this to solve for the two missing trigonometric ratios ($\sin \theta$, $\cos \theta$ or $\tan \theta$). HINT: there should be two answer for each. (3 marks each)

a) $\sin \theta = \frac{4}{5}$

Answer:

b) $\tan \theta = -\frac{\sqrt{3}}{\sqrt{13}}$

Answer:

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2. Evaluate exactly (without a calculator) (1 mark each)

| | |
|-----------------------|--|
| a) $\sin 270^\circ =$ | b) $\cos(-45^\circ) =$ |
| c) $\tan 240^\circ =$ | d) $\frac{\sin 135^\circ}{\cos(-225^\circ)}$ |

3. Find all θ for $0^\circ \leq \theta \leq 360^\circ$ that satisfy the given equation. There could be more than one answer! Use the unit circle and/or special triangles! (1.5 marks each)

| | |
|---------------------------------------|------------------------|
| a) $\cos \theta = 0$ | b) $\tan \theta = -1$ |
| c) $\sin \theta = \frac{\sqrt{3}}{2}$ | d) $\cos \theta = 0.5$ |

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4. Use the sine law to solve the following triangles. In the case where there is no triangle, write "no solution." In the case where there is two triangles, solve for both. (2 marks each)

a) $\angle A = 65^\circ, a = 9, b = 11$

Answer:

b) $\angle A = 105^\circ, \angle B = 35^\circ, c = 12\text{cm}$

Answer:

c) $\angle A = 76^\circ, a = 25, b = 20$

Answer:

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5. Determine whether or not you need to use the Sine Law or the Cosine Law to solve the triangle. Then, solve the triangle (watch for no solution and 2 solutions!) (3marks each)

a) $a=8, b=10, c=15$

Answer:

b) $\angle A = 25^\circ, a = 9, b = 20$

Answer:

c) $a = 14, b = 12, \angle C = 35^\circ$

Answer:

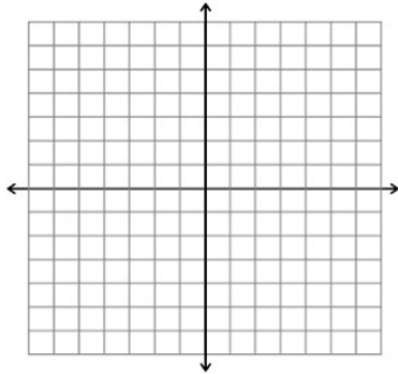
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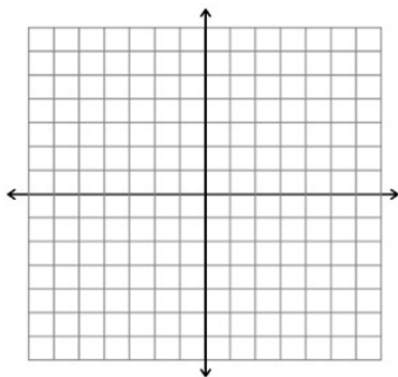
UNIT 4: Factoring and Quadratic Functions (Ch.5)

1. Sketch the graph of the quadratic function. Identify the vertex, axis of symmetry, and x-intercept(s), domain, range and state the maximum or minimum value.

(a) $f(x) = x^2 + 3x + 2$



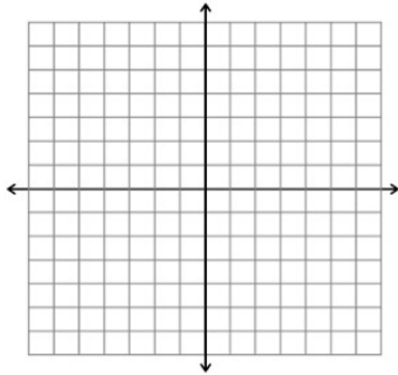
(b) $f(x) = (x + 4)^2 - 3$



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(c) $m(x) = -\frac{1}{3}x^2 + 3x - 6$



2. Write the standard form of the equation of the parabola that has the indicated vertex and whose graph passes through the given point.

a) Vertex: $(-2, 5)$; Point: $(0, 9)$

b) Vertex: $(\frac{5}{2}, -\frac{3}{4})$; x-intercept = -2

3. Write the standard form of the quadratic function that passes through the following 3 points. $(0,2), (6,2), (-8,4)$

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4. **What is the maximum area of a rectangle that can be constructed with a perimeter of 64 cm?**

UNIT 5: Solving Quadratic Equations (CH. 6)

- 1) **Solve the following Quadratic Equations (use the method of your choice)**

a. $(x + 13)^2 = 25$

b. $(2x + 3)^2 - 27 = 0$

c. $(x - 7)^2 = (x + 3)^2$

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d. $\frac{1}{8}x^2 - x - 16 = 0$

e. $3x^2 + 24x + 16 = 0$

f. $\frac{1}{4}x^2 - 2x + 7 = 0$

g. $12x - 9x^2 = -3$

h. $25x^2 + 80x + 61 = 0$

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i. $3x + 4 = 2x^2 - 7$

a. $2x^2 - 3x = 4x + 12$

2. Brian decides to start training for swimming in a river. The current in the river is 4km/hr. If he swims upstream 2 km and then back downstream to where he started in 3 hours, what is his swimming speed?

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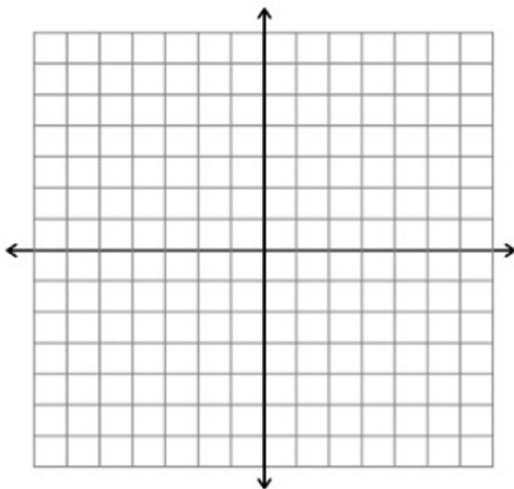
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3. Natasha leaves school at 3pm and she drives north at 40 km/hr. 2 hours later (at 5pm), Alli leaves and she drives East at 50 km/hr. How long does it take before the two cars are 300 km apart?

Unit 6: SYSTEMS OF EQUATIONS (CH. 7)

1. Solve the system of equations and inequalities by graphing. If doing on calculator, sketch an accurate graph.

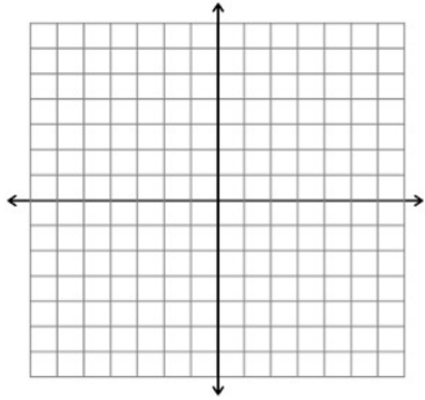
$$\text{a) } \begin{cases} y = x^2 - 2x - 4 \\ y = -\frac{3}{4}x^2 - 4x + 4 \end{cases}$$



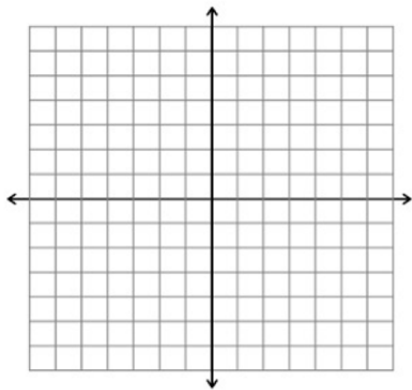
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b)
$$\begin{cases} x^2 + y \leq 7 \\ x \geq -2 \\ y \geq 0 \end{cases}$$



c)
$$\begin{cases} 2x + y > 2 \\ 6x + 3y < 2 \end{cases}$$



d) $-2x^2 + 3x + 4 \geq 0$



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2. Solve the following systems algebraically:

a)
$$\begin{cases} y = -x^2 - 4x + 5 \\ y = -3x + 7 \end{cases}$$

b)
$$\begin{cases} -7x + 6y = -4 \\ 14x - 12y = 8 \end{cases}$$

- a) The profit for a construction company is $P(x) = -0.1x^2 + 50x - 5250$, where x is the total number of hours worked by the employees in a week. What total hours worked by the employees will produce a profit for the company?

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- b) The height in metres of a ball thrown upward from a building is $h(t) = -4.9t^2 + 29.4t + 24.3$, where "t" is the time in seconds after releasing the ball. During what time interval will the ball be above 30 meters?

UNIT 7: Absolute Value, Rational and Reciprocal Functions (CH. 4)

1. Write the absolute value function as a piecewise function:

a) $g(x) = -4|x + 2| + 3$

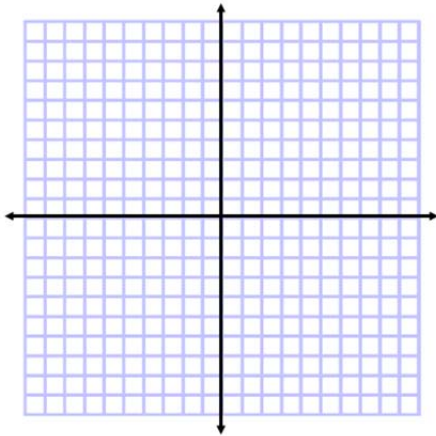
b) $f(x) = \frac{1}{3}|2x - 7| + 9$

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2. Graph the absolute value function. State the vertex, intercepts (x and y), domain and range.

a) $h(x) = -\frac{1}{2}|x - 4| + 4$



3. Solve the following absolute value functions:

a) $|x+3|=-3x$

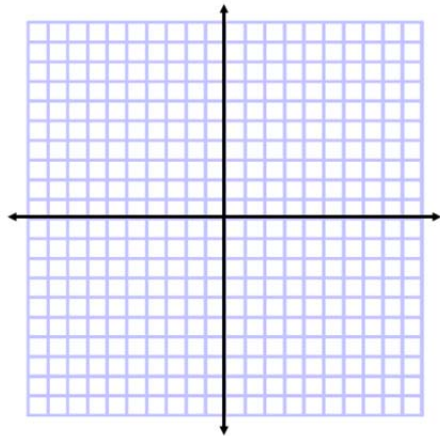
b) $|x-3|=|2x+4|$

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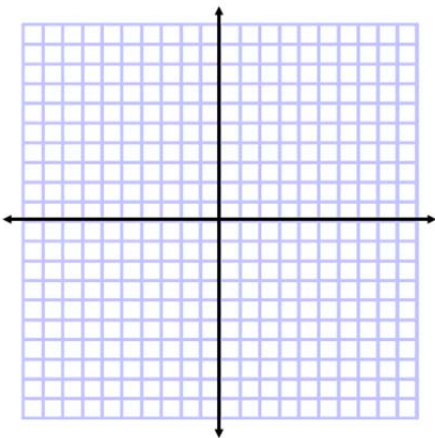
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4. Sketch the following graphs and label both the horizontal and vertical asymptotes. State the domain of each function.

a) $f(x) = \frac{3x}{x-1}$



b) $h(x) = \frac{x^2-1}{x^2+2x-3}$

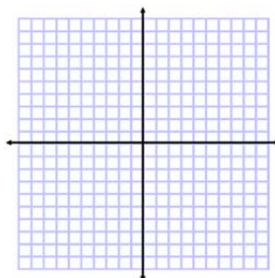
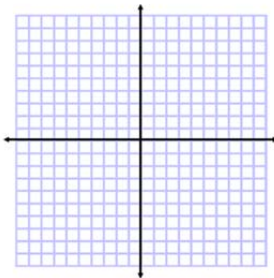
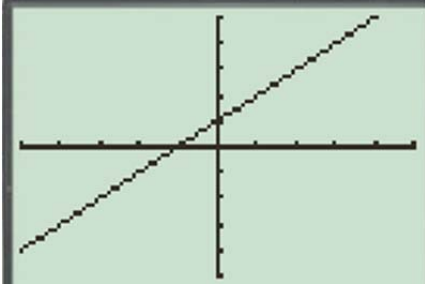


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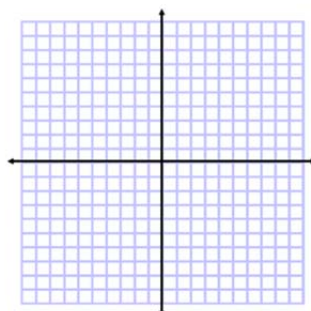
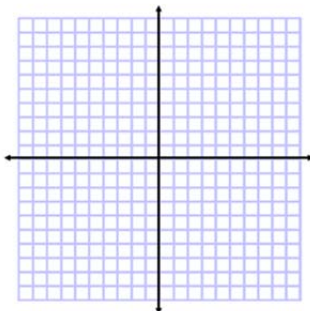
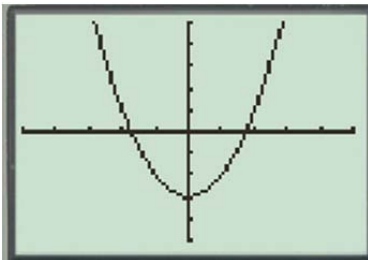
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5. Given the following graph of $y = f(x)$, sketch the graph of $y = \frac{1}{f(x)}$ and the graph of $y = |f(x)|$

a)



b)



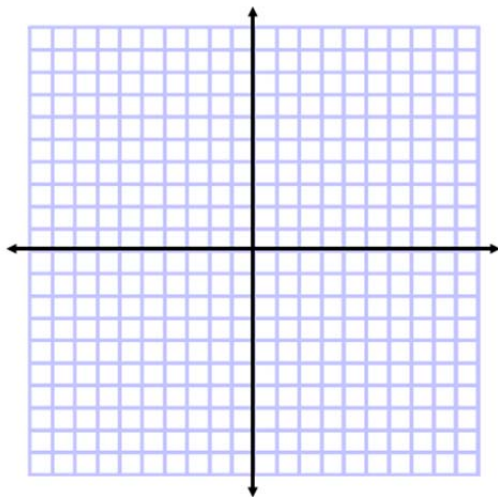
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6. Sketch a graph of a rational function that has the following characteristics.

a)

| | |
|----------------------|----------|
| x-intercept | -1 |
| y-intercept | -2 |
| Vertical Asymptote | $x=-2.5$ |
| Horizontal Asymptote | $y=-3.5$ |



UNIT 8: Sequences and Series (CH. 8)

1. Given the series defined by $\sum_{k=2}^{15} 16 \left(\frac{1}{2}\right)^{k-1}$, determine the common ratio, the number of terms and the sum.

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- 2. Find the 14th term of the sequence {3,11,19....}**
- 3. Three consecutive terms of a geometric sequence are 2.5, $y+3$ and 9.6. Find the value of y .**
- 4. Compute the sum of the first 8 terms in the sequence {1,-3, 9.....}**
- 5. How can you tell whether or not an infinite geometric series has a finite or an infinite sum?**
- 6. Find the 18th term in an arithmetic sequence who's 2nd term is 11 and who's 8th term is 41.**

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7. Find the 9th term in a geometric sequence who's first term is 6 and who's 4th term is -3/4.

8. Calculate the sum of the infinite geometric series given by

$$\sum_{k=2}^{\infty} 8\left(-\frac{1}{2}\right)^{k-1}$$

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Formulas

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$t_n = ar^{n-1}$$

$$x = -\frac{b}{2a}$$

$$S_n = \frac{a(1 - r^n)}{1 - r}$$

$$y = c - \frac{b^2}{4a}$$

$$S_n = \frac{a}{1 - r}$$

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

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

$$t_n = a + (n - 1)d$$

$$S_n = \frac{n}{2}(2a + (n - 1)d)$$