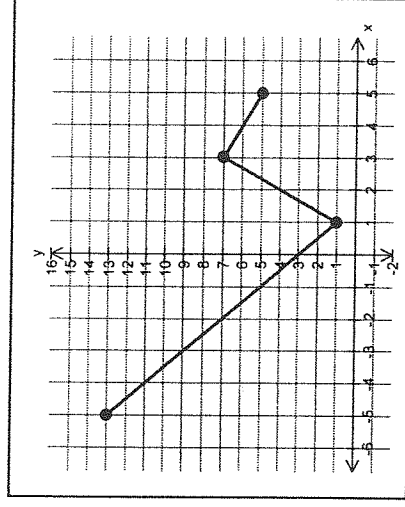


EXAM REVIEW

The Exam Review is not to be considered comprehensive ... be sure to review all course material (ie worksheets, quizzes, tests, etc ...)

Introducing Functions (Chapter 1)

1. Determine:
 - a) $f(-2)$ if $f(x) = 3x^2 - 5$
 - b) $f(a^2 + 1)$ if $f(x) = \sqrt{x + 3}$
2. Determine $f^{-1}(x)$ given:
 - a) $f(x) = 2x - 3$
 - b) $f(x) = 2x^2 - 5$
 - c) $f(x) = 2x^2 - 12x + 22, x \geq 3$
3. The graph of a function, $f(x)$, contains the point $(2, \frac{1}{3})$. Determine the corresponding point on the graph of $f^{-1}(x)$.
4. Describe the transformations required to obtain the graph of $y = -2f(-3x + 3) - 5$ from the graph of $y = f(x)$.
5. Given the graph of $y = f(x)$ sketch the graphs of:
 - a) $y = -3f(x)$
 - b) $y = f(\frac{1}{2}x)$
 - c) $y = -f(-\frac{1}{2}x - 2) + 3$
 - d) $y = f^{-1}(x)$
6. Given the function $f(x) = -\sqrt{x + 4}$, determine the domain and range.
7. Determine whether the:
 - i) following relations are functions.
 - ii) inverses of the following relations are functions
 - a) $y = \sqrt{25 - x^2}$
 - b) $x^2 - y + 7 = 0$
 - c) $3x + 2y^2 - 4 = 0$
 - d) $(1.5), (-3.7), (4, -8), (-9.5)$
 - e) $f(x) = 3(2)^x$
 - f) $y = 3 \sin(x - 50^\circ)$
8. Given $f(x) = k(x+5)$, find k if $f^{-1}(24) = -11$.



Rational Expressions and Quadratic Functions (Chapters 2 and 3)

1. For of each of the following quadratics determine the:
 - i) vertex.
 - ii) domain and range.
 - a) $y = 8(x - 6)^2 + 3$
 - b) $f(x) = -4x^2 - 3x + 2$
2. Alex threw a baseball to Michelle so that the height of the baseball is given by the function $h(t) = 1 + 20t - 5t^2$ where h is the height, in m, and t is the elapsed time, in s, from the time the ball was thrown.
 - a) From what height was the ball thrown?
 - b) If the ball was caught at the same height from which it was thrown, how long was the ball in the air?
 - c) Complete the square to determine the maximum height of the ball.
3. The demand function for a new product is $p(x) = -3x + 25$ and the cost function is $C(x) = 7x + 15$.
 - a) Determine the revenue function.
 - b) Determine the profit function.
 - c) What level of production will maximize profits?
 - d) At what production level(s) will the company break even?

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4. Determine the number of zeroes of each of the following quadratics.
- $f(x) = x^2 - 4x + 3$
 - $f(x) = x^2 - 4x + 4$
 - $f(x) = -3(x+7)^2 - 5$
 - $f(x) = 3(x-6)^2$
 - $f(x) = x^2 - 4x + 9$
 - $f(x) = 5(x+2)^2 - 4$
5. Express each of the following as mixed radicals:
- $\sqrt{48}$
 - $3\sqrt{72}$
6. Determine the value of k so that the graph of $y = (x-3)^2 - 4 + k$ has only one x -intercept.
7. Solve, $x \in R$.
- $x^2 - 4x = 5$
 - $2x^2 - 5x - 7 = 0$
 - $-5x^2 + 2x + 1 = 0$
8. Determine a possible quadratic equation which has one root of $5 - \sqrt{2}$.
9. Given $f(x) = x^2 + 2x - 8$:
- Determine $[f^{-1}(x)]$. Hint: Write $f(x)$ in vertex form first.
 - Graph both $f(x)$ and $[f^{-1}(x)]$ on the same set of axes.
10. Simplify:
- $\frac{4x}{(x+3)^2} + \frac{3}{x+3}$
 - $\frac{x}{3x-6} - \frac{2}{x^2-4}$
 - $\frac{2x^2}{x+4} \div \frac{x^2+4x}{x^2+8x+16}$
 - $\frac{x^2-1}{4x^2-1} \cdot \frac{4x^2+8x+3}{x+1} \div \frac{2x+3}{2x-1}$
 - $\frac{1}{x-1} - \frac{1}{x}$
 - $\frac{x-5}{4x^3} + \frac{x+5}{16x}$
11. Simplify: Express answers with least positive radicand.
- $10\sqrt{8} + 6\sqrt{98} - \sqrt{128}$
 - $\sqrt{2}(7\sqrt{8} - 4\sqrt{2})$
 - $\frac{8\sqrt{30}}{2\sqrt{5}}$
12. Determine the coordinates of the vertex:
- $y = \frac{7}{13}x^2 - \frac{5}{3}x - 5$
 - $y = -\frac{6}{5}x^2 - \frac{9}{4}x - 11$

Periodic Functions and Trigonometry (Chapters 5 and 6)

1. One cycle of the graph of a periodic function, $y = f(x)$, is shown below.
- State the period.
 - State the amplitude.
 - State the equation of the axis of curve.
 - Extend the graph for one more cycle.
 - Determine $f(75)$.
-
2. Given the point $P(3, -6)$ is on the terminal arm of an angle, θ , in standard position, determine:
- the three primary trigonometric ratios
 - the related acute angle to the nearest degree
 - the measure of θ to the nearest degree
3. Solve for $0^\circ \leq \theta \leq 360^\circ$
- $\cos \theta = 0.7281$
 - $\tan \theta = -7.8211$
 - $\sec \theta = -\frac{5}{3}$

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4. Solve for $0^\circ \leq \theta \leq 360^\circ$:
 - a) $\cos \theta = \frac{1}{\sqrt{2}}$
 - b) $2 \sin \theta + \sqrt{3} = 0$

5. Given $y = -3 \cos\left(\frac{1}{2}\theta - 30^\circ\right) + 1$:
 - a) State the amplitude.
 - b) State the period.
 - c) State the phase shift.
 - d) State the vertical displacement.
 - e) Sketch the graph for one full cycle.

6. Evaluate $2(\sin^2 \theta + \cos^2 \theta)$

7. Prove each of the following identities:
 - a) $\tan^2 \theta = \sin^2 \theta(1 + \tan^2 \theta)$
 - b) $\sin \theta \tan \theta + \cos \theta = \sec \theta$

8. Evaluate exactly:
 - a) $\sin 240^\circ$
 - b) $\cos 135^\circ$
 - c) $\tan(-150^\circ)$
 - d) $\sin 330^\circ$

9. Solve, $0^\circ \leq \theta \leq 360^\circ$, to the nearest degree:
 - a) $4 \tan \theta = 3$
 - b) $15 \sin^2 \theta + \sin \theta = 6$

10. Solve, $0^\circ \leq \theta \leq 360^\circ$, to the nearest degree.
 - a) $5 \cos \theta + 4 = 0$
 - b) $3 \tan \theta - 7 = 10 \tan \theta + 2$
 - c) $2 \cos \theta = \sqrt{3}$
 - d) $\tan \theta = -\sqrt{3}$
 - e) $2 \sin \theta \cos \theta + \sin \theta + 2 \cos \theta + 1 = 0$

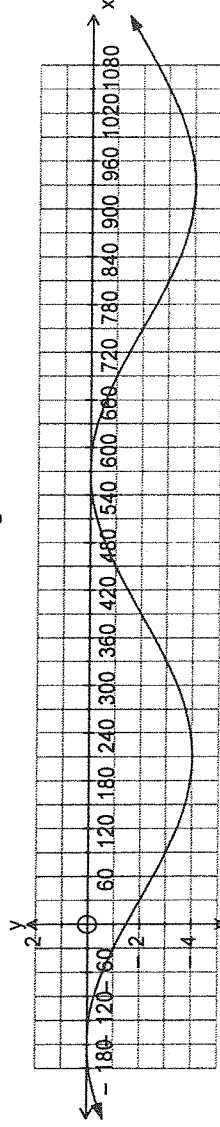
11. Solve $\triangle ABC$ if $\angle B = 42^\circ$, $a = 15$ cm and $b = 11$ cm.

12. A hot air balloon is anchored to the ground by ropes on either side. The ropes are anchored 150 m apart along the ground. If one of the ropes is 90 m and forms an angle of 37° with the ground, determine:
 - a) the length of the other rope (to the nearest metre).
 - b) the height of the balloon above the ground (to the nearest metre).

13. A helicopter is hovering 200 m directly above the top of a forest observation tower. From the helicopter a fire is sighted at an angle of depression of 22° and from the top of the tower the fire is sighted at an angle of depression of 18° . How far is the fire from the base of the tower (to 1 decimal place)?

14. The tides on the 7th moon of Walkooder are at their highest (29m) at 4:00 am earth time. They are at their lowest (13m) at noon earth time. Let $t=0$ represent midnight.
 - a) Determine an equation that models the tides.
 - b) How high is the tide at 4:24 pm earth time?
 - c) When is the tide at 17m?

15. Determine an equation to model the following curve:



Exponential and Discrete Functions (Chapters 4, 7, and 8)

1. The first term of a sequence is -5 and the common ratio is 2.
 - a) List the first 3 terms of the sequence.
 - b) State the general term.

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2. In a theatre, seats are arranged so that the first row has 29 seats, the second row has 32 seats, the third row has 35 seats, ...
 - a) If the last row has 80 seats, how many rows are in the theatre?
 - b) What is the total number of seats in the theatre?

3. Given the general term, $T_n = 4n - 66$, determine:
 - a) the first two terms of the sequence
 - b) the sum of the first ten terms.

4. a) Kate was offered a summer job for 10 weeks. For the first week she will earn \$300, the second week \$310, the third week \$320 and so on. How much will she earn in total for the 10 weeks?
 b) Luke was also offered a job for 10 weeks. For the first week he will earn \$300. He will be given a 3% raise for each of the succeeding weeks. Who will have earned more money at the end of the 10 weeks?

5. Given the sequence -2, 6, -18, ...
 - a) state the general term.
 - b) Determine the tenth term.

6. Evaluate (express your answers as fractions):
 - a) $16^{\frac{3}{4}}$
 - b) $3^{-1} + 3^0$
 - c) $\sqrt[3]{\frac{8}{27}}$
 - d) $9^{\frac{1}{2}} \cdot 7^{-1}$

7. Simplify:
 - a) $x^{\frac{3}{4}} \div x^{\frac{1}{4}}$
 - b) $\frac{\left(x^{\frac{1}{4}}\right)^8}{x^{-2}}$
 - c) $\left(\frac{3x^2}{y^{-1}}\right)^{-2} \left(\frac{2y^2}{3x}\right)^3$

8. Solve:
 - a) $16^{x+3} = \left(\frac{1}{2}\right)^{10x}$
 - b) $5^{2x+1} = 5^9$
 - c) $\left(\frac{1}{4}\right)^{x-2} = \left(\frac{1}{8}\right)^{x+1}$
 - d) $\left(\frac{1}{27}\right)^{3x-4} = 81(9)^{x+6}$

9. Express $\sqrt[3]{8}$ as a power of 2.

10. Draw the graphs of the following functions on the same set of axes:
 - a) $f(x) = 3^x$
 - b) $g(x) = 2(3^{x-4}) + 2$
 - c) $y = f^{-1}(x)$

11. Use Pascal's triangle to expand $(2x - 5)^5$.

12. There are 5400 red ants in a particular colony. If there were 1200 ants in the colony 8 months ago, what is the monthly growth rate?

13. Radiocarbon has a half-life of 5600 years. A piece of excavated wood has $\frac{1}{8}$ the amount of radiocarbon that a newly cut piece of the same kind of wood has. How old is the piece of excavated wood?

14. Mr. Mooder deposits \$250 into an account earning 11%/a compounded quarterly. How much will he have in 13.5 years?

15. Ms. Walker remembers an old account which earned 7%/a compounded monthly she started with a lump sum deposit 25 years ago. If the account currently has \$13205.30, and she hasn't made a deposit in 19 years, how much did the account have immediately following that last deposit?

Please also ensure that you have corrected all your tests and quizzes. For additional review, look at worksheets given to you throughout the year and the chapter reviews in the text book ... particularly the three cumulative reviews which follow every third chapter!