Name: _____

MHF 4U1 - PRACTICE EXAMINATION

This is a practice exam. It does not cover all the material in this course and should not be the only review that you do in preparation for your final exam. Your exam may contain questions that do not appear on this practice exam. Ideally, this should be completed after you have completed the final exam review so that you can get a feel for how long your exam will be.

PART A: Fill in the blanks

Place the simplified answer in the space provided. 1 mark each = 24 marks total

1. When $f(x) = x^3 + 3x^2 - 6x + 1$ is divided by $x - 2$, the remainder is _____ .

2. Write in exponential form: $\log_4 1024 = 5$ _____

3. Write in logarithmic form: $2^8 = 256$ _____

4. Evaluate: (a) $\log_3 729$ = _____ (b) $\log_2\left(\frac{1}{64}\right)$ = _____

5. Convert the following into radians: 60^o = _____

6. Convert the following into degrees: $\frac{4\pi}{5}$ = _____

7. Determine all values for θ, $0 \le \theta \le 2\pi$, if $\cos\theta = 0.2588$ θ = _____ or θ = _____

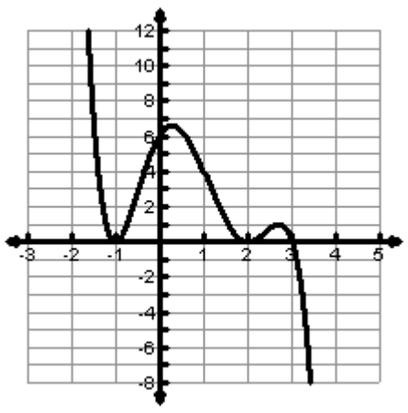
8. Determine the exact values of:

(a) $\cos\frac{\pi}{6}$ = _____ (b) $\sin 225^0$ = _____ (c) $\sec\left(\frac{7\pi}{4}\right)$ = _____

9. Write in the following in terms of its co-related angle:

(a) $\sin 75^o$ = _____ (b) $\cos\left(\frac{3\pi}{4}\right)$ = _____

10. For the following graph, decide if:
(a) the degree of the function is even or odd, and (b) if the leading coefficient is positive or negative.



(a) Degree: _____

(b) Leading Coeff: _____

Decide whether the following statements are true or false.

11. $x - 3$ is a factor of $f(x)$ if $f(-3) = 0$ _____

12. The function $y = \frac{x^2 - 1}{x - 1}$ has point discontinuity at $x = 1$. _____

13. The function $y = \frac{2}{x + 3}$ has a vertical asymptote at $x = -3$. _____

14. The function $y = \frac{3x - 1}{x + 2}$ has a horizontal asymptote at $y = 3$. _____

12. $\cos x \cos 4x - \sin x \sin 4x = \cos(-3x)$ _____

13. $2\sin(5x)\cos(5x) = \sin(10x)$ _____

14. $\cos^2(2\theta) - \sin^2(2\theta) = \cos(\theta)$ _____

PART B: Full Solutions
All steps must be shown. Marks will be deducted for poor form. 61 total marks.

1. Solve for x:

④ (a) $4x^3 - 12x^2 - x + 3 = 0$

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④ (b) $3x^3 + 15x^2 - 42x > 0$

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④ (c) $\log_7(x+1) + \log_7(x-5) = 1$

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④ (d) $2^{x^2} = (16^{x-1})(2^x)$

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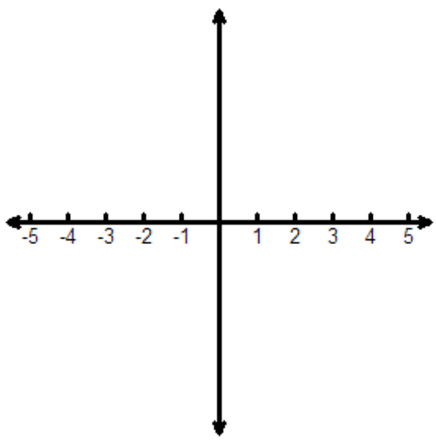
④ (e) $3\sin^2 x - 8\sin x - 3 = 0,\ 0 \le x \le 2\pi$

1. con't Solve for x:

④ (f) $\dfrac{3}{2x+1}-\dfrac{x+2}{3x-1}=\dfrac{x-3}{2x+1}$

③ 2. ***Sketch*** the function $f(x) = 2x(x + 3)^2(x - 4)$

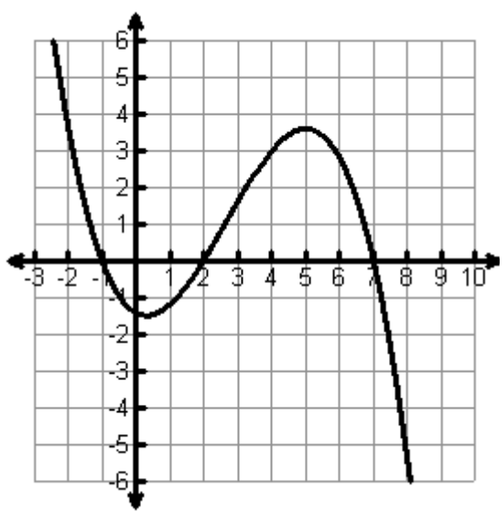


③ 3. Given: $f(x) = x^2 + 2x - 5$ and $g(x) = 3x - 1$ determine $(f \circ g)(x)$:

4. Use the ***graph*** to determine:

② (a) the average rate of change between $x = 2$ and $x = 6$

② (b) the instantaneous rate of change at $x = 4$



5. The displacement of an object, in metres, is given by $f(t) = 5t^3 - 4t^2 + t - 3$, where t is time in seconds.

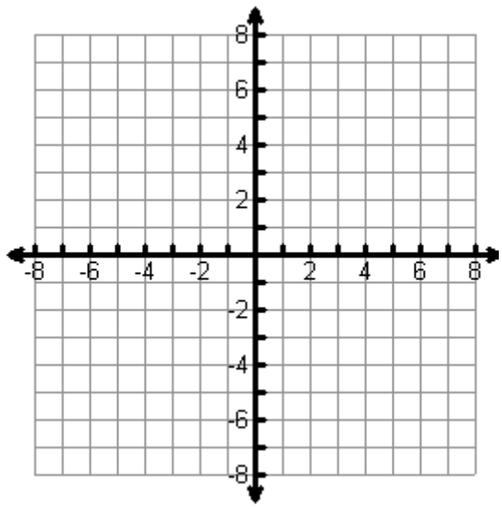
③ (a) Find the average rate of change of displacement with respect to time from $t = 1s$ to $t = 4s$.

③ (b) Determine the instantaneous rate of change of displacement with respect to time at $t = 4$s. (Use an h value of 0.01.)

⑦ 6. For $y = \dfrac{2x-3}{x+1}$,

(a) determine the x– and y- intercepts

(b) determine the equations of any vertical and/or horizontal asymptotes



(c) sketch the function on the grid provided.

③ 7. The temperature of a Starbuck's coffee after n minutes is given by $T = 72(0.85)^n + 20$.
How long does it take for the coffee to cool to a temperature of 70°?

④ 9. For $f(x) = \sin(2x + \frac{\pi}{2}) + 2$:

(a) Complete a table of values for the "key" points. (b) Sketch the starting function.
(c) Write a mapping formula. (d) Determine the translated "key" points.
(e) Sketch the new graph. ***Be sure to fill the grid with as many cycles as will fit.***

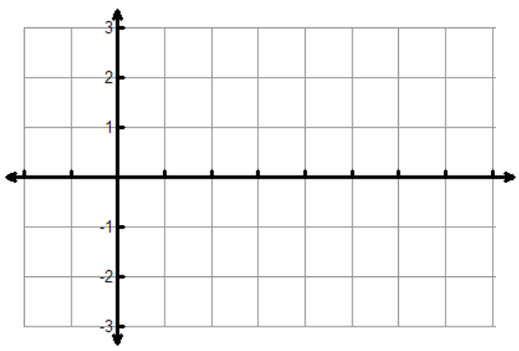
(a)

x	$f(x) = \sin x$
0	
$\frac{\pi}{2}$	
π	
$\frac{3\pi}{2}$	
2π	

(d)

x	$f(x)$

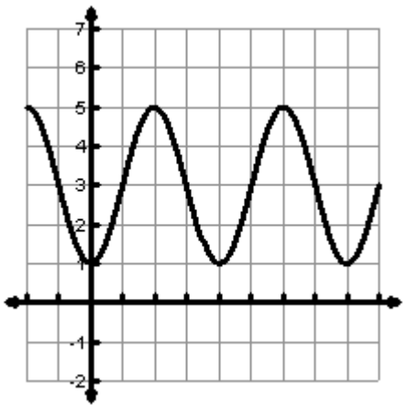
(b) & (e)



x axis scale: 1 square = $\frac{\pi}{4}$

(c) $(x, y) \rightarrow$ _____

③ 10. Determine the equation of a trig function that models the graph below:



x axis scale: 1 square = $\frac{\pi}{6}$

④ 11. Prove: $\sin x \tan x = \sec x - \cos x$

84 Marks Total