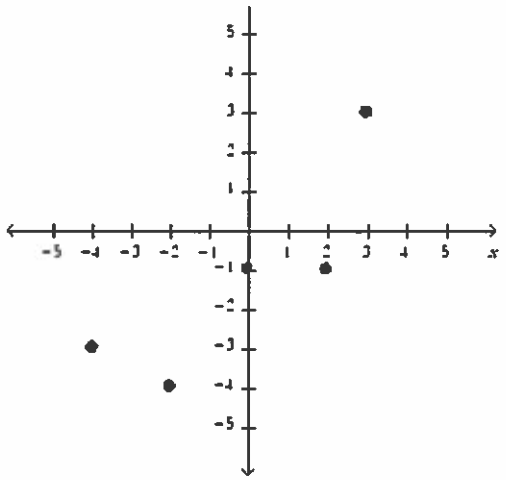
MCR3U Extra Questions 2014 - 2015 sem 2



____ 1. The graph of $y = h(x)$ is shown.

Evaluate $h(x) = -4$, determine x.

a. –4
b. -3
c. 0
d. -2

____ 2. The graph of $y = h(x)$ is shown.

Evaluate $h(-4) + h(3)$.

a. 0
b. 2
c. 1
d. 3

____ 3. What are the domain and range of the function $d(x) = 5(x - 9)^2 - 32$?

a. Domain = $\{x \in \mathbf{R}\}$
Range = $\{y \in \mathbf{R} \mid y \geq 0\}$

b. Domain = $\{x \in \mathbf{R}\}$
Range = $\{y \in \mathbf{R} \mid y \geq -32\}$

c. Domain = $\{x \in \mathbf{R}\}$
Range = $\{y \in \mathbf{R} \mid y \geq -842\}$

d. Domain = $\{x \in \mathbf{R}\}$
Range = $\{y \in \mathbf{R}\}$

____ 4. Which of the following are factors for the polynomial $6x^2 + 36x + 54$?

a. $(2x + 6)(3x + 3)$
b. $6(x + 3)(x + 3)$
c. $3(x + 6)(x + 3)$
d. $6(x + 9)(x + 6)$

____ 5. What are the restrictions on the variable for $\frac{18n^5}{27n^2}$?

a. $n \neq -1$
b. $n \neq 0$
c. $n \neq 1$
d. No restrictions

____ $\left(\frac{6x^2 - 54y^2}{x^2 + 4xy - 21y^2}\right)$fy.

a. $6(-4y)$
b. $\frac{5x^2 - 33y^2}{4xy}$
c. $\frac{6(x + 3y)}{(x + 7y)}$
d. $\frac{6(x - 3y)}{(x + 7y)}$

____ 7. What are the restrictions on the variable of th $\frac{3f}{f^2 - 4} \div \frac{f}{f + 1}$ own?

a. $f \neq -2, -1, 2$
b. $f \neq -2, 0, 2$
c. $f \neq -2, 2$
d. No restrictions

____ 8. What is the equation of the parabola with x-intercepts 1 and 3, and that passes through $(-1, 16)$?

a. $f(x) = 2(x - 1)^2 + 3$
b. $f(x) = x^2 + 4x + 3$
c. $f(x) = 2x^2 - 8x + 6$
d. $f(x) = -x^2 + x + 16$

____ 9. How many points of intersection do the functions $f(x) = -3x^2 + 12$ and $g(x) = 2x + 4$ contain?

a. None
b. One
c. Two
d. More than two

____ 10. What are the points of intersection for the functions $f(x) = -2x^2 + 8$ and $g(x) = x + 8$?

a. (0, 0), (8, 8)
b. (0, 8)
c. (8, 8)
d. There are no points of intersection.

____ 11. Which of the following is equivalent to the expression $12^{-4} \cdot \frac{12^2}{(12^3)^1}$?

a. $\frac{1}{12^4}$
b. $\frac{1}{12^9}$
c. 12^9
d. 12

____ 12. Evaluate. $\left(\frac{12^{\frac{6}{7}}}{12^{\frac{4}{7}}}\right)^{-3}$

a. $\frac{1}{512}$
b. $\frac{1}{64}$
c. $\frac{1}{8}$
d. $\frac{1}{4}$

____ 13. Which of the following functions represents $f(x) = 9^x$ after a reflection on the x-axis and a vertical translation 5 units down?

a. $g(x) = -\left(9^{x-5}\right)$
b. $g(x) = 9^{-x+5}$
c. $g(x) = -\left(9^x\right) - 5$
d. $g(x) = -\left(9^x\right) + 5$

____ 14. Which of the following is a transformation applied to the base function of $f(x) = 6\left(8^{-x-2}\right) - 4$?

a. A horizontal translation 2 units to the right.
b. A horizontal stretch by the factor 6.
c. A reflection on the x-axis.
d. A vertical translation 2 units down.

____ 15. A bucket contains 425 mL of water. The capacity of water in the bucket increases 4.8% each hour. Which equation models the situation?

a. $C(t) = 425(1.048)^t$
b. $C(t) = 425(4.8)^t$
c. $C(t) = 425(0.952)^t$
d. $C(t) = 425(0.048)^t$

____ 16. Angle θ lies in quadrant 3. Without using a calculator, determine which ratio is valid.

1) $\sin\theta = 0.789$
2) $\tan\theta = -0.573$
3) $\sin\theta = -1.083$
4) $\tan\theta = 0.841$

a. 1)
b. 2)
c. 3)
d. 4)

____ 17. Given $\cos 170°$, determine which of the following is an equivalent expression.

a. $\cos 190°$
b. $\cos 10°$
c. $\cos 350°$
d. $\cos 280°$

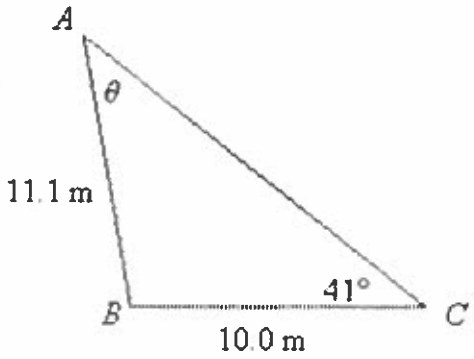
____ 18. Determine the correct simplification of the expression $(1+\cos\alpha)(1-\cos\alpha)$.

a. $1-\sin^2\alpha$
b. $\cos^2\alpha$
c. $\sin^2\alpha$
d. $1+\cos^2\alpha$

____ 19. Determine the correct simplification of the expression $\tan^2\alpha\cos^2\alpha+\cos^2\alpha$.

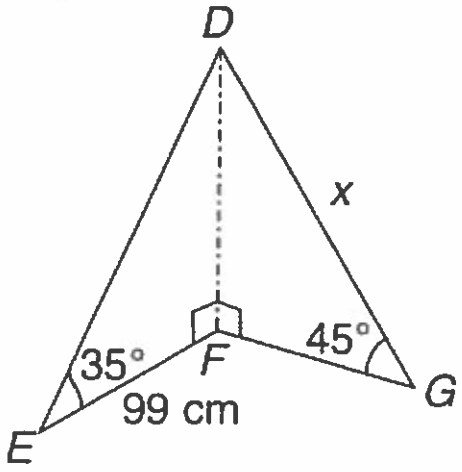
a. $\sin^2\alpha$
b. $\cos^2\alpha$
c. $\sin^2\alpha+\cos^2\alpha$
d. 1

____ 20. Determine the measure of the angle θ to the nc



a. $\theta = 47°$
b. $\theta = 39°$
c. $\theta = 36°$
d. $\theta = 41°$

____ 21. Determine the value of x to the nearest cm.



a. 47 cm
b. 68 cm
c. 74 cm
d. 98 cm

____ 22. Frank is riding a Ferris wheel, where t is time in seconds. Suppose the Ferris wheel is 20 m tall. Let $h(t) = 10\cos(12t)$ represent the height of Frank in m above or below the centre of the Ferris wheel. How long does it take to make two complete cycles on the Ferris wheel? Assume there are no stops.

a. 60 s
b. 30 s
c. 45 s
d. 120 s

____ 23. Determine the equation of a sine function that would have a range of $\{y \in \mathbf{R} | 6 \le y \le 9\}$ and a period of $60°$.

a. $y = 3\sin(12x) + 6$
b. $y = 3\sin(12x) + 9$
c. $y = 1.5\sin(6x) + 7.5$
d. $y = \sin(6x) + 9$

____ 24. A sinusoidal function has an amplitude of 0.75 units, a period of $1440°$, and a maximum at $(0, -3)$. Determine an equation of the function.

a. $y = 0.25\cos(0.25x) - 3.75$
b. $y = 0.25\cos(0.75x) - 3.75$
c. $y = 0.75\cos(0.25x) - 3.75$
d. $y = 0.75\cos(0.75x) - 3.75$

____ 25. If the first term of a sequence is 3 and the common difference is 4, what is the 23rd term in the sequence?

a. 88
b. 87
c. 95
d. 91

____ 26. What is the general term of the sequence: 6, 42, 294, 2058,14406, ...

a. $t_n = 6(7)^n$
b. $t_n = 6(6)^{n-1}$
c. $t_n = 6(7)^{n-1}$
d. $t_n = 7(6)^{n-1}$

____ 27. Determine S_{26} for the series: $-452 - 396 - 340 - 284 - \ldots$

a. 6448
b. 7176
c. 12298
d. 6200

____ 28. Determine the sum of the geometric series $3 + 15 + 75 + 375 + \ldots + 46\,875$.

a. 58 593
b. 11 718
c. 19 531
d. 292 968

____ 29. Expand the binomial $(2x + 1)^4$.

a. $16x^4 + 32x^3 + 24x^2 + 8x + 1$
b. $16x^4 + 8x^3 + 4x^2 + 2x + 1$
c. $x^4 + 8x^3 + 24x^2 + 32x + 16$
d. $x^4 + 4x^3 + 6x^3 + 4x + 1$

____ 30. How much is the future value of an investment of \$6300 at 2.6%/a compounded weekly for 1.5 years?

a. \$6347.31
b. \$6420.81
c. \$6550.49
d. \$6800.98

1. D 2. A 3. B 4. B 5. B

6. C 7. B 8. C 9. C 10. B

11.	D	12.	B	13.	C	14.	A	15.	A
16.	D	17.	A	18.	C	19.	D	20.	C
21.	D	22.	A	23.	C	24.	C	25.	D
26.	C	27.	A	28.	A	29.	A	30.	C