

me
Advanced Mathematics Final Review Test

Quadratic Formula: $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Part I: Each correct answer will receive 2 credits. Write answers on the provided scan sheet.

1) The expression $x^{-4}(x^3)^{\frac{3}{2}}$ is equivalent to

$x^{-4}(x^3)^{\frac{3}{2}} \rightarrow \frac{x^3}{x^4} = \frac{1}{x}$

1) x

2) $-x$

3) $\frac{1}{x}$

4) $-\frac{1}{x}$

2) A \$20,000 car depreciates by 10% each year. Which equation best models this situation, where t represents the age of the car in years?

(1) $I = 20,000(.1)^t$

(2) $I = 20,000(.9)^t$

(3) $I = 20,000(1.1)^t$

(4) $I = 20,000(1.9)^t$

3) If $\cos \theta > 0$, $\sin \theta > 0$, θ is in what quadrant?



1) I

2) II

3) III

4) IV

4) The expression $5x^2 - 20y^2$ is equivalent to

$5(x^2 - 4y^2) \rightarrow 5(x+2y)(x-2y)$

1) $5(x-y)(x+y)$

2) $5xy(x-y)(x+y)$

3) $5(x-y)(x-y)$

4) $20xy(x-y)(x-y)$

$5(x-2y)(x-2y)$ $5(x-2y)(x+2y)$ $5xy(x-2y)(x+2y)$

right 2, up 3

5) If $f(x)$ is parabola with vertex $(4, -3)$, and $g(x) = f(x-2) + 3$, the vertex of $g(x)$ is

$(6, 0)$

1) $(2, 0)$

2) $(6, 0)$

3) $(2, -6)$

4) $(6, -6)$

6) The expression $x^3 + 3x^2 - 2x - 6$ is equivalent to

- 1) $(x^2 + 3)(x - 2)$ 2) $(x^2 - 3)(x - 2)$ 3) $(x^2 - 2)(x + 3)$ 4) $(x^2 + 2)(x - 3)$

$$\begin{aligned} & x^2(x+3) - 2(x+3) \\ & (x^2 - 2)(x+3) \end{aligned}$$

7) The expression $\sqrt[3]{24x^7}$ is equivalent to

- 1) $2x^6\sqrt[3]{6x}$ 2) $2x^6\sqrt[3]{3x}$ 3) $2x^2\sqrt[3]{6x}$ 4) $2x^2\sqrt[3]{3x}$

$$\begin{aligned} & \sqrt[3]{8x^6} \quad \sqrt[3]{3x} \\ & 2x^2\sqrt[3]{3x} \end{aligned}$$

8) The expression $(3 + i)(4 - 5i)$ is equivalent to

- 1) $17 - 11i$ 2) $17 - 19i$ 3) $7 - 11i$ 4) $7 - 19i$

$$\begin{aligned} & 12 - 15i + 4i - 5i^2 \\ & 12 - 11i + 5 \quad 17 - 11i \end{aligned}$$

9) "If I study hard, I will pass math." Which statement below is logically equivalent?

- $P \rightarrow Q$
- 1) If I don't study hard, I will not pass math
2) If I pass math, I studied hard.
3) If I don't pass math, I didn't study hard. $\sim Q \rightarrow \sim P$
4) If I study hard and pass math, I will be successful in life.

10) The radian equivalent of 240° is

- 1) $\frac{4\pi}{3}$ 2) $\frac{3\pi}{2}$ 3) $\frac{3\pi}{4}$ 4) $\frac{2\pi}{3}$

$$(\cos\theta, \sin\theta)$$

11) If θ intersects the unit circle at $(\frac{3}{5}, \frac{4}{5})$, $\cos\theta =$

- 1) $-\frac{3}{5}$ 2) $\frac{3}{5}$ 3) $-\frac{4}{5}$ 4) $\frac{4}{5}$

12) What is the inverse of $f(x) = 5x + 3$

$$x = 5y + 3$$

$$\frac{x-3}{5} = y$$

1) $f^{-1}(x) = 5x - 3$

2) $f^{-1}(x) = 3x + 5$

3) $f^{-1}(x) = \frac{x-3}{5}$

4) $f^{-1}(x) = \frac{x+5}{3}$

13) The end behavior of the graph of the function $f(x) = -5x^6 + bx^4 - cx^2 - dx + 7$, is

1) $x \rightarrow -\infty, f(x) \rightarrow \infty$

$x \rightarrow \infty, f(x) \rightarrow \infty$

2) $x \rightarrow -\infty, f(x) \rightarrow \infty$

$x \rightarrow \infty, f(x) \rightarrow -\infty$

3) $x \rightarrow -\infty, f(x) \rightarrow -\infty$

$x \rightarrow \infty, f(x) \rightarrow \infty$

4) $x \rightarrow -\infty, f(x) \rightarrow -\infty$

$x \rightarrow \infty, f(x) \rightarrow -\infty$

neg + even

↓ ↓

remainder = 0

14) Which is a factor of $x^3 - 2x^2 - 13x + 6$?

~~1) $x+1$~~ 2) $x+2$ 3) $x+3$ 4) $x+4$

$$x+3=0$$

$$x=-3$$

$$\begin{array}{r|rrrr} -3 & 1 & -2 & -13 & 6 \\ & \downarrow & -3 & 15 & -6 \\ \hline & 1 & -5 & 2 & 0 \end{array}$$

Part II: Each correct answer will receive 4 credits. Show all work on the answer sheet. Partial credit will be awarded:

15) Simplify Completely: $\frac{(x+3)x}{(x+3)^{x+2}} - \frac{2(x+2)}{x+3(x+2)}$

$$\frac{x^2 + 3x - \widehat{(2x+4)}}{(x+2)(x+3)} \rightarrow \frac{x^2 + x - 4}{(x+2)(x+3)}$$

16) Factor: $2x^2 - x - 6$

$$x^2 - x - 12$$

$$\left(\frac{x-4}{2}\right)\left(\frac{x+3}{2}\right) \rightarrow (x-2)(2x+3)$$

17) Divide $6x^3 - 19x^2 + 19x - 7$ by $3x - 2$ and state the remainder as a fraction.

$$3x - 2 = 0$$

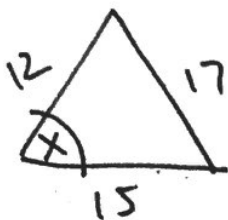
$$3x = 2$$

$$x = \frac{2}{3}$$

$$\begin{array}{r} \frac{2}{3} \overline{) 6 \ -19 \ 19 \ -7} \\ \underline{\downarrow \ 4 \ -10 \ 6} \\ 6 \ -15 \ 9 \ -1 \end{array}$$
$$6x^2 - 15x + 9 - \frac{1}{3x-2}$$

18) Given a triangle with sides 12, 15, 17

a. Find, to the nearest tenth, the measure of the largest angle of the triangle.



$$17^2 = 12^2 + 15^2 - 2(12)(15)\cos x$$

$$289 = 369 - 360\cos x$$

$$-80 = -360\cos x$$

$$\boxed{x = 77.2^\circ}$$

b. Find the area of the triangle to the nearest square unit.

$$A = \frac{1}{2}ab \sin C$$

$$A = \frac{1}{2}(12)(15)\sin 77.2$$

$$= \boxed{88}$$